GOVERNMENT OF KARNATAKA
DEPARTMENT OF TECHNICAL EDUCATION
Board of Technical Examinations, Bengaluru

Course Title	: **COMMUNICATION SKILLS IN ENGLISH**	Course Code	: **15CP01E**
Semester	: **I / II**	Course Group	: **Core**
Teaching Scheme (L:T:P)	: **4:0:0** (in hours)	Credits	: **4 Credits**
Type of course	: **Theory**	Total Contact Hours	: **52**
CIE	: **25 Marks**	SEE	: **100 Marks**

Pre-requisites:

- Basic Knowledge of Grammar
- Listening, Speaking, Reading and Writing Skills as acquired in Secondary Education

Course Objectives:

The students shall be able to:

- Learn to apply the basic grammar in day to day communication in English
- Comprehend the given ideas in a passage and be able to effectively express the same in written form
- Enrich their vocabulary through reading
- Face oral examinations and interviews
- Express their ideas creatively through (spoken/written) exercises

Course Delivery:

The Course will be delivered through lectures, class room interactions, exercises and case studies as detailed below:

Sl. No.	Description	Teaching contact hours
1.	Text	24
2.	Grammar	18
3.	Descriptive writing	5
4.	Comprehension	5
Total		**52**

Text book: Communication Skills in English for Polytechnics – by **ORIENT BLACKSWAN** publishers – published by NITTTR Chennai

UNIT I: CAREER PLANNING (09Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Spelling; Grammar- Parts of Speech; Newspaper Reading and Comprehension; Descriptive Writing – Describing Objects; Listening/ Speaking Exercise – Self Introduction.

UNIT-II: THE GREAT INDIAN PSYCHOTHERAPY (09Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Prefixes and Suffixes; Grammar – Articles and Prepositions; Descriptive Writing – Describing People; Listening/ Speaking Exercises – Listening to speeches and writing gist of it in one's own words.

UNIT III: GLOBAL WARMING (08Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Synonyms and Antonyms; Grammar – Auxiliaries, Question Tags and Short-form Answers; Descriptive Writing – Describing Places; Listening/ Speaking Exercises – Narrating one's own experiences of different situations in their day- to-day life.

UNIT IV: RENDEZVOUS WITH A WOMAN CORPORATE GIANT (09Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Homonyms, Homophones, Homographs; Grammar – Subject-Verb Agreement; Descriptive Writing – Describing Processes; Listening/ Speaking Exercises – A short presentation on a given topic ;Paraphrasing of Proverbs; Different kinds of Interviews.

UNIT V: A UNIQUE PATIENT (09 Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Compound words; Grammar –Tenses; Descriptive Writing – Describing Events (Eg: College Day, National Festivals, Etc.); Comprehension of a paragraph; Quiz – Questions on health and hygiene.

UNIT VI: A FARMER'S WIFE (08 Hrs)

Glossary; Comprehension Exercises; Vocabulary Exercises – Formation of plurals; Grammar – Active and Passive Voices; Descriptive Writing – Describing one's goal and its attainment; Developing hints into a paragraph; Comprehension of an unseen passage.

Reference Books:

1. **HIGH SCHOOL ENGLISH GRAMMAR AND COMPOSITION** BY WREN AND MARTIN (S.CHAND & CO.)
2. **THE KING'S GRAMMAR** BY SANJAY KUMAR SINHA (S.CHAND & CO.)
3. **STRENGTHEN YOUR WRITING** BY V.R. NARAYANA SWAMY (ORIENT BLACKSWAN)

4. **ESSENTIAL ENGLISH** BY E. SURESH KUMAR et.al (ORIENT BLACKSWAN)
5. **ENGLISH GRAMMAR &COMPOSITION AND EFFECTIVE BUSINESS COMMUNICATION** BY M.A.PINK AND THOMAS S.E. (S.CHAND & CO.)

6. **WHAT YOUNG INDIA WANTS: SELECTED ESSAYS AND COLUMNS** BY CHETAN BHAGAT (RUPA PUBLICATION, NEW DELHI)

7. **CHICKEN SOUP FOR THE INDIAN DOCTOR'S SOUL** BY JACK CANFIELD et.al (WESTLAND LIMITED PUBLISHERS)

8. **SOFT SKILLS** BY K. ALEX(S.CHAND AND COMPANY)
9. **"REFLECTIONS":** I PUC ENGLISH COURSE BOOK, PUBLISHED BY DEPT.OF PRE-UNIVERSITY EDUCATION, GOVT OF KARNATAKA

10. **A PRACTICAL COURSE FOR WRITING SKILLS IN ENGLISH**BY J.K.GANGAL. (PHI PUBLICATIONS)

11. **ENGLISH LANGUAGE LABORATORIES** – A COMPREHENSIVE MANUAL BY NIRA KONAR (PHI LEARNING)

Course outcomes:

On successful completion of the course, the student will be able to:

1. Read their text, and respond to basic comprehension questions

2. Enhance the students' English grammar skills by using the following grammatical components in written and verbal communication

   - Parts of speech
   - Auxiliaries
   - Articles
   - Tenses
   - Active and Passive voice
   - Prepositions
   - Question Tags and Short form answers
   - Prefixes and Suffixes
   - Subject-Verb Agreement
   - Homonyms/Homophones/ Synonyms /Antonyms

3. Communicate an idea in series logically connected sentences by describing an event such as objects, people, places, processes, expanding proverbs and also conducting activity such as group discussion, presentation, reporting and documentation

4. Comprehend the given passage and able to answer the linked questions

Mapping Course Outcomes with Program Outcomes:

CO –PO Mapping

CO	Course Outcome	PO Mapped	Cognitive Level	Theory Sessions	Allotted marks on cognitive levels			TOTAL
					R	U	A	
CO1	Read their text, and respond to basic comprehension questions	5, 6, 7,9	R/U	24	30	25	-	55
CO2	Enhance the student English grammar skills by using the following grammatical components in written and verbal communication • Parts of speech • Auxiliaries • Articles • Tenses • Active and Passive voice • Prepositions • Question Tags and Short form answers • Prefixes and Suffixes • Subject-Verb Agreement • Homonyms/Homophones/ Synonyms /Antonyms	9	U/A	18	-	16	25	41
CO3	Communicate an idea in series logically connected sentences by describing an event such as objects, people, places, processes, expanding proverbs and also conducting activities such as group discussion, presentation, reporting and documentation	7,8,9,10	U/A	7	-	-	15	15
CO4	Comprehend the given passage and able to answer the linked questions	8,9,10	U/A	3	-	10	-	10
		Total Hours of instruction		52	**Total marks**			121

R-Remember; U-Understanding; A-Application

Course outcomes –Program outcomes mapping strength

Course	Program Outcomes									
	1	2	3	4	5	6	7	8	9	10
COMMUNICATION SKILLS IN ENGLISH	-	-	-	-	3	3	3	1	3	1

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Question Paper Blue Print:

Course: COMMUNICATION SKILLS IN ENGLISH
Course code: 15CP 01E

Sl. No.	Content	Knowledge	Comprehension	Application	Total
1.	**TEXT**				**55**
a	Lesson	30	25		
2.	**GRAMMAR**				**41**
a	Parts of speech			4	4
b	Auxiliaries: Primary and Modals			3	3
c	Articles			3	3
d	Identification of tenses			4	4
e	Active and Passive voice			4	4
f	Prepositions	4			4
g	Question tags			3	3
h	Short form answers			2	2
i	Prefixes and Suffixes	2			2
j	Homonyms/Homophones/	4			4
k	Synonyms and Antonyms	4			4
l	Agreement of the Verb with its Subject	4			4
3.	**DESCRIPTION WRITING**				**15**
a	Descriptive writing – Describing objects, people and places, Process and Events			15	
4.	**COMPRHENSION**				**10**
a	Comprehension of an unseen passage		10		
	Total	**48**	**35**	**38**	**121**

Question Paper Pattern:

Sl. No.	Source	Question	Type	Marks
1.	Textual Units	Answer any twelve of the following questions in one or two sentences each	15 questions to be asked from 6 Textual Units	12 x 2 = 24
2.	Textual Units	Write short notes on any three of the following	5 questions to be asked from 6 Textual Units	3 x 5 = 15
3.	Grammar	Identify the parts of speech of the underlined words	4 sentences are to be given and word to be identified is underlined	4 x 1= 4
4.	Grammar	Fill in the blanks using suitable Auxiliaries	3 sentences are to be given.	3 x 1= 3
5.	Grammar	Fill in the blanks using suitable Articles	3 sentences are to be given	3 x 1=3
6.	Grammar	Identification of Tenses	4 sentences are to be given	4 x 1= 4
7.	Grammar	Active and Passive Voice: Change the voice of the verb in the following sentences	4 sentences are to be given for changing the voice of the verb	4 x 1= 4
8.	Grammar	Prepositions: Fill in the blanks with appropriate prepositions	4 sentences are to be given	4 x 1= 4
9.	Grammar	Question Tags: Add question tags	3 sentences are to be given	3 x 1= 3
10.	Grammar	Short form answers: Give short form answers	2 sentences are to be given	2 x 1= 2
11.	Grammar	Prefixes and Suffixes: Add Prefixes/Suffixes to the stem words	2 stem words are to be given	2 x 1= 2
12.	Grammar	Homonyms, Homophones and Homographs: Use the following words in your own sentences.	4 words are to be given	4 x 1= 4
13.	Grammar	Synonyms / Antonyms: Give the	2 words each are to be given	

		Synonyms/Antonyms for the following words		2 x 1= 2
14.	Grammar	Agreement of the Verb with its Subject: Fill in the blanks with verbs that agree with their subjects	4 sentences are to be given	4 x 1= 4
15.	Composition	Descriptive Writing: Describe objects, people, places and processes	3 questions are to be given	2 x 5 = 10
16.	Composition	Comprehension of an unseen passage: Read the following passage and answer the questions that follow	Questions to be set for 10 marks	10
	Total	-	-	100

Guidelines for Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weightage of marks fixed for each category. (As per model question paper)
2. The question paper pattern provided should be adhered to.
3. Care must be taken so that there is only one possible answer for all 'fill in the blanks' questions.

Course Assessment and Evaluation:

		What	To Whom	Frequency	Max Marks	Evidence Collected	Course Outcomes
Direct Assessment	**CIE (Continuous Internal Evaluation)**	I A Tests	**Students**	Three tests (average of three tests will be computed)	20	Blue Books	1 and 2
		Class room Assignments		Any one Activity(*)	05	Log of Activity	3
				TOTAL	**25**		
	SEE (Semester End Examination)	End Exam	Students	End Of the Course	100	Answer Scripts at BTE	1 to 4
Indirect Assessment	Student Feedback on course		**Students**	Middle Of The Course	Feedback forms		1 to 3 delivery of the course
	End Of Course Survey			End Of The Course	Questionnaire		1 to 4 Effectiveness of delivery of instructions and assessment

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit. Any decimals shall be rounded off to the next higher digit. **Eg: 15.1** should be rounded of to **16**.

* Class room Assignments: Evaluated for any ONE activity

Suggested list of Tutorial Exercises leading to the Development of Speaking Skills

1. Introducing oneself
2. Discussion about weather
3. Discussion about hobbies
4. Discussing holiday plans
5. Telephonic conversation
6. Talking about favorite sports, movie, TV shows etc.
7. Description about one's goal and its attainment.

8. Any other topic of your/students' choice.

MODEL OF RUBRICS /CRITERIA FOR ASSESSING STUDENT ACTIVITY

RUBRICS FOR ACTIVITY(5 Marks)						
Dimension	**Unsatisfactory**	**Developing**	**Satisfactory**	**Good**	**Exemplary**	**Student Score**
	1	**2**	**3**	**4**	**5**	
Speaks on the given topic	Does not perform any duties assigned to them	Performs very few duties but unreliable	Performs very few duties	Performs nearly all duties	Performs all duties assigned	Ex: 4
Students' Enunciation	Does not enunciate clearly	Enunciation not up to the mark	Enunciation adequate	Enunciation above average	Enunciation extremely good	3
Presentation Skills	Poor presentation	Scope for improvement	Average presentation skills	Presentation effective	Excellent Presentation	2
Submission of Assignment	Does not collect any information relating to the topic	Collects very limited information	Collects some information	Collects much information	Collects a great deal of information	5
Average / Total marks = (4+3+2+5) /4 = 14/4= 3.5 = 4						**4**

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned faculty (course coordinator) for assessing the given activity.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's Taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1.	Remembering	42
2.	Understanding the course	25
3.	Applying the knowledge acquired from course	33

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/ Date and Time	Semester/ Year	Course / Course Code	Max. Marks
Ex: I test/6th week of sem. 10-11 a.m.	**I/II SEM**	**COMMUNICATION SKILLS IN ENGLISH**	**20**
	Year: 2015-16	**Course Code:15CP01E**	

Name of Course Coordinator :   **Units: 2 CO's: 2**

Question No.	QUESTIONS	MARKS	CL	CO	PO
I	**Answer any <u>five</u> of the following in one or two sentences each:** 1. What do you mean by career? 2. Define 'Career Planning'? 3. What should be the major focus of career planning? 4. What are the questions often asked by the young? 5. What are the three traits as identified by the author? 6. How have the content of our films changed? 7. What has startled global experts?	5x 2 = 10	R/U	1	5,7,9
II	**<u>Grammar:</u>** **1. Identify the parts of speech of the underlined words:** a. **<u>All</u>** spoke in his favour. b. Let us **<u>even</u>** the ground. **2. Fill in the blanks with suitable articles:** a. Charlie is ___ European. b. She is ____untidy girl. **3. Fill in the blanks with appropriate prepositions:** a. Caesar was killed ____Brutus____ a dagger. b. We arrived____ Belagavi_____6 o' clock. **4. Add Suffix and Prefix to the following:** _____ nation_____	2 x 1 = 2 2 x 1 =2 4 x 1 = 4 2 x 1 = 2	U /A	2	9

Sources:

UNIT 1: CAREER PLANNING: **SOFT SKILLS** -BY DR. K. ALEX

UNIT 2: THE GREAT INDIAN PSYCHOTHERAPY: **WHAT YOUNG INDIA WANTS: SELECTED ESSAYS AND COLUMNS** - BY CHETAN BHAGAT

UNIT 3: GLOBAL WARMING: AN ESSAY BY DR. B.M.RAVINDRA, RETD. DY. DIR., DEPT. OF MINES AND GEOLOGY

UNIT 4: RENDEZVOUS WITH A WOMAN CORPORATE GIANT**: ESSENTIAL ENGLISH** BY E. SURESH KUMAR et.al.

UNIT 5: A UNIQUE PATIENT: **CHICKEN SOUP FOR THE INDIAN DOCTOR'S SOUL -** BY JACK CANFIELD et.al.

Government of Karnataka
Department of Technical Education, Bengaluru

Course: COMMUNICATION SKILLS IN ENGLISH

Course code: 15CP 01E

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1.	Mrs. Geetha K.	Selection Grade Lecturer	GRICP, Bengaluru
2.	Mr. C.V. Inamdar	Selection Grade Lecturer	Govt. Polytechnic, Belagavi
3.	Mrs. Bharathi Naik	Selection Grade Lecturer	Women's Polytechnic, Mangaluru
4.	Mrs. Rajyashree Srikant	Selection Grade Lecturer	Govt. Polytechnic, Bagepalli
5.	Mrs. Sunitha M.N.	Selection Grade Lecturer	HMS Polytechnic, Tumakuru
6.	Mr. Deepak Dongre	Selection Grade Lecturer	Govt. Residential Women's Polytechnic, Shivamogga

Review committee

	Name	Designation	Institution
1.	Mrs. Rajyashree Srikant	Selection Grade Lecturer	Govt. Polytechnic, Bagepalli
2.	Mrs. Shailaja D.	Lecturer	Women's Polytechnic, Bengaluru

Model Question Paper:

Code: 15CP 01E

I / II Semester Diploma Examination
COMMUNICATION SKILLS IN ENGLISH
(Common to all Diploma programmes)

Time: 3 Hours]   **[Max. Marks: 100**

Note:

    (i)   Answer all the questions as directed.
    (ii)   Spelling and grammatical errors shall be penalized.
    (iii) Answers to Question No. I and II are based on the prescribed text.

I. **Answer any TWELVE of the following in one or two sentences each:**   **2 x 12 = 24**

1. What do you mean by career?
2. Define 'Career Planning'?
3. What should be the major focus of career planning?
4. What are the questions often asked by the young?
5. What are the three traits as identified by the author?
6. How have the content of our films changed?
7. What is Global Warming?
8. How does Global Warming occur?
9. What are the major causes for Global Warming?
10. What was the usual talk when the parents of the children met?
11. What ambition did Nooyi's mother have for her daughter?
12. Who is the sinner according to the poem?
13. Why did the farmer commit suicide?
14. Explain in your own words the reason for the farmer's visit to the clinic.
15. Describe how the doctor fixed the bull's tooth.

II. **Write short notes on any THREE of the following:**   **5 x 3 = 15**

1. How does career planning play a major role in making career choices?
2. How does our environment contribute to our numbness to injustice?
3. Explain in your own words the traditional and modern views of one or two facts expressed in the interview?
4. Explain in your own words the reason for the farmer's visit to the clinic.
5. Why does the farmer's wife resolve to live?

III. GRAMMAR:

1. **Identify the parts of speech of the underlined words:**   **4 x 1= 4**
   a. **All** spoke in his favour.
   b. Let us **even** the ground.
   c. I can **shift** for myself.
   d. She lives in **luxury.**

2. **Fill in the blanks with suitable auxiliaries:**   **3 x 1 =3**
   a. You _____ not use calculators in the exam hall.
   b. _____ I come in sir?
   c. _____ you lend me your scooter?

3. **Fill in the blanks with suitable articles:**   **3 x 1 = 3**
   a. Charlie is ___ European.
   b. She is ____untidy girl.
   c. What is ____matter?

4. **Identify the tense of the verbs in the following sentences:**   **4 x 1 = 4**
   a. I am writing a letter.
   b. Sun rises in the east.
   c. I have done my homework.
   d. She has been learning western music.

5. **Change the voice of the verb in the following sentences:**   **4 x 1 = 4**
   a. Who did this?
   b. The money was lost.
   c. The cat is chasing the mouse.
   d. He was made the king.

6. **Fill in the blanks with appropriate prepositions:**   **4 x 1= 4**
   a. Caesar was killed ____Brutus____ a dagger.
   b. We arrived____ Belagavi_____6 o' clock.

7. **Add suitable question tag:**   **3 x 1=3**
   a. You were late this morning,_____?
   b. I did not hurt you, _____?
   c. Your father is a doctor, _____?

8. **Give short form answers for the following:**   **2 x 1=2**
   a. Does your father smoke? (Negative)
   b. Have you read today's newspaper? (Affirmative)

9. **Add Suffix and Prefix to the following:**   **2 x 1= 2**
   a. _____ nation_____

10. **Frame sentences using each word to bring out the difference in meaning clearly:**

a. (i) Sight   (ii) Site

b. (i) Present   (ii) Present

11. Give Synonyms to the following words: **2 x 1=2**

a. Teach

b. Agree

12. Give Antonyms to the following words: **2 x 1 = 2**

a. War

b. Happy

13. Fill in the blanks with verbs to agree with their subjects: **4 x 1 = 4**

a. Twenty kilometers _____not a long distance.

b. Either you or I_____ mistake.

c. Gold and Silver_____ precious metals

d. The captain with his team _____arrived.

IV. COMPOSITION: (Answer any two in 80 -100 words each)   **5 x 2 = 10**

1. Describe your favorite tourist place.

2. Describe the process of preparing tea.

3. Expand – Work is worship.

V. **COMPREHENSION:**

Read the following passage and answer the questions that follow:

She was all of one-and-a-half years old. Two nurses were holding her down while a third was trying to insert a syringe into a vein to get a blood sample. She was crying loudly, but I was crying even louder. We had no option. It was the fifth day and the fever had not broken; it was imperative that we run the test to rule out typhoid. They finally asked me to leave the room, not just because they were embarrassed at a grown-up crying, but because they thought it would be easier and quicker for the child if the mother was not in the room. They got her out within a few minutes. She jumped into my arms and gave a few more loud wails. Fresh tears streamed down my eyes as we made our way out of the wretched pathology lab. Her paediatrician was getting into the building just then. Between sobs I told him how my daughter had flung the syringe and the lab had to have three attendants on her to collect the sample. As I was talking, my voice broke. To my surprise, Dr. Patel handed me his briefcase and stethoscope, took my girl in his arms and went to the store just a few paces away. He bought her a Cadbury bar and my daughter's face lit up like a million bucks. Gone were the tears, the memory of the syringe, smell of antiseptic, cotton …everything receded to the background as she un wrapped the big bar with her tiny fingers and dug into it with all her heart. I smiled as the angelic doctor handed me my princess.

Meanings of difficult words:

1. **Imperative:** absolutely essential
2. **Wretched:** miserable; unpleasant
3. **Pathology lab:** where the causes and effects of diseases are studied
4. **Receded:** moved back gradually
5. **Paediatrician:** children's doctor
6. **Flung:**(past tense of fling) an act of throwing violently
7. **Attendants:** one who attends

Questions:

1.	How old was the child?	1
2.	What did the nurses have to do to get a blood sample?	2
3.	Why was the mother asked to leave the room?	2
4.	Why does the mother called the pathology lab 'wretched'?	2
5.	How did Dr. Patel calm down the little girl?	2
6.	Suggest a suitable title for this passage.	1

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Model Question Bank:

Course Title : **COMMUNICATION SKILLS IN ENGLISH**	Course Code: **15CP01E**

I. ANSWER IN ONE OR TWO SENTENCES EACH:

1. What do you mean by career?
2. Define 'Career Planning'?
3. What should be the major focus of career planning?
4. List out the benefits of career planning?
5. Identify the guidelines for choosing a career?
6. What are the frequently asked questions about career fields?
7. How do connections help in searching for a suitable job?
8. What are the sample questions asked about a particular job title?
9. What is the role of a career counselor in charting out a career path?
10. List out the factors influencing career decisions?
11. What has startled global experts?
12. What are the questions often asked by the young?
13. What are the three traits as identified by the author?
14. How have the content of our films changed?
15. In what way have we been exposed to corruption from our childhood?

16. How can we contribute to India's progress?
17. What is global warming?
18. How does global warming occur?
19. What are the major causes for Global Warming?
20. What is the quantity of fossil fuel burnt each year?
21. How does the concentration of carbon dioxide in the air increase?
22. Define Greenhouse effect?
23. By burning forests around the world, how much carbon dioxide is added to the atmosphere?
24. What are the steps to be taken to save our environment?
25. What is the possible problem of global warming and its result?
26. What is the effect of global warming?
27. What was the usual talk when the parents of the children met?
28. What ambition did Nooyi's mother have for her daughter?
29. How did Nooyi's mother threaten Nooyi?
30. What good news did Indra Nooyi want to share with her mother?
31. What did Nooyi's mother say when she was told the good news?
32. What lesson did Nooyi learn from her mother?
33. Why does Nooyi's mother take full credit for Nooyi's success?
34. What does Indra Nooyi discover about the language of business in the U.S?
35. What does Indra Nooyi think about herself as a mother?
36. What is the secret of Indra Nooyi's success?
37. How does Indra Nooyi manage time?
38. What is Indra Nooyi's passion?
39. Describe the farmer who visited the dentist's clinic.
41. What was the curious act of the farmer?
42. What request did the farmer make?
43. Why did the doctor almost 'faint in shock'?
44. What did the farmer say when he came back to the clinic?
45. Who do 'you' and 'I' in the poem refer to?
46. Who is the sinner according to the poem?
47. Why did the farmer commit suicide?
48. Explain the meaning of the phrase 'you crossed over'.
49. What are the contrasts depicted by the writer between the farmer's wife and her husband?
50. What memories of her husband trouble her now?

II. ANSWER IN A PARAGRAPH OF NOT MORE THAN 100 WORDS EACH:

1. Write a short note on Guidelines for Choosing a Career.
2. How does career planning play a major role in making career choices?
3. Explain in your own words the first trait of our psyche.
4. How does our environment contribute to our numbness to injustice?
5. Describe the divisiveness that the author talks about.
6. What are the causes and effects of global warming?
7. How does deforestation affect our environment?

8. What information do you gather about Indra Nooyi after going through the interview with Nandan Nilekani?

9. How did Indra Nooyi's mother try to teach her the role of a woman in a family? Do you agree with her?

10. How do you think Indra Nooyi's mother and her husband contribute to her success?

11. What does Indra Nooyi mean when she says "I have to decide every moment in time whether I am going be a mother or a wife or an executive"?

12. Explain in your own words the traditional and modern views of one or two facts expressed in the interview?

13. Explain in your own words the reason for the farmer's visit to the clinic.

14. Describe how the doctor fixed the bull's tooth.

15. Describe the lament of the farmer's wife on her husband's death?

III.GRAMMAR:

1. Fill in the blanks with suitable articles:
a. Dr. Sanjay is ___ dentist.
b. My friend is ___ MLA.
c. Have you ever visited___ Himalayas?
d. Please bring me ___ cup of coffee.
e. He is ___untidy boy.
f. She is __backbone of her organization.
g. He is ___ honour to his profession.
h. Raghu is going to___ mall.
i. ____world is ___happy place.
j. I met___ European at ___ party in ___ friend's house.

2. Fill in the blanks with suitable prepositions:
a. She works __ a big shop __ Jayanagar.
b. There is a book ___ the floor. Put it __ the table.
c. I often see Mrs. Dixit __ the station, waiting __ her train.
d. Mangalore is __ the coast __ the south __ India.
e. My daughter isn't __ work today because she isn't feeling well.
f. There were several people __ the bus stop.
g. Mr. and Mrs. Sharma were __ the shop talking __ the assistant.
h. Yesterday we spent the day __ the country.
i. We had lunch __ a pretty little village.
j. When I was __ the bus stop this morning; I saw two boys __ the church roof.

3. Add appropriate prefixes to form new words:
a. form   b. regular   c. literate   d. accurate   e. operate
f. pure   g. fix   h. technic   i. tone   j. national

4. Add appropriate suffixes to form new words:

a. rich   b. love   c. start   d. beauty   e. differ
f. use   g. cheer   h. attract   i. save   j. slow

5. Give the synonyms of the following:
a. release   b. arrive   c. trap   d. happinesse.   e. large
f. teach   g. change   h. confusion   i. discover   j. charge

6. Give the antonyms for the following:
a. rise   b. increase   c. smiled.   d. strict.   e.sadness
f. full   g. host   h. success   i. discover   j. charge

7. Add the correct question tags to the following statements:
a. It is cold,_____?
b. But it isn't as cold as yesterday, ____?
c. It was very cold yesterday,_____?
d. It hasn't been so cold for a long time, ____?
e. It is snowing in the north, ____?
f. It often snows there, ____?

8. Give short form answers for the following:
a. Does Renu work hard?_____._____.
b. Can you swim?_____._____.
c. Are you angry with me?_____._____.
d. Do you like watching movies?_____._____.
e. Have you met our Prime Minister?_____._____.

9. Fill in the blanks with appropriate words from the brackets:
a. His father-in-law owns a _____ farm. (dairy/diary)
b. Diabetics must take extra care of their _____. (feat/feet)
c. Rekha is a popular ____ of Bollywood.(heroin/heroine)
d. The country was prosperous during the_____of Krishnadevaraya.(rein/reign/rain)
e. You should be_____ in the class. (quite/quiet)

10. Differentiate between the following pairs of words by using each of them in a sentence of your own:
a. Wrong, rung   b. Principal, principle   c. Hair, hare
d. Gate, gait.   e. Sea, see   f. Fair, fare
g. Some, sum.   h. Sell, cell   i. Weather, whether
j. Birth, berth   k. Vacation, vocation   l. Bear, bare

11. Fill in the blanks with verbs to agree with their subjects:

a. Every seat in the bus _____ taken.
b. All the seats in this bus _____ reserved.
c. One of my friends _____ visiting me this week end.
d. Neither Gopal nor Deepak _____ come today.
e. The Captain of Indian team as well as his players _____ staying here.
f. Intelligence and hard work _____ required to get good marks.
g. Mathematics _____ my favourite subject.
h. _____ your father and mother at home?

12. Identify the tense of the verbs in the following in the sentences.

a. He was listening to her attentively.
b. Raghu denies stealing my purse.
c. She has bought a flat near my house.
d. Kiran fought bravely.
e. The teachers are discussing the details of the annual day function.
f. I am not trying to copy you.
g. Sushma was cooking pasta.
h. The students have been waiting eagerly for the results.
i. Risheeba speaks Tamil very fluently.
j. I have been waiting for her for over an hour.

13. Change the voice:

a. Ramu was making a kite.
b. Close the door.
c. Cable wires have been cut.
d. We prohibit smoking.
e. Everyone loves him.
e. My watch was lost.
f. He was refused admission.
g. Do not insult the poor.
h. Without effort nothing can be gained.
i. They made him captain.

****

Course Title: **ENGINEERING MATHEMATICS – I**	Course Code : **15SC01M**
Semester : **I**	Core / Elective : **Core**
Teaching Scheme in Hrs (L:T:P) : **4:0:0**	Credits : **4 Credits**
Type of course : **Lecture + Assignments**	Total Contact Hours : **52**
CIE : **25 Marks**	SEE : **100 Marks**
Programmes: **Common to all Engineering Diploma Programmes**	

Pre-requisites:

Basics in Algebra, Trigonometry and Coordinate Geometry in Secondary Education.

Course Objectives:

1. Apply the concept of matrices and determinants and their applications to solve the linear equation in engineering field.
2. Apply the vector algebra in solving the problems of statics and mechanics.
3. Analyse the civil engineering problems using concepts of probability.
4. Evaluate the advanced engineering mathematical problems using logarithms.
5. Apply and evaluate trigonometric concept in vector engineering field.
6. Create the basic concept of calculus.

Course Content:

Topic and Contents	Hours	Marks
LINEAR ALGEBRA		
UNIT-1: MATRICES AND DETERMINANTS	10	31
(a) Matrices: Basic concepts of matrices: Definition, types of matrices and mathematical operations on matrices (addition, subtraction and multiplication of matrices).	02	
(b) Determinant: Definition, problems on finding the determinant value of 2nd and 3rd order. Problems on finding unknown quantity in a 2nd and 3rd order determinants using expansion. Solving simultaneous linear equations using determinant method (Cramer's rule up to 3rd order).	04	

(c) Inverse and applications of matrices: Minors and Cofactors of elements of matrix. Adjoint and Inverse of matrices of order 2nd and 3rd order. Elementary row and column operations on matrices. Characteristic equation and characteristic roots (eigen values) of 2x2 matrix. Statement of Cayley-Hamilton theorem and its verification for 2x2 matrix. Solution of system of linear equations using Gauss Elimination method (for 3 unknowns only).	04	

ALGEBRA

UNITS-2: VECTORS	08	27
Definition of vector. Representation of vector as a directed line segment. Magnitude of a vector. Types of vectors. Position vector. Expression of vector by means of position vectors. Addition and subtraction of vectors in terms of line segment. Vector in plane and vector in a space in terms of unit vector i, j and k respectively. Product of vectors. Scalar product and vector product of two vectors. Geometrical meaning of scalar and vector product. Applications of dot (scalar) and cross (vector) products. Projection of a vector on another vector. Area of parallelogram and area of triangle. Work done by force and moment of force.		
UNITS-3: PROBABILITY AND LOGARITHMS	08	14
(a) **Probability:** Introduction. Random experiments: outcomes and sample space. Event: Definition, occurrence of an event, types of events. Algebra of events- complementary event, the events A or B, A and B, A but not B, mutually exclusive events, exhaustive events, defining probability of an event. Addition rule of probability. Conditional probability: definition, properties of conditional probability, simple problems.	06	
(b) **Logarithms:** Definition of common and natural logarithms. Laws of logarithms (no proof). Simple problems on laws of logarithms.	02	

TRIGONOMETRY		
UNIT-4: ALLIED ANGLES AND COMPOUND ANGLES.	16	47
(a) Recapitulation of angle measurement, trigonometric ratios and standard angles. **Allied angles:** Meaning of allied angle. Signs of trigonometric ratios. Trigonometric ratios of allied angles in terms of θ. Problems on allied angles. (b) **Compound angles:** Geometrical proof of sin(A+B) and cos(A+B) and hence deduce tan(A+B). Write the formulae for sin(A-B), cos(A-B) and tan(A-B), problems. Multiple and sub multiple angle formulae for 2A and 3A. Simple problems. Transformation formulae. Expression for sum or difference of sine and cosine of angles into product form. Expression for product of sine and cosine of angles into sum or differences form.	02 06 08	
UNIT-5:COMPLEX NUMBERS	04	09
Meaning of imaginary number i and its value. Definition of complex number in the form of $a + ib$. Argand diagram of complex number $a + ib$ (Cartesian system). Equality of complex numbers. Conjugate of complex number. Algebra of complex numbers, modulus of complex number, principal value of argument of complex number, polar form: $Z = r(cos\theta + i\ sin\theta)$ and exponential form $Z = re^{i\theta}$ of complex number, where r is modulus and θ is principal value of argument of complex number.		
UNIT-6: INTRODUCTION TO CALCULUS	06	17
Limits: Constants and variables. Definition of function. Types of functions: Explicit and implicit function, odd and even functions(definition with example). Concept of $x \rightarrow a$. Definition of limit of a function. Indeterminate forms. Evaluation of limit of functions by factorization, rationalization. Algebraic limits. Statement of $\lim\limits_{x \to a} \frac{x^n - a^n}{x-a} = na^{n-1}$ where n is any rational number. Proof of $\lim\limits_{\theta \to 0} \frac{sin\theta}{\theta} = 1$ where θ is in radian. Related problems. Standard limit (statement only) 1. $\lim\limits_{x \to 0} \frac{a^x - 1}{x} = \log_e a,$ 2. $\lim\limits_{x \to 0} \frac{e^x - 1}{x} = 1$ 3. $\lim\limits_{n \to \infty} \left(1 + \frac{1}{n}\right)^n = e,$ 4. $\lim\limits_{n \to 0}(1 + n)^{\frac{1}{n}} = e$ Simple problems on standard limits.		
TOTAL	**52**	**145**

Course outcomes:

On successful completion of the course, the student will be able to:

1. Find the product of matrices, value of determinants, and inverse of matrix and solve the simultaneous linear equation.
2. Find the product of vectors and their geometrical applications in finding moment of force, work done.
3. Determine probability of various types of events.
4. Solve the problems related to logarithms.
5. Solve the problems on trigonometric functions with angle of any magnitude.
6. Evaluate the limiting value of algebraic and trigonometric functions.

Mapping Course Outcomes with Program Outcomes:

CO	Course Outcome	PO Mapped	Cognitive Level	Theory Sessions	Allotted marks on cognitive levels			TOTAL
					R	U	A	
CO1	Find the product of matrices, value of determinants, and inverse of matrix and solve the simultaneous linear equation	1,2,3	R/U/A	10	9	10	12	31
CO2	Find the product of vectors and their geometrical applications in finding moment of force, work done	1,2,3	R/U/A	8	6	15	6	27
CO3	Determine probability of various types of events	1,2,	R/U/A	8	3	5	6	14
CO4	Evaluate the integrations of algebraic, trigonometric and exponential function	1,2,3,10	R/U/A	16	15	20	12	47
CO5	Solve the problems related to logarithms.	1,2	R/A	4	3	0	6	09
CO6	Evaluate the limiting value of algebraic and trigonometric functions	1,2,10	R/U/A	6	6	5	6	17
		Total Hours of instruction		52	**Total marks**			145

R-Remember; U-Understanding; A-Application
Course outcomes –Program outcomes mapping strength

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Engineering Mathematics-I	3	3	3	-	-	-	-	-	-	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Reference:

1. NCERT Mathematics Text books of class XI and XII.
2. Karnataka State PUC mathematics Text Books of I & II PUC by H.K. Dass and Dr.Ramaverma published by S.Chand & Co.Pvt.Ltd.
3. CBSE Class Xi & XII by Khattar&Khattar published PHI Learning Pvt. ltd.,
4. First and Second PUC mathematics Text Books of different authors.
5. www.freebookcentre.net/mathematics/introductory-mathematics -books.html

Course Assessment and Evaluation:

The Course will be delivered through lectures, class room interaction, exercises and self-study cases.

Method	What		To whom	When/where (Frequency in the course)	Max Marks	Evidence collected	Contributing to course outcomes
DIRECT ASSMENT	*CIE	Internal Assessment Tests	Student	Three tests (Average of Three tests will be computed).	20	Blue books	1 to 6
		Assignments		Two Assignments based on CO's (Average marks of Two Assignments shall be rounded off to the next higher digit.)	5	Log of record	1 to 6
				Total	25		
	*SEE	Semester End Examination		End of the course	100	Answer scripts at BTE	1 to 6
INDIRECT ASSESSMENT	Student feedback		Students	Middle of the course	-NA-	Feedback forms	1 to 3, delivery of the course
	End of Course survey			End of course		Questionnaire	1 to 6, Effectiveness of delivery of instructions and assessment methods

*CIE – Continuous Internal Evaluation   *SEE – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering	25
2	Understanding	40
3	Applying the knowledge acquired from the course	30
	Analysis and Evaluation	5

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM	**ENGINEERING MATHEMATICS –I**	20
	Year:	Course code: **15SC01M**	

Name of Course coordinator :   Units:__ CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Model Question Paper:

Code: 15SC01M

I Semester Diploma Examination

ENGINEERING MATHEMATICS –I
(Common to All Engineering Diploma Programmes)

Time: 3 Hours.][Max marks: 100

Note:

    (i)   Answer any **Ten** questions from **section-A,** any **Eight** questions from **section-B** and any **Five** questions from **section-C.**

    (ii)   Each question carries **3** marks in **section-A**.

    (iii)   Each question carries **5** marks in **section-B**.

    (iv)   Each question carries **6** marks in **section-C**.

SECTION – A

1. Find the product of $A = \begin{bmatrix} 2 & 3 & 1 \\ 0 & -1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 \\ -1 \\ 5 \end{bmatrix}$

2. If $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 5 & 1 \\ 0 & -3 \end{bmatrix}$ find adj(AB).

3. If $A + B = \begin{bmatrix} 3 & -7 \\ 0 & 2 \end{bmatrix}$, $A - B = \begin{bmatrix} 1 & 5 \\ 4 & -6 \end{bmatrix}$ find A.

4. If $\vec{a} = i + 2j - 3k$, $\vec{b} = 3i - 5j + 2k$. Find the magnitude of $2\vec{a} + 3\vec{b}$.

5. If $\vec{A}$=(3,-4), $\vec{B}$= (-5,6) find position vector of A and B and also find $\left|\overrightarrow{AB}\right|$

6. Three coins are tossed simultaneously. List the sample space for event.

7. If $\sin \theta = -\,^{8}/_{17}$ and $\pi < \theta < \frac{3\pi}{2}$ find the value of $4\tan\theta + 3\sec\theta$.

8. Find the value of $\sin 75^{o}$ using standard angles.

9. Show that $\frac{cosec(180-A)\cos(-A)}{\sec(180+A)\cos(90+A)} = cot^{2}A$

10. Prove that $\sin(A + B) \sin(A - B) = \sin^{2} A - \sin^{2} B$.

11. Prove that $\frac{\sin 3A}{\sin A} - \frac{\cos 3A}{\cos A} = 2$.

12. Express the product $(1 + i)(1 + 2i)$ in $a + ib$ form and hence find its modulus.

13. Evaluate : $\lim\limits_{x\to 3} \left[\frac{x-1}{2x^{2}-7x+5}\right]$

14. Evaluate: $\lim\limits_{x\to\infty} \left[\frac{3x^{2}+4x+7}{4x^{2}+7x-1}\right]$

SECTION – B

1. Find the value of x if $\begin{vmatrix} 1 & x & 0 \\ 2 & -1 & 3 \\ -2 & 1 & 4 \end{vmatrix} = 0$.

2. Find the characteristic equation and its roots of a square matrix $A = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$

3. Find the *sine* of the angle between the vectors $2i - j + 3k$ and $i - 2j + 2k$.

4. If vector $\vec{a} = i + j + 2k$, $\vec{b} = 2i - j + k$ show that $\vec{a} + \vec{b}$ perpendicular $\vec{a} - \vec{b}$.

5. Find the projection of $\vec{a} = 2i + j - k$ on $\vec{b} = 2i - 3i + 4k$.

6. Prove that $\dfrac{1}{\log_a abc} + \dfrac{1}{\log_b abc} + \dfrac{1}{\log_c abc} = 1$

7. Find the numerical value of $\sin\left(\dfrac{\pi}{3}\right).\cos\left(-\dfrac{\pi}{3}\right) - \cos\left(\dfrac{\pi}{4}\right).\sin\left(-\dfrac{3\pi}{4}\right)$

8. Prove that $\sin(A + B) = \sin A \cos B + \cos A \sin B$ geometrically

9. If $A + B + C = \dfrac{\pi}{2}$, prove that $\tan A \tan B + \tan B \tan C + \tan C \tan A = 1$.

10. Show that $\dfrac{\sin 56^o - \sin 44^o}{\cos 56^o + \cos 44^o} = \cot 82^o$

11. Evaluate: $\lim\limits_{x \to 0} \left[\dfrac{\sqrt{1+x+x^2}-1}{x}\right]$

SECTION – C

1. Solve for x, y & z using determinant method

$x + y = 0, y + z = 1 \& z + x = 3$.

2. Solve the equation $x + y + z = 6, 2x - 3y + z = 1 \& x + 3y - 2z = 7$ using Gauss elimination method.

3. A force $\vec{F} = 2i + j + k$ is acting at the point (-3,2,1). Find the magnitude of the moment of force $\vec{F}$ about the point (2,1,2).

4. A die is thrown twice and the sum of the numbers appearing is absorbed tobe. What is the conditional probability that the number 5 has appeared at least once?

5. Prove that $\dfrac{\cos\left(\frac{5\pi}{2}-\theta\right)}{\sin(4\pi+\theta)} + \dfrac{\tan(-\theta)}{\cot(\pi-\theta)} = sec^2\theta$

6. Prove that $\cos 80^o \cos 60^o \cos 40^o \cos 20^o = \dfrac{1}{16}$

7. Find the modulus and argument of the complex number $z = -\sqrt{3} + i$ and hence represent in argand diagram.

8. Prove that $\lim\limits_{\theta \to 0} \left(\dfrac{\sin\theta}{\theta}\right) = 1$ where θ is in radian.

Question Paper Blue Print:

Course: ENGINEERING MATHEMATICS – I   **Course Code: 15SC01M**

UNIT NO		HOURS	Each questions to be set for 3 Marks Section - A	Each questions to be set for 5 Marks Section - B	Each questions to be set for 6 Marks Section- C	Weightage of Marks
1	a	2	2	-	-	31
	b	4	-	1	1	
	c	4	1	1	1	
2		8	2	3	1	27
3	a	6	1	-	1	14
	b	2	-	1	-	
4	a	8	1	1	1	47
	b	8	4	3	1	
5		4	1	-	1	9
6		6	2	1	1	17
TOTAL		52	14	11	08	145
Questions to be answered			10	08	05	100

Guidelines for Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weigh age of model fixed for each unit.

2. The question paper pattern provided should be adhered to

    Section-A: 10 questions to be answered out of 14 questions each carrying 03 marks

    Section-B: 08 questions to be answered out of 11 questions each carrying 05 marks.

    Section-C: 05 questions to be answered out of 08 questions each carrying 06 marks.

3. Questions should not be set from the recapitulation topics.

4. Questions should not be set from the recapitulation topics.

| Course Title: **ENGINEERING MATHEMATICS – I** | Course Code: **15SC01M** |

UNIT-1: MATRICES AND DETERMINANTS

3 MARK QUESTIONS

1. If $A = \begin{bmatrix} 3 & -9 \\ -4 & 7 \end{bmatrix}$, find $A + A'$.

2. If $A = [2 \quad -1 \quad 3]$ and $B = \begin{bmatrix} 5 & -2 \\ 3 & 1 \\ 2 & 4 \end{bmatrix}$, find AB matrix.

3. If matrix $A = \begin{bmatrix} 2 & -1 & 3 \\ 5 & 1 & 0 \\ 1 & 0 & x \end{bmatrix}$ is a singular matrix, then find the value of x.

4. Find the adjoint of the matrix $A = \begin{bmatrix} 4 & -5 \\ 3 & -2 \end{bmatrix}$.

5. If $A = \begin{bmatrix} 3 & -1 \\ 0 & -2 \end{bmatrix}$ find the characteristic equation.

5 MARK QUESTIONS

1. Solve the equations $x + y = 3, 2x + 3y = 8$ by Cramer's rule.

2. Solve for x, if $\begin{vmatrix} 1 & 5 & 7 \\ 2 & x & 14 \\ 3 & 1 & 2 \end{vmatrix} = 0$

3. Verify Cayley-Hamilton theorem if $A = \begin{bmatrix} 1 & 3 \\ 2 & -4 \end{bmatrix}$.

4. Verify $A(AdjA) = |A|.I.$ if $A = \begin{bmatrix} 5 & -2 \\ 3 & 1 \end{bmatrix}$.

5. Find the adjoint of the matrix $A = \begin{bmatrix} 3 & -1 & 2 \\ 2 & -3 & 1 \\ 0 & 4 & 2 \end{bmatrix}$

6 MARK QUESTIONS

1. Solve for x &y from the equations $4x + y = 7, 3y + 4z = 5, 5x + 3z = 2$by Cramer's rule.

2. Find the inverse of the matrix $\begin{bmatrix} 1 & 2 & 2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$

3. Prove that adj(AB)=(adjB).(adjA) if $A = \begin{bmatrix} -1 & 0 \\ 5 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 5 \\ 2 & 4 \end{bmatrix}$

4. Find the characteristic roots of a matrix $\begin{bmatrix} 1 & -1 \\ -6 & -2 \end{bmatrix}$.
5. Solve the equations by Gauss elimination method $3x - y + z = 0, x + 2y - 2z = 3, 3x + z = 4$.

UNIT-2: VECTORS

3 MARK QUESTIONS

1. Find the magnitude of vector 2i +3j − 6k
2. If $\vec{a} = i + 2j - 3k, \vec{b} = 3i - 5j + 2k$ find magnitude of $\overrightarrow{3a} - \overrightarrow{2b}$
3. Show that $\cos\theta i - \sin\theta j$ is unit vector
4. Show that the vectors $2i + 5j - 6k$, and $7i + 2j + 4k$ orthogonal vectors.
5. If $\vec{a} = 5i + 2j - 4k$, and $\vec{b} = 2i - 5j + 3k$ find $\vec{a}X\vec{b}$.

5 MARK QUESTIONS

1. Find cosine of the angle between the vectors $4i - 2j - 3k$ and $2i - 3j + 4k$.
2. Find the projection of $\vec{b}$ on $\vec{a}$ if $\vec{a} = 5i + 2j - 4k$ and $\vec{b} = 2i - 5j + 6k$.
3. If $\vec{a} = 3i + 2j - 4k$ and $\vec{b} = i - 2j + 5k$ are two sides of a triangle, find its area.
4. Simplify $(\vec{a} + \vec{b}).(\vec{a} - \vec{b})$ and $(\vec{a} + \vec{b})X(\vec{a} - \vec{b})$.
5. Find the magnitude of moment of force $4i - 2j + 5k$ about (2,5,-7) acting at (4,7,0)

6 MARK QUESTIONS

1. If A=(2,5,7), B=(3,9,4) and C=(-2,5,7) are three vertices of parallelogram find its area.
2. If a force $4i + 6j + 2k$ acting on a body displaces it from (2,7,-8) to (3,9,4). Find the work done by the force.
3. Find the sine of the angle between the vectors $4i - 2j - 3k$ and $2i - 3j + 4k$.
4. Find the unit vector in the direction perpendicular to both vector $2i - 5j + k$ and $5i + j + 7k$.
5. Show that the points whose position vectors are $i - 3j - 5k$, $2i - j + k$ and $3i - 4j - 4k$ form a right angled triangle.

UNIT-3: PROBABILITY AND LOGARITHMS

3 MARK QUESTIONS

1. Define equally likely events, Independent event, and mutually exclusive event.
2. Define probability of an event.
3. A coin is tossed twice. What is the probability that at least one head occurs.
4. A die is thrown once, what is the probability an odd number appears.
5. If E and F are events such that P(E)=0.6, P(F)=0.3 and P(E∩F)= 0.2. Find P(E/F).

5 MARK QUESTIONS

1. Prove that $\dfrac{1}{1+\log_c ab} + \dfrac{1}{1+\log_a bc} + \dfrac{1}{1+\log_b ca} = 1$
2. If $x = \log_c ab$, $y = \log_b bc$, $z = \log_a ca$,
   Prove that $xyz = x + y + z + 2$
3. If $x = \log_{2a} a$, $y = \log_{3a} 2a$, $z = \log_{4a} 3a$, prove that $xyz + 1 = 2yz$
4. If $a^2 + b^2 = 7ab$, prove that $\log\left(\dfrac{a+b}{3}\right) = \dfrac{1}{2}(\log a + \log b)$
5. Solve for x given that $(\log_2 x)^2 + (\log_2 x) - 20 = 0$

6 MARK QUESTIONS

1. An integer is chosen at random from the numbers ranging from 1 to 50 . What is the probability that the integer chosen is a multiple of 3 or 10 ?
2. Two unbiased dice are thrown once . Find the probability of getting the sum of the numbers obtained on the two dice is neither a multiple of 2 nor a multiple of 4 .
3. One card is drawn from a well shuffled pack of 52 cards. If E is the event "the card drawn is a king or an ace" and F is the event " the card drawn is an ace or a jack " then find the conditional probability of the event E, when the event F has already occurred .
4. A pair of dice is thrown once. If the two numbers appearing on them are different, find the probability that the sum of the numbers is 6.
5. A family has two children. What is the probability that both the children are boys given that (i) the youngest is a boy. (ii) at least one is a boy ?

UNIT-4: ALLIED ANGLES AND COMPOUND ANGLES

ALLIED ANGLES

3 MARKS QUESTIONS

1. Find the value of $\cos ec\left(-1110^{\,0}\right)$

2. Find the value of $\dfrac{\cos ec\left(180^{\,0} - A\right)\cos A}{\sec\left(180^{\,0} + A\right)\cos\left(90^{\,0} + A\right)}$

3. 3.If $\sin\theta = \dfrac{1}{2}$ and $\dfrac{\pi}{2} \subset \theta \subset \pi$, find $\cos\theta$

4. 4. If A+B+C =180^0 Prove that $\cot\left(\dfrac{A+B}{2}\right) = \tan c/2$

5. 5.find the value of $\tan\left(\dfrac{7\pi}{3}\right)$

5 MARKS QUESTIONS

1. Prove that $\dfrac{\sin(180^0 - A)COS(360^0 - A)\tan(180^0 + A)}{COS(270 + A)\sin(90 + A)\cot(270 - A)} = 1$

2. If secx = 13/5 and $270^0 \subset x \subset 360^0$, Find the value of $\dfrac{3\sin x - 2\cos x}{9\cos x + 4\sin x}$

3. Find the value of $\cos 570^0 \sin 510^0 - \sin 330^0 \cos 390^0$

4. Evaluate $\dfrac{\sin(-\alpha)}{\sin(90^0 + \alpha)} - \dfrac{\cos(-\alpha)}{\cos(90 - \alpha)} - \dfrac{\sec(90^0 - \alpha)}{\cos(180^0 + \alpha)}$

5. Show that $\tan 225^0 x\cot 405^0 + \tan 765^0 x\cot 675^0 + \cosec 135^0 x\sec 315^0 = 0$

6 MARK QUESTIONS

1. Evaluate $\tan 315^0 x\cot 405^0 + \tan 765^0 x\cot 675^0 + \cosec 135^0 x\sec 315^0$

2. Find x if $\dfrac{x\sin^2 300^0 \sec^2 240^0}{\cos 225^0 \cosec^2 240^0} = \cot^2 315^0 \tan^2 300^0$

3. If $\sin\theta = \dfrac{-1}{4} \, and \, \pi \subset \theta \subset \dfrac{3\pi}{2}$, find the value of $\dfrac{\cos\theta + \tan\theta}{\cot\theta + \sec\theta}$

4. Evaluate $\dfrac{\sin(2\pi - A)}{\sin(\pi - A)} - \dfrac{\tan\left(\dfrac{\pi}{2} + A\right)}{\cot(2\pi + A)} + \dfrac{\cosec(-A)}{\sec\left(\dfrac{\pi}{2} + A\right)}$

5. Show that $\tan^2(315^0)\cot(-405^0) + \cot(495^0)\tan(-585^0) = 0$

COMPOUND ANGLES

3 MARKS QUESTIONS

1. Find the value of $\sin 15^0$

2. Show that $\tan(45^0 + \theta) = \dfrac{1 + \tan\theta}{1 - \tan\theta}$

3. Prove that $\dfrac{\sin(A - B)}{\cos A\cos B} + \dfrac{\sin(B - C)}{\cos B\cos C} + \dfrac{\sin(C - A)}{\cos C\cos A} = 0$

4. Using tan(A+B), prove that $\cot(A+B) = \dfrac{\cot A\cot B - 1}{\cot A + \cot B}$

5. Prove that $\dfrac{\sin 2A}{\sin A} - \dfrac{\cos 2A}{\cos A} = \sin A$

5 MARKS QUESTIONS

1. Prove that cos(A-B) cos(A+B)= cos^{2}A-sin^{2}B

2. Show that $\sin\left(A+\dfrac{\pi}{4}\right)+\cos\left(A+\dfrac{\pi}{4}\right)=\sqrt{2}\cos A$

3. If sinA=$\dfrac{1}{\sqrt{10}}$, $\sin B=\dfrac{1}{\sqrt{5}}$ $provethatA+B=45^0$

4. Prove that $\tan3\theta-\tan2\theta-\tan\theta=\tan\theta\tan2\theta\tan3\theta$

5. If A+B = $\dfrac{\pi}{4}$, $provethat(1+\tan A)(1+\tan B))=2$

TRASFORMATION FORMULAE

3 MARKS QUESTIONS

1 P.T $\dfrac{\cos A+\cos B}{\sin A+\sin B}=\cot\left(\dfrac{A+B}{2}\right)$

2 P.T $\dfrac{\sin 68°+\sin 52°}{\cos68°+\cos52°}=\sqrt{3}$

3 Show that $\cos 40°-\cos50°=\sqrt{2}\ \sin5°$

4 Show that $\sin47°+\cos77°=\cos17°$

5 Show that $\cos80°+\cos40°-\cos20°=0$

MARKS QUESTIONS

1 P.T $\dfrac{\sin\theta+\sin3\theta+\sin5\theta}{\cos\theta+\cos3\theta+\cos5\theta}=\tan3\theta$

2 In and triangle ABC prove that tanA + tanB +tanC = tanA tanB tanC

3 Show that $\dfrac{\sin9°+\cos9°}{\cos9°-\sin9°}=\tan54°$

4 Prove that $\cos55°+\cos65°+\cos175°=0$

5 Prove that $\sin20°\times\sin40°\times\sin80°=\dfrac{\sqrt{3}}{8}$

MARKS QUESTIONS

1 Prove that cos20^{0}xcos40^{0}xcos80^{0}xcos60^0= 1/16

2 In any triangle ABC prove that sinA + sinB + sinC=4Cos(A/2)cos(B/2)cos(C/2)

3 Show that $\dfrac{\cos x+\cos2x-\cos3x-\cos4x}{\sin x+\sin2x+\sin3x+\sin4x}=\tan x$

4 If A+B+C = 180^0 prove that $\cos^2 A+\cos^2 B+\cos^2 C=1-2\cos A\cos B\cos C$

5   If A+B+C = 180^0 prove that sin2A-sin2B+sin2C=4cosAcosCsinB

UNIT-5: COMPLEX NUMBERS

3 MARK QUESTIONS

1. Evaluate i^{-999}
2. Find the complex conjugate of $(1 + 2i)(3i - 4)$
3. Express $(3 + 4i)^{-1}$ in the form a+ib
4. Find the real part and imaginary part of $\frac{1}{\sqrt{2} + i}$
5. $if x + iy = \cos\theta + i\sin\theta$ show that $x + \frac{1}{x} = 2\cos\theta$

5 MARK QUESTIONS

1. Evaluate $\left(i^{19} + \left(\frac{1}{i}\right)^{25}\right)^2$
2. Find the modulus and amplitude of $(1 - i\sqrt{3})$
3. Express in a + ib form: $\frac{(2+3i)}{(1+3i).(2+i)}$
4. Express the complex number $1 + i$ in the polar form.
5. Find the amplitude of $\sqrt{3} + i$ and represent in Argand diagram.

UNIT-6: INTRODUCTION TO CALCULUS

3 MARK QUESTIONS

1. Evaluate: $\lim_{x \to -3} \frac{x^2 - 9}{x + 3}$
2. Evaluate: $\lim_{\theta \to 0} \left(\frac{\tan m\theta}{\sin n\theta}\right)$
3. Evaluate: $\lim_{n \to \infty} \left(\frac{n+1}{n}\right)^n$.
4. Evaluate: $\lim_{x \to \infty} \left(\frac{3x^2 - 2x + 1}{2x^2 + 5x - 1}\right)$
5. Evaluate: $\lim_{x \to 0} \left(\frac{1 - \cos 2x}{x^2}\right)$

5 MARK QUESTIONS

1. Evaluate: $\lim_{x \to 1} \frac{x^2 + x - 2}{x^2 - 1}$.
2. Evaluate: $\lim_{x \to 0} \left(\frac{\sqrt{a+x} - \sqrt{a-x}}{3x}\right)$
3. Evaluate: $\lim_{x \to 1} \left(\frac{x^m - 1}{x^n - 1}\right)$

4. Evaluate: $\lim\limits_{\theta \to 0} \left(\dfrac{1-\cos x + \tan^2 x}{x \sin x} \right)$

5. Evaluate: $\lim\limits_{x \to 0} \left(\dfrac{e^{ax} - e^{bx}}{x} \right).$

6 MARK QUESTIONS

1. Prove that $\mathbf{\lim\limits_{\theta \to 0} \dfrac{sin\theta}{\theta} = 1}$, if θ is in "radian".

2. Evaluate: $\lim\limits_{x \to 0} \left(\dfrac{\sin \pi x}{x-1} \right)$

3. Evaluate: $\lim\limits_{n \to \infty} \left(\dfrac{(5-n^2)(n-2)}{(2n-3)(n+3)(5-n)} \right).$

4. Evaluate: $\lim\limits_{x \to 1} \dfrac{x^2 - 5x + 4}{x^2 - 12x + 11}.$

5. Evaluate: $\lim\limits_{x \to 2} \left(\dfrac{x^2 - 4}{\sqrt{x+2} - \sqrt{3x-2}} \right)$

■■

Course: ENGINEERING MATHEMATICS - I

Course code: 15SC01M

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1	Dr. D.S. Prakash	Asst. Director (LRDC)	DTE, Bengaluru
2	Dr.MokaShekhu, ,	Lecturer (Selection Grade /Science)	Government Polytechnic, Channasandra, Bengaluru
3	Sri.Sathyanaraya Dixit,	Lecturer (Selection Grade /Science)	PVP Polytechnic, Bengaluru
4	Sri. Guruprasad V	Lecturer (Selection Grade /Science)	APS Polytechnic, Somanahalli
5	Dr.RajasekharHeera,	Lecturer/Science,	Government Polytechnic, Gulbarga.

Curriculum Review committee

	Name	Designation	Institution
1	Dr.MokaShekhu, ,	Lecturer (Selection Grade /Science)	Government Polytechnic, Channasandra, Bengaluru
2	Sri.Sathyanaraya Dixit,	Lecturer (Selection Grade /Science)	PVP Polytechnic, Bengaluru

	Course Title: **WORK SHOP TECHNOLOGY**	Course Code: **15ME11T**
	Credits (L:T:P) : **4:0:0**	Core/Elective: **Core**
	Type of course: **Lecture**	Total Contact Hours: **52**
	CIE : **25** Marks	SEE : **100** Marks

Prerequisites: Enthusiasm to learn the subject.

COURSE OBJECTIVES

1. Appreciate the various materials available for manufacturing.
2. Gain the knowledge about manufacturing process for particular application.
3. Powder metallurgy application for various types of cutting tools.

COURSE OUTCOMES

On successful completion of the course, the students will be able to attain CO:

	Course Outcome	**CL**	**Linked PO**	**Teaching Hrs**
CO1	Identify the various materials for manufacturing process for a particular application.	*R/U/A*	1,2,3,4,6,10	10
CO2	Identify the manufacturing process for a particular application.	*R/U/A*	1,2,3,4,6,10	08
CO3	Select the various types of Fabrication Process for Mechanical applications.	*R/U/A*	1,2,3,4,6,10	10
CO4	Understand the Metal casting Techniques and basic structure of products.	*R/U/A*	1,2,3,4,6,10	10
CO5	Understand the various Sheet metal works in practice for production.	*R/U/A*	1,2,3,4,6,10	06
CO6	To know the application of powder metallurgy techniques in Engineering and specially in cutting tools area	*R/U/A*	1,2,3,4,6,10	08
			Total sessions	**52**

COURSE-PO ATTAINMENT MATRIX

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
WORK SHOP TECHNOLOGY	3	3	3	3	-	3	-	-	-	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENT AND BLUE PRINT OF MARKS FOR SEE/

Unit No	Unit Name	Hour	Questions to be set for SEE/Marks			Marks weightage	weightage (%)
			R	U	A		
1	Materials for Manufacturing	10	05	20	05	30	21
2	Basic Manufacturing process	08	05	05	20	30	21
3	Basic Fabrication Process	10	05	10	15	30	21
4	Metal casting processes	10	05	10	10	25	17
5	Sheet metal processes	06	05	05	05	15	10
6	Powder metallurgy	08	05	05	05	15	10
	Total	52	30	55	60	145	100

Legend: R; Remember, U: Understand A: Application

CONTENTS

UNIT: I	MATERIALS FOR MANUFACTURING	CONTACT HOURS: 10 Hours

Introduction of Engineering Materials- Classification, mechanical Properties of metals and uses of Ferrous Metals-Pig Iron, Cast Iron, Wrought Iron, steel, Classification of Steels according to Carbon content, Introduction to High speed Steels-18-4-1 HSS & uses. Introduction, Purposes and methods of Heat treatment -Annealing-Normalizing-Hardening-Tempering and Case Hardening-Properties and uses of Nonferrous metals- Aluminum, Copper,Lead,Tin,zinc,Magnesium,Nickel, Properties and uses of Plastics- Thermo plastics & Thermosetting-Properties and Uses of Ceramics , Composite Materials and uses.

UNIT: II	BASIC MANUFACTURING PROCESS	CONTACT HOURS: 08 Hours

Introduction to manufacturing processes- Mechanical working of metal – Introduction to Hot working and cold working of metals. - Hot Rolling and types-Three High, Four high rolls. Principle of Drawing, Deep drawing. Principle of Extrusion, Direct, Indirect and tube Extrusion. Introduction to Forging, Smith forging operations. .

UNIT: III	BASIC FABRICATION PROCESS	CONTACT HOURS:10 Hours

Introduction to Welding-Classification of welding- Principle of Arc welding, Gas welding. Types of Arc welding-MIG Welding, TIG Welding, Submerged arc welding. Principle of resistance welding – Spot, butt, seam Welding. -Welding Defects and remedies. Comparison of welding, soldering and Brazing.

UNIT: IV	METAL CASTING PROCESSES	CONTACT HOURS: 10 Hours

Introduction to metal castings, Use of patterns, Pattern materials, types of Patterns-single, Split, loose Piece, Sweep, Skeleton, gated Patterns - allowances – Types of Moulding sand and Properties. Concept of Cope, Drag, Runner, Riser & core. Permanent mould casting – Die casting, Slush Casting, Centrifugal casting, Name and brief explanation of Defects in Castings

UNIT: V	SHEET METAL PROCESSES	CONTACT HOURS:06 Hours

Introduction to Sheet Metal Work and Applications, metals used for Sheet Metal work, Standard Gauge numbers. Sheet metal operations-shearing, cutting off, Parting, blanking, Punching, notching, slitting, Lancing, Bending, Drawing and squeezing. Introduction to Press working- Types of presses- Power press and Ball or Fly press. Applications of presses.

UNIT:VI	POWDER METALLURGY	CONTACT HOURS: 08 Hours

Introduction to Powder Metallurgy –Manufacture of Metal Powders by Different Methods-Automization, reduction, Electrolysis and Shotting.Powder Metallurgy Process, Secondary Operations. Products of Powder Metallurgy. Advantages and Limitations of powder metallurgy.

TOTAL CONTACT HOURS:52

TEXT BOOKS:

1. *Elements of Workshop Technology* Vol-I Manufacturing Process edition-By Hajra Choudry

Reference:

1. *Manufacturing Technology -1* By P.C Sharma of S.CHAND Publications.
2. *Engineering Materials* by Er.R.K.RAJPUT of S.CHAND Publications
3. *Work shop technology* By R.S KHURMI & J.K GUPTA of S.CHAND & Co.Ltd

Course Delivery: The course will be delivered through lectures and presentations, suitable Videos

Course Assessment and Evaluation Scheme:

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment	CIE*	IA	Students	Three tests (Average of three tests will be computed)	20	Blue books	1,2,3,4,5,6
				Student Activity	05	Log of Activity	1,2,3,4,5,6
				Total	**25**		
	SEE*	End Exam		**End of the course**	**100**	Answer scripts at BTE	1,2,3,4,5
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2,3 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,5&6 Effectiveness of Delivery of instructions & Assessment Methods

*CIE – Continuous Internal Evaluation   ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM	**WORKSHOP TECHNOLOGY**	20
	Year:	Course code: **15ME11T**	

Name of Course coordinator :	Units:__ CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

1. Remembering and Understanding :   - 30% weightage
2. Applying the knowledge acquired from the course :   - 50 % weightage
3. Analysis :   - 10% weightage
4. Evaluation :   - 5% weightage
5. Creating new knowledge :   - 5% weightage

• MODEL OF RUBRICS /CRITERIA FOR ASSESSING STUDENT ACTIVITY

RUBRICS FOR STUDENT ACTIVITY(5 Marks)						
Dimension	**Unsatisfactory**	**Developing**	**Satisfactory**	**Good**	**Exemplary**	**Student Score**
	1	**2**	**3**	**4**	**5**	
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collect much information; but very limited relate to the topic	Collects some basic information; most refer to the topic	Collects a great deal of information; all refer to the topic	Ex: 4
Fulfill team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties but unreliable.	Performs very little duties	Performs nearly all duties	Performs all duties of assigned team roles	5
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded.	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening others	Listens, but sometimes talk too much	Listens and speaks a fair amount	2
Average / Total marks=(4+5+3+2)/4=14/4=3.5=4						

Note: This is only an example. Appropriate rubrics/criteria may be devised by the Concerned faculty (Course Coordinator) for assessing the given activity.

Diploma in Mechanical Engineering

1 Semester
Course Title: WORK SHOP TECHNOLOGY

Time: 3 hrs   Max marks:100

    1 Answer any SIX question from Part A
    2. Answer any SEVEN full questions From Part B

Section A   5x6=   30

1. Name the different engineering materials with Examples.
2. Explain the following processes of heat treatment with applications
      a) Annealing   b) hardening
3. State the uses of manufacturing process.
4. Explain common forging operations.
5) Explain with a neat sketch Tube Extrusion.
6) Define Welding and Classify.
7) Explain with neat sketch MIG welding
8) List the differences between Sand casting and Die casting.
9) Sketch and show the basic steps involved in powder metallurgy process.

Section B   10x7=70

10 a) Explain briefly Ductility & Malleability property of metal
        b) Explain use of composite materials in engineering.
11 a) Explain Thermo plastics & thermosetting.
        b) Differentiate between Pig Iron And Cast Iron.
12) Explain with neat sketch the following extrusions
    a) Direct Extrusion.
        b) Indirect Extrusion.
13) a) Explain with a neat sketch three high rolling.
        b) Name different metals used for sheet metal work.
14) Explain with sketch Gas welding and mention its advantages.
15) Explain with neat sketch
    a) Split pattern
        b) Gated pattern
16) a) Explain briefly manufacture of metal powder by Reduction method.
        b) Name the different products of powder metallurgy.
17) a) Differentiate between welding & Soldering.
        b) Compare MIG welding & TIG Welding.
18) a) Explain briefly Runner and Raiser used in casting process.
        b) Explain briefly any five defects in casting
19) a) Explain Gauges of sheet metal.
        b) Sketch Ball press neatly and labels its parts.

Diploma in Mechanical Engineering

1St Semester

Course Title: WORK SHOP TECHNOLOGY

CO 1: IDENTIFY THE VARIOUS MATERIALS FOR MANUFACTURING PROCESS FOR A PARTICULAR APPLICATION

Remember
3. Define Engineering Materials? List any four important applications of them.
4. Name the different engineering materials with Examples.
5. State plasticity & Elasticity of metals.
6. List any five properties and uses of Cast Iron.
7. State five uses and Properties of Wrought Iron.
8. Define Heat treatment? And Indicate Any Four purpose
9. Name the Different Heat treatment Process?
10. Define Non Ferrous metal and Name any four Non ferrous metals.
11. State any five properties of Non ferrous metals.
12. State any five uses of Non ferrous metals.
13. State any five properties and uses of aluminium.
14. State any five properties and uses of copper.
15. State any five uses of nickel.
16. State any five properties and uses of Plastics.
17. State any five uses & properties of Ceramics.
18. Define composite materials. Indicate any four uses of them.
19. State any five uses of Cast Iron.
20. State any four uses of wrought Iron
21. State the Differences between Ferrous & Non Ferrous Metals.
22. State any four Examples for ferrous & non ferrous metals
23. State the five properties and uses of plastics.
24. State the five properties and uses of Ceramics

Understanding
25. Classify the engineering Materials with Examples.
26. Explain briefly Ductility & Malleability property of metal
27. Explain plasticity & Elasticity of metals.
28. Explain Annealing process in heat treatment.
29. Explain Normalizing Process.
30. Explain Hardening Process of   heat treatment.
31. Explain Tempering Process of Heat treatment.

32. Explain Case Hardening Process of heat treatment.
33. Explain Thermo plastics & thermosetting.
34. Differentiate between Pig Iron And Cast Iron.
35. Distinguish wrought Iron With steel
36. Indicate Five Properties and uses of Pig Iron.
37. Explain the following processes of heat treatment with applications
     a) Annealing   b) hardening
36. Explain the following processes of heat treatment with applications
     a) Normalizing .   b) Tempering.
37. Compare thermoplastics and thermosetting
38. Explain use of composite materials in engineering.

Application
38. Explain Annealing process in heat treatment.
39. Explain Normalizing Process.
40. Explain Hardening Process of heat treatment.
41. Explain Tempering Process of Heat treatment.
42. Explain Case Hardening Process of heat treatment.
43. Explain Thermo plastics & thermosetting.
44. Explain the following processes of heat treatment with applications
      a) Annealing   b) hardening
43. Explain the following processes of heat treatment with applications
     a) Normalizing .   b) Tempering.
44. Explain use of composite materials in engineering.
45. Write short notes ceramics.

1. **CO 2: IDENTIFY THE MANUFACTURING PROCESS FOR A PARTICULAR APPLICATION**

Remember

1) Define Forging. List the common forging operations.
2) Define Rolling operation. List the types of rolling
3) Define Extrusion. State the uses of it.
4) State the uses of manufacturing process.
 5) Describe the uses of hot working & cold working.

Understand

1)Explain hot working and cold working of metals.
2)Explain the Principle of wire drawing operation.
3)Explain common forging operations.
4)Compare hot working with cold working
Application
1)Explain hot working and cold working of metals.

2)Explain with a neat sketch three high rolling.
3)Explain with a neat sketch four high rolling.
4)Explain with a neat sketch Direct Extrusion.
5)Explain with a neat sketch Indirect Extrusion.
6)Explain with neat sketch Tube Extrusion.
7)Explain with a neat sketch Tube Extrusion.
8)Explain with neat sketch the following extrusions
    a) Direct Extrusion.
    b) Indirect Extrusion.
9)Explain with neat sketch following Rolling operations
    a) Three high Rolling
    b) Four High Rolling
10) Explain with neat sketch
    a) Indirect Extrusion
    b) Three high rolling

CO3: SELECT THE VARIOUS TYPES OF FABRICATION PROCESS FOR MECHANICAL APPLICATIONS.

Remember
1) Define Welding and Classify.
2) State the Differences between Arc welding & Gas welding.
3) List the welding defects.
4) State three uses of Arc welding
5) List any three uses of Gas welding.
6) Name the different types of Resistance Welding.
7) Define Soldering and classify
8) List the equipments used for Arc welding.
9) Define Welding and Classify.
10) State the Differences between Arc welding & Gas welding.
11) List the welding defects.
12) Explain with neat sketch MIG welding.
13) State three uses of Arc welding
14) List any three uses of Gas welding.
15) Name the different types of Resistance Welding.
16) List the equipments used for Arc welding.
    Understanding
        17).Explain with neat sketch MIG welding.
18)Differentiate between welding & Soldering.
19) Differentiate between Brazing & Soldering.
20)Compare welding with soldering.
21) Explain briefly Soldering.
22)Compare MIG welding & TIG Welding.
Application:
23)Explain with neat sketch MIG welding.
24)Explain with neat sketch TIG welding.
25)Explain with sketch arc welding.
26)Explain with neat sketch Gas welding.

27) Explain with neat sketch Spot welding.
28) Explain briefly with sketches
   a) Spot welding
   b) Seam welding
29) Explain with neat sketch butt welding.
30) Explain with neat sketch Submerged arc welding.
31) Explain with neat sketch MIG welding.
32) Explain with neat sketch TIG welding.

CO4: UNDERSTAND THE METAL CASTING TECHNIQUES AND BASIC STRUCTURE OF PRODUCTS.

Remember
1) Define metal Casting process.
2) Define Pattern. List the materials used for Pattern.
3) Name the different types of patterns.
4) State the properties of moulding sand.
5) list defects in casting
6) state the importance of metal casting.
7) State the Ingredients of Foundry Sand
8) List the differences between Sand casting and Die casting.
9) State the uses of metal casting

Understanding
10) Explain metal Casting process.
11) Explain briefly Runner and Raiser used in casting process.
12) Explain briefly any five defects in casting
13) Explain briefly Cope, Drag and Core used in casting process
14) Explain pattern making materials
15) Explain casting allowance

Application
1) Explain with sketch Split pattern.
2) Explain with sketch loose pattern.
3) Explain with sketch gated pattern.
4) Explain with sketch sweep pattern.
5) Explain with sketch slush Casting.
6) Explain briefly with a neat sketch centrifugal casting.
7) Explain with sketch slush Casting.
8) Explain with neat sketch centrifugal casting
9) Explain with neat sketch
   a) Split pattern
   b) Gated pattern
10) Explain with neat sketch die casting

CO5: UNDERSTAND THE VARIOUS SHEET METAL WORKS IN PRACTICE FOR PRODUCTION.

Remember
1) State the uses of sheet metal in Engineering
2) Describe properties and Gauges of sheet metal.
3) Name different metals used for sheet metal work.
4) State any Four applications of sheet metals
5) State any three applications of presses
6) State any three applications of presses

Understanding
1) Explain properties and Gauges of sheet metal.
2) Explain shearing and bending operation of sheet metals.
3) Explain briefly squeezing and blanking operation of sheet metal
4)) Explain following shearing operation in sheet metal
   a) Cutting off   b) Blanking
           Application
1) Explain briefly with sketch drawing operation of sheet metal.
2) Explain with necessary sketches of different Shearing operations in sheet metals.
3) Explain with sketch the following sheet metal operations
a)   Bending   b) Drawing
 4) Explain Power press with a neat sketch
5) Explain Ball or fly press with a neat sketch
6) Sketch Ball press neatly and labels its parts.

CO6: TO KNOW THE APPLICATION OF POWDER METALLURGY TECHNIQUES IN ENGINEERING AND SPECIALLY IN CUTTING TOOLS AREA

Remember
 1) List the uses of powder metallurgy in engineering.
2) State any five Limitations of powder metallurgy.
3) State any five advantages of powder metallurgy.
4) Define metal powder. And name the different methods of manufacture.
5) Indicate the dis-advantages of powder metallurgy.
 6) Name the different products of powder metallurgy.
7) State the advantages & limitations of powder metallurgy.
8) Name the different methods used for metal powder.

Understanding
1). Explain the uses of powder metallurgy in engineering.
2) Explain briefly manufacture of metal powder by mechanical method.

3) Explain briefly manufacture of metal powder by Automization method.
4) Explain briefly manufacture of metal powder by Reduction method.
5) Explain briefly manufacture of metal powder by Electrolysis method.
6) Explain briefly manufacture of metal powder by shotting method.
7) Explain secondary operations of powder metallurgy process.
8) Explain the following metal powder manufacturing methods.
      a) Mechanical method   b) Automization
9) Explain the following metal powder manufacturing methods.
      a) Reduction method b) Electrolysis

Application

1) Explain with neat sketch powder metallurgy process
2) Explain the following metal powder manufacturing methods with sketch.
   a) Mechanical method   b) Automization
3) Explain the following metal powder manufacturing methods.
   a) Reduction method b) Electrolysis
4) Explain basic steps involved powder metallurgy with diagram.

Course Title: **ENGINEERING GRAPHICS-I**	Course Code: 15ME12D
Credits (L:T:P) : **0:2:4**	Core/ Elective: **Core**
Type of course: **Lectures & Practice**	Total Contact Hours: **78**
CIE- 25 Marks	SEE – 100 Marks

(***(Common to all Mechanical /AE/MTT/Chemical /Metallurgy Programme)***
Prerequisites: Zeal to learn the subject

Course Objectives:

1. The course is aimed at developing Basic Graphic skills.
2. Develop Skills In Preparation Of Basic Drawings.
3. Skills in Reading and Interpretation of Engineering Drawings.

Course Outcomes:

On successful completion of the course, the students will be able to attain CO:

	Course Outcome	CL	Linked units	Linked PO	Teaching Hrs
CO1	Use the drawing instruments effectively and able to dimension the given figures	U/A	1	1,2,3,9,10	12
CO2	Appreciate the usage of engineering curves in tracing the paths of simple machine components	U/A	2	1,2,3,9,10	18
CO3	Understand the concept of projection and acquire visualization skills, projection of points	A	3	1,2,3,9,10	12
CO 4	Able to draw the basic views related to projections of Lines, Planes	A	4,5	1,2,3,9,10	36
			Total sessions		**78**

COURSE-PO ATTAINMENT MATRIX

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
ENGINEERING GRAPHICS-I	3	3	3	-	-	-	-	-	3	3

LEVEL 3- HIGHLY ADDRESSED, LEVEL 2-MODERATELY ADDRESSED, LEVEL 1-LOW ADDRESSED.
METHOD IS TO RELATE THE LEVEL OF PO WITH THE NUMBER OF HOURS DEVOTED TO THE COS WHICH ADDRESS THE GIVEN PO.
IF ≥40% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 3
IF 25 TO 40% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 2
IF 5 TO 25% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 1
IF < 5% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS CONSIDERED NOT-ADDRESSED.

COURSE CONTENT AND BLUE PRINT OF MARKS FOR SEE

Unit No	Unit Name	Hour	Questions to be set for SEE/MARKS			Marks weightage	weightage (%)
			R	U	A		
1	DIMENSIONING	12	--	05	10	15	10
2	CONIC SECTIONS AND SPECIAL CURVES	18	--	10	30	40	28
3	ORTHOGRAPHIC PROJECTION AND PROJECTION OF POINTS	12	--	-	15	15	10
4	PROJECTION OF LINES	18	---	-	30	30	21
5	PROJECTIONS OF PLANE SURFACES	18	---	-	45	45	31
	Total	78		15	130	145	100

Legend: R; Remember, U: Understand A: Application

COURSE CONTENT

UNITI: DIMENSIONING   (12 Hours)

Introduction to Engineering Drawing-Drawing Instruments – Standard Sizes of Drawing sheets-Layout of drawing sheets-Types of lines and their applications-Conventions for various materials-Introduction to Dimensioning-Elements of Dimensioning–Systems of Dimensioning-Methods of arrangements of Dimensioning- Dimensioning of common features like diameters, radii, arcs and chords- Dimensioning of counter sunk and counter bore-Introduction to Scale- Definition of R.F- Concept of reducing, enlarging and full size scale.

UNITII:CONIC SECTIONS AND SPECIAL CURVES   (18 Hours)

Introduction to conic sections -Division of a line into equal number of parts- Types of conic section- Eccentricity- Construction of conic sections(Parabola, Ellipse and Hyperbola) when eccentricity and distance of the focus from the directrix is given-Construction of ellipse by Intersecting lines method(Rectangular and parallelogram methods)and Concentric circles method -Construction of parabola by rectangle method, parallelogram method and a tangent method-Construction of Rectangular/Equilateral Hyperbola-Construction of Involutes of a circle and to draw tangent and normal at any point on the curve- Construction of Cycloid and to draw a tangent and normal at any point on the curve.

UNITIII: ORTHOGRAPHIC PROJECTIONAND PROJECTION OF POINTS(12Hours)

Introduction to orthographic projection- Principal planes of projection- Four Quadrants- Concept of First angle &Third angle projection methods- Projection of points in all the four quadrants.

UNIT IV: PROJECTION OF LINES   **(18 Hours)**
Projection of lines – Line Parallel to both HP and VP –Line parallel to one plane and Perpendicular to other- Line parallel to one plane and Inclined to the other- Line inclined to both HP and VP. (**First angle projection should be followed).**

UNIT V: PROJECTION OF PLANE SURFACES   **(18Hours)**

Construction of polygons-Projection of plane Surfaces–Plane surface parallel to one plane and Perpendicular toother two–Plane surface Perpendicular to one plane and inclined to the other-Plane surface inclined to both HP and VP.

Total Contact Hours: 78

TEXT BOOK

1.K.R.Gopalakrishna"Fundamentalsof Drawing" Subhas Publications, 2010.
2.K.R.Gopalakrishna"Engineering Drawing" (Vol. I & II), Subhas Publications, 2014.

REFERENCES

1. R.K. Dhawan, "A text book of Engineering Drawing", S. Chand Publishers, Delhi,2010.
2.G.S. Phull and H.S.Sandhu, "Engineering Graphics", Wiley Publications, 2014.
3. K.Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International Private Limited, 2008.
4. M.B.Shah and B.C.Rana, "Engineering Drawing", Pearson Education, 2005..
5. DhananjayA.Jolhe, "Engineering Drawing with an Introduction to AutoCAD", Tata McGraw Hill Publishing Company Limited, 2008.
6. BasantAgarwal and Agarwal.C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct method — **Assessment**	CIE*	IA	Students	Graded Exercises (Average marks of each graded exercise to be considered)	25	Drawing Sheets	1,2,3,4
	SEE*	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2,3 ,Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3,4,Effectiveness of Delivery of instructions & Assessment Methods

*CIE – Continuous Internal Evaluation   ***SEE** – Semester End Examination

NOTE:THIS SUBJECT SHOULD THOUGHT IN A BATCH OF 15 TO 20 STUDENTS. FACULTY INCHARGE PER BATCH HAS TO MONITER, EVALUATE OR ASSESS THE STUDENTS.

Diploma in Mechanical Engineering
1st semester
Course title: **Engineering Graphics-I (Conventional)**
Time; 4 Hrs.   Max. marks: 100
Note: Part –A is compulsory. Answer ANY TWO full questions from Part-B,C& D

Part –A
1.(a)List the standard sizes of the drawing sheets.   -- 05
   (b)Mention the types of lines and their applications.   --05

Part –B
1.Draw an ellipse when the distance of focus from the directrix is 40and Eccentricity is ¾.-15

2.A Stone thrown from the ground level reaches a maximum height of 45 metre and
falls on the ground at a distance of 100metre from the point of projection. Trace the
path of the stone in space. Select a scale of 1:1000   ---15

3.Draw the involute of a circle of diameter 50mm . Also draw a tangent and normal   ---15
at any point on the curve.

PART- C

1. Draw the projections of the following points on a common reference line:
a)Point P is 25mm above the HP and 40mm behind the VP
b)Point Q is 30mm below the HP and 40mm behind the VP
c) Point R is 25mm above the HP and in the VP.
d)Point S is 30mm below the HP and in the VP
e)Point T is 35mm in front of the VP and in the HP.
                                        --- 15
2. A line AB measuring 70mm has its end A is 15mm in front of VP and 20mm above HP.
And the other end B is 60mm in front of VP and 50mm above HP.
Draw the projections of the line and find the Inclinations of the line with both the reference
planes of projection.
                --- 15
3.A line PQ has its end P 15mm above HP and 10mm in front of VP. The end Q is 55mm above
HP and the line is inclined at 30° to HP. The distance between the end projectors
of the line. When measured parallel to the line of intersection of HP and VP is 50mm.
Draw the Projections of line and find its inclination with VP.   ---15

1.Apentagonal plane lamina of edges 20mm is resting on HP with one of its corners
touching it such that the plane surface makes an angle of 60° with HP. The two of the base
edges containing the corner on which the lamina rests make equal inclination with HP. If the
edge opposite to this corner makes an angle of 45° with the VP. Draw the top and front views of
the plane lamina in this position.   --15
2. A equilateral triangular lamina of 30mm side lies with one of its edges on HP such that
The surface of the lamina is inclined to the HP at 60°. The edge on which it rests is
inclined to the VP at 60°. Draw the projections.   --15

3. A circular lamina of 60mm diameter rests on HP such that the surface of the lamina is
inclined at   30° to HP. The diameter through which the point on which the lamina rests on HP
appears to be inclined at 30° to VP in the top view. Obtain its projections.   --15
****

MODEL QUESTION BANK
Diploma in Mechanical Engineering
1ST semester
Course title: Engineering Graphics-I (Conventional)

CO 1: USE THE DRAWING INSTRUMENTS EFFECTIVELY AND ABLE TO DIMENSION THE GIVEN FIGURES

LEVEL:UNDERSTANDING

10 Marks Questions (Each sub questions carries 5 marks)

1. (a)List the standard sizes of drawing sheets.
    (b)Mention the types of lines and their applications.

2. a) Illustrate the elements of dimensioning with the help of a sketch.
    b) Illustrate the dimensioning of given common features: diameter, radius, chord, Arc
    and angle.
3. a)Mention the uses of the following drawing instruments.
    i) T-square ii) Set square   iii)Bow compass iv) Clinograph   v)Minidrafter
    b) Mention the uses of the following drawing instruments.
    i) French curves ii) Protractor   iii) Clips iv)Erasing Shield   v)Drafting machine
4. a) Define RF. Mention the types of scales based on RF.
    b) Give the conventional representation for the following materials.
    i) Cast iron   ii) Lead   iii)Bronze   iv)Glass   v)Wood
5. a) Illustrate the dimensioning of counter sunk and counter bore
    b)Draw the standard layout of aA2 size drawing sheet

1. List the standard sizes of drawing sheets.
2. Mention the types of lines and their applications.
3.Illustrate the elements of dimensioning with the help of a sketch.
4.Illustrate the dimensioning of given common features: diameter, radius, chord, Arc and angle.
5. Mention the uses of the following drawing instruments.
i) T-square ii) Set square   iii) Bow compass iv) Clinograph   v) Minidrafter
6. Mention the uses of the following drawing instruments.
i) French curves ii) Protractor   iii) Clips iv)Erasing Shield   v) Drafting machine
7.Draw the standard layout of aA2 size drawing sheet

LEVEL:APPLICATION

8. Copy the given sketch to 1:1 scale and dimension adopting aligned system with parallel dimensioning method.
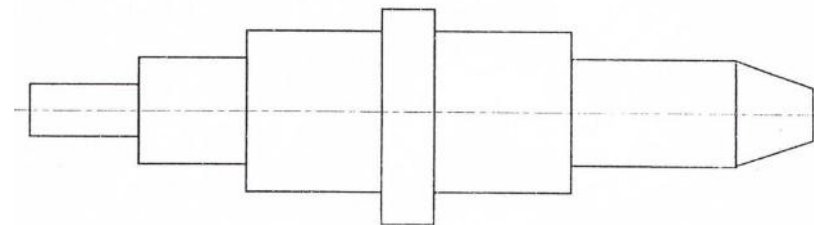
9. Copy the given sketch to 1:1 scale and dimension adopting aligned system with progressive dimensioning method.
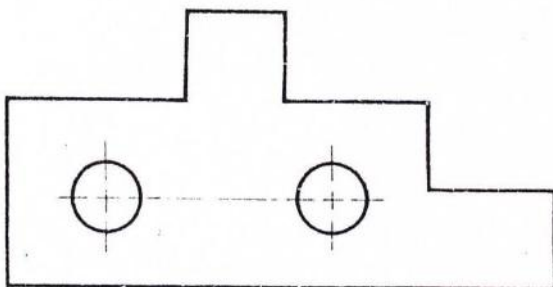
10. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with chain dimensioning method.
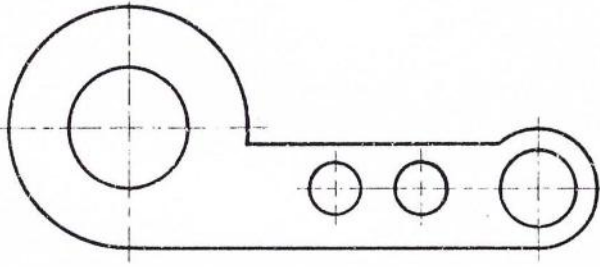
11. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with combined dimensioning method.
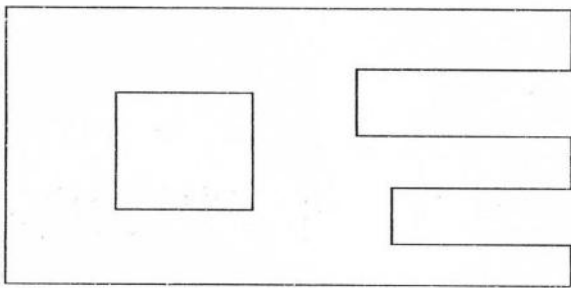
12. Copy the given sketch to 1:1 scale and dimension adopting unidirectional system with parallel dimensioning method.
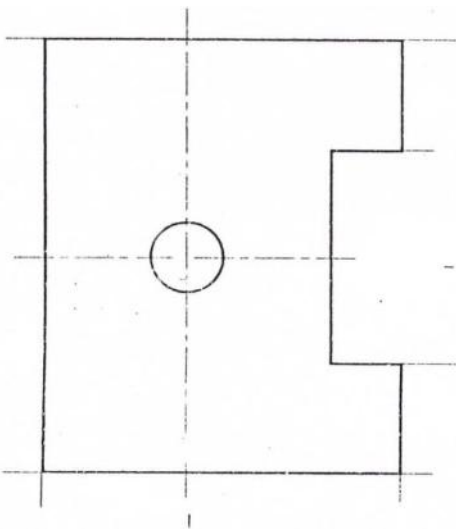
13. Copy the given sketch to 1:1 scale and dimension adopting aligned system with chain dimensioning method.
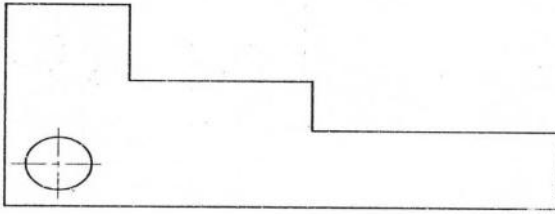
LEVEL:UNDERSTANDING

10 Marks Questions

1. Inscribe an ellipse in a rectangle of 130x80mm by intersecting lines method.
2. A parallelogram has sides 130mm and 80mm at an included angle of 60°. Inscribe an ellipse In the parallelogram. Find the major and minor axes of the ellipse.
3. Draw a parabola when the distance of the focus from the directrix is 30mm.
4. Construct a Parabola in a parallelogram of the sides 100mmx45mm and with an included angle of 75°.

LEVEL:APPLICATION

15Marks Questions

5. A Stone thrown from the ground level reaches a maximum height of 45 meter and falls on the ground at a distance of 100metre from the point of projection. Trace the path of the stone in space. Select a scale of 1:1000

6. A shot is discharged from the ground level at an inclination of 55° to the ground which is assumed to be horizontal. The shot returns to the ground at a point 75metre distant from the point of discharge. Trace the path of the shot. Scale 1:1000. Use tangent method only.

7. Draw an ellipse when the distance of focus from the directrix is 40 mm &eccentricity is ¾.
8. An ellipse has the major axis and minor axis in the ratio 3:2. Draw the ellipse when the major is axis is 135mm by concentric circles Method.
9. Construct a hyperbola when the distance of focus from the directrix is 35 mm and eccentricity is 4/3.
10. Construct a rectangular hyperbola given a point P on it at a distance of 20 mm and 15 mm from the two asymptotes.
11. Draw the involute of a circle of diameter 40 mm. Also draw a tangent and normal at any point on the curve.
12. A circle of 50 mm diameter rolls on a line. A point on the circumference of the circle is in

Contact with the line in the beginning and after one complete revolution. Draw the cycloidal path of the point. Draw a tangent and normal at any point on the curve.

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CO: 3 UNDERSTAND THE CONCEPT OF PROJECTION AND ACQUIRE VISUALIZATION SKILLS,PROJECTION OF POINTS

</div>

LEVEL:APPLICATION

(15Marks Questions)

1. a) Draw the symbolic representation of First angle projection method.
    b) Draw the projections of the following points:
          i)   P is 25mm below the HP and in the VP
      ii) Q is 40mm behind the VP and in the HP
          iii) R is 30mm below the HP and 30mm in front of the VP
          iv) S is 25mm above the HP and 25mm behind the VP

2. a) Draw the symbolic representation of Third angle projection method.
    b)Draw the projections of the following points:
    i)   T is 25mm above the HP and 30mm in front of the VP.
          ii) U is in both the VP and HP
          iii) V is 35mm below the HP and 30mmm behind the VP
          iv) W is 30mm above the HP and 35mm behind the VP

3. a) Draw the projections of the following points:

          i)A is 25mm above the HP and 35mm in front of the VP
          ii)B is 25mm above the HP and 40mm behind the VP
          iii)C is 30mm below the HP and 40mm behind the VP
          iv)D is 30mm below the HP and 35mm in front of the VP
          v)E is 25mm above the HP and in the VP.
          vi) F is 30mm below the HP and in the VP
          vii)G is 35mm in front of the VP and in the HP
          viii)H is 40mm behind the VP and in the HP
          ix)M lies in all the three principal planes

4. a) A point P is 40 mm in front of VP, 50 mm above HP and 30 mm in front of left PP. Draw the three principal views of the point.
    b) A point P is 30 mm above HP, 50 mm behind VP and 45 mm in front of left PP. Draw the three principal views of the point

5. a) Draw the three principal views of a point P lying 40 mm behind VP, 60 mm below HP and 30 mm behind the right PP
    b)Draw the three principal views of a point P lying 60 mm below HP, 50 mm in front of VP and 45 mm in front of the left PP.

LEVEL:APPLICATION

(15Marks Questions)

1.a)Draw the three principal views of a line 80 mm long placed parallel to VP and perpendicular to HP. The line is 70mm in front of VP and 60mm in front of right PP. The lower end of the line is 30mm above HP.

b) Draw the three principal views of a line 80 mm long when it is placed parallel toboth HP & VP. One of the ends of the line is 70 mm above HP, 60 mm in front of VP and 30mm in front of the right PP.

2. a) A line AB 80 mm long is inclined at 30° to HP and parallel to VP. The line is 90 mm in front of VP. The lower end A is 35 mm above HP,110 mm in front of the right PP and is away from it than the higher end. Draw the three principal views of the line.

b) A line AB 80 mm long is inclined at 45° to VP and parallel to HP. The end nearer to VP is 30mm in front of VP, 60 mm above HP and 100 mm in front of right PP. Draw the three principal views of the line.

3. a) Draw the projections of a line AB, 80 mm long inclined at 30° to HP and parallel to VP. The line is 40 mm in front of VP. The lower end A is 20 mm above HP.

b) The length of a line is 100 mm long and is inclined at 45° to VP and parallel to HP.The line is 15 mm above HP and one end of the line is 10 mm in front of VP. Draw the projections of the line and measure top and front views.

4.a)The length of top view of a line which is parallel to VP and inclined at 45° to HP is 50 mm. One end of the line is 12 mm above HP and 25 mm in front of 45° to VP. Draw the projections of the line and determine its true length.

b) Draw the projections of a line 70 mm long lying in VP and inclined at 45° to HP. The lower end of the line is 10 mm above HP.

5. A straight line AB, 80 mm long makes an angle of 45° to HP and 30° to VP. The end A is 10 mm in front of VP and is on HP. Draw the projections of the line.

6.A line AB 60 mm long has one of its extremities 20 mm in front of VP and 15 mm above HP. The line is inclined at 30° to HP and 45° to VP. Draw its top and front views.

7.A line AB is 75 mm long. The end A is touching VP and 10 mm above HP. The end B is 50 mm in front of VP and 30 mm above HP. Draw the top view of the line AB and finds the true inclinations of the line AB with HP & VP.

8.A line AB measuring 70 mm has its end A 15 mm in front of VP and 20 mm above HP. The other end B is 60 mm in front of VP and 50 mm above HP. Draw the projections of the line with HP & VP.

9.A line PQ has its end P 15 mm above HP and mm in front of VP. The end Q is 55 mm above HP and the line is inclined at 30° to HP. The distance between the end projectors of the line when measured parallel to the line of intersection of HP & VP is 50 mm. Draw the projections of the line and find its inclinations with VP.

10.The distance between the end projectors passing through the end points of a line AB is 40 mm. The end A is 20 mm above HP and 15 mm in front of VP. The line AB appears as 65 mm long in the front view. Complete the projections. Find the true length of the line and its inclinations with HP & VP.

11. The top view of a line PQ, 75 mm long measures 50 mm. The end P is 50 mm in front of VP and 15 mm above HP. The end Q is 15 mm in front of VP. Draw the projections of the line PQ and fine its inclinations with HP & VP.

12.The front view of a line is 80 mm in length and makes 40° with XY line. One of its ends is 10 mm in front of VP and 15 mm above HP. The other end is 50 mm in front of VP. Draw the top and front views of the line. Determine the true length and inclinations of the line with HP & VP.

13.The front view of a line AB, 125 mm long, is 75 mm and its top view is 100 mm long. Its end A is 30 mm from both the planes of projection. Draw the projections and find the inclinations of the line with the reference planes of projection.

14.Line measuring 75 mmlong has one of its ends 50mm in front of VP and 15mm above HP. The top view of the line is 50mm long. The other end is 15mm in front of VP and above HP. Draw the projections of the line and find the true inclination.

CO 5: ABLE TO DRAW THE BASIC VIEWS RELATED TO PROJECTIONS OF PLANES

(15Marks Questions)

1. An equilateral triangular lamina of side 40mm rests with one its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the projections of the lamina.
2. An equilateral triangular lamina of sides 30mm is resting with one of its corners on HP, The surface of the lamina is inclined at 45° to HP and the side opposite to the corner on which the lamina rests is inclined at 45° to VP. Draw the projections of the lamina.

3. A square lamina of 40mm side rests with one of its sides on HP so that the surface of the lamina is inclined at 30° to HP. The side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the square lamina in this position.

4. A square lamina of 40mm sides rests with one of its corner on HP. The diagonal passing through this corner is inclined at 45° to HP and appears to be inclined at 45° to VP. Draw its projections.

5. A square lamina of side 40mm rests with one of its corner on HP. The diagonal passing through this corner is inclined at 45° to HP and 30° to VP. Draw its projections.

6. A regular pentagonal lamina has its sides as 30mm. It is resting with one of its corners on HP so that the side opposite to this corner touches VP. The plane surface of the lamina is inclined at 30° to HP.

7. A hexagonal lamina of sides 30mm rests on one of its sides on HP so that the surface of the lamina is inclined at 45° to HP. The side parallel to the side on which the lamina rests is inclined at 45° to VP. Draw the top and front views of the lamina.

8. A hexagonal lamina of side 30mm is resting with one of its corner on HP so that the diagonal passing through that corner is inclined at an angle of 45° and appears to be inclined at 30° to VP. Draw the top and front views of the lamina.

9. A square lamina of ABCD of 30mm side rests on the corner C such that diagonal AC appears as at 30° to the VP in the top view. The two sides BC and CD containing the corner C make equal inclinations with the HP. The surface of the lamina makes 45° with HP. Draw its top and front views.

10. A pentagonal plane lamina of edges 20mm is resting on HP with one of its corner touching it such that plane surface makes an angle of 60° with HP. The two of the base edges containing the corner on which the lamina rests make equal inclinations with HP. If the edge opposite to this corner makes an angle of 45° with the VP. Draw the top and front views of the plane lamina in this position.

11. A hexagonal lamina of 30mm sides rests on HP on one of its sides. The side which is on HP is perpendicular to VP and the surface of the lamina is inclined to HP at 45°.
The lamina is then rotated through 90° such that the side on HP is parallel to the VP, while the surface is still inclined to HP at 45°. Draw the front view and the top view of the lamina in its final position.

12. A circular lamina of 60mm diameter rests on HP such that the surface of the lamina is inclined at 30° to HP. The diameter through the point on which the lamina rests on HP appears to be inclined at 30° to the VP in the top view. Obtain its projections.

Course Title: **Basic Computer Skills Lab**	Course Code: 15ME13P
Credits (L:T:P) : **0:2:4**	Core/ Elective: **Core**
Type of course: **Tutorial, Practice**	Total Contact Hours: **78**
CIE- 25 Marks	SEE-50 Marks

Prerequisites: Knowledge of English comprehension.

COURSE OBJECTIVES

Will learn and understand the Basics of Computers and apply the application tools like word processor, spread sheet and presentation.

COURSE OUTCOMES

On successful completion of the course, the students will be able to attain CO:

	Course Outcome	**CL**	Experiments linked	**Linked PO**	**Teaching Hrs**
CO1	Understand the basic organization of the computer.	*R/U/A*	1and 2 of Unit-1	1,2,3,4,8,9,10	**03**
CO2	Use the different tools and utilities of the operating system.	*R/U/A*	3 to 7 of Unit-1	1,2,3,4,8,9,10	**18**
CO3	Demonstrate specified skills of using word processor module.	*R/U/A*	1 to 6 of word processor part of Unit-2	1,2,3,4,8,9,10	**18**
CO4	Demonstrate specified skills of using word spread sheet module	*R/U/A*	1 to 5 of spread sheets part of Unit-2	1,2,3,4,8,9,10	**18**
C05	Demonstrate specified skills of using presentation module.	*R/U/A*	1 to 3 of presentation part of Unit-2	1,2,3,4,8,9,10	**09**
C06	Utilize the concepts learned to create a mini project.	U/A	Contents mini project part of Unit2	All ten	12
		Total sessions			**78**

COURSE PO ATTAINMENT MATRIX

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Basic Computer Skills Lab	3	3	3	3	1	1	1	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.
Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENTS

Tutorials and Practice

Unit – I

Introduction to computer hardware and software
1. Identify and understand the models of Computers, Identify and understand front panel and back panel connections of a Computer system, Identify and understand the physical components of a Computer.
2. Conduct computer system connection and understand the booting process.
3. Familiarization of GUI based Operating System environment.
4. Practice creating Icons and Folders, Creating/Opening of file, Editing and saving the document, Copy, Cut and Paste operations, in-built utilities of OS like – Text editors, paint, calculator, etc.
5. Practice browsing of different sites using search engine.
6. Practice Creating E-Mail accounts, E-Mail Group, Sending, and Receiving of E-Mails.

Unit –II
Word Processing
1. Create a Business Letter and Personal Letter.
2. Create a Company Letterhead.
3. Create a Simple Newsletter with minimum three columns. Insert a Clip art in the newsletter.
4. Create a Resume for a Job Application.
5. Create the cover page of a Project Report(use Word Art, insert Picture Image).
6. Prepare the class time table for your class.

Spreadsheet
1. Create a worksheet with five columns. Enter ten records and find the sum of all columns using autosum feature.
2. You have a monthly income of Rs.11000. Your monthly expenditures are Rent- Rs 3500, Food- Rs. 1500, Electricity- Rs.110, Phone- Rs. 160, and Cable TV-Rs. 300. Prepare a worksheet with the Monthly Income, the Monthly Expenditures listed and summed, monthly savings amount (what's left over each month) calculated, and the amount saved per day (assuming 30 days in a month).

3. Create a worksheet containing the pay details(containing Basic pay, DA, HRA ,Other Allowance , Deductions- PF,PT, Insurance, Gross and Net salary) of the employees using formulas.
4. Create a Simple Bar Chart to highlight the sales of a company for three different periods.
5. Create a Pie Chart for a sample data and give legends.

Presentation
1. Using presentation tool, Create a simple Presentation consisting of 4-5 slides about Input and Output Devices.
2. Create a presentation about a book containing Title, Author, Publisher and Contents.
3. Create an automated (with timings & animation) Presentation with five slides about different Models of Computers. Use Presentation tool.

Mini-project [CIE- 05 Marks]
1. Prepare a mini project using the above concepts of Unit-I and/or Unit-II.
   - Repair and Overhauling of PC of laboratory
   - Formatting of PC
   - Servicing of UPS
   - Prepare a report using the learned skills on Unit 1 to Unit II

Course Delivery:
The course will be delivered through tutorials of two hours and four hours of hands on practice per week

References:
1. Computer Fundamentals Concepts, Systems, Application, D.P.Nagapal, S.Chand Publication, RP-2014, ISBN: 81-219-2388-3
2. http://www.tutorialsforopenoffice.org/
3. http://www.libreoffice.org/get-help/documentation/
4. http:// www.kingsoftstore.com/

S/W Tools: Any open source tool or equivalent proprietary tools

Course Assessment and Evaluation Scheme:

Method	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
DIRECT ASSESSMENT	CIE (Continuous Internal Evaluation)	IA Tests	Students	Two Tests (Average of two tests to be computed)	10	Blue books	1,2,3,4
				Record Writing (Average marks of each exercise to be computed)	10	Record Book	1,2,3,4
				Mini Project	05	Report	1,2,3,4
				TOTAL	25		
	SEE (Semester End Examination)	End Exam		End of the course	50	Answer scripts at BTE	1,2,3,4
INDIRECT ASSESSMENT	Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2,3,4 Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2,3, 4 Effectiveness of Delivery of instructions & Assessment Methods

*CIE – Continuous Internal Evaluation   ***SEE** – Semester End Examination

Note:
1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Mini project/Student activities.

- **MODEL OF RUBRICS /CRITERIA FOR ASSESSING STUDENT ACTIVITY**

RUBRICS FOR ACTIVITY(5 Marks)					
Dimension	**Unsatisfactory**	**Developing**	**Satisfactory**	**Good**	**Exemplary**	**Student Score**
	1	**2**	**3**	**4**	**5**	
Collection of data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collect much information; but very limited relate to the topic	Collects some basic information; most refer to the topic	Collects a great deal of information; all refer to the topic	Ex: 4
Fulfil team's roles & duties	Does not perform any duties assigned to the team role	Performs very little duties but unreliable.	Performs very little duties	Performs nearly all duties	Performs all duties of assigned team roles	5
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Normally does the assigned work	Always does the assigned work without having to be reminded.	3
Listen to other Team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others to speak	Talks good; but never show interest in listening others	Listens, but sometimes talk too much	Listens and speaks a fair amount	2
Average / Total marks=(4+5+3+2)/4=14/4=3.5=4						

Note: This is only an example. Appropriate rubrics/criteria may be devised by the concerned faculty (Course Coordinator) for assessing the given activity.

Questions for CIE and SEE will be designed to evaluate the various educational components such as:

1. Remembering and Understanding :   - 20% weightage
2. Applying the knowledge acquired from the course :   - 70 % weightage
3. Analysis :   - 1% weightage
4. Evaluation :   - 1% weightage
5. Creating new knowledge :   - 8% weightage

Scheme of Evaluation for End Exam

SN	Scheme	Max. Marks
2	Testing skills/ abilities from Unit - I	05
3	One question on Word or Power point05M), one question from spread sheet(10M) from UNIT-II	15
4	Execution of Word or Power point	10
5	Execution of spread sheet	10
6	Viva voce	10
	Total	**50**
	Note: 1. Candidate shall submit Lab Record for the Examination. 2. Student should be allowed to execute directly even if she / he unable to write the procedure 3. In case of change in experiment or no write up, marks will not be awarded for writing procedure/steps.	

Resource requirements for Basic Computer Skills Lab
(for an Intake of 60 Students [3 Batches])

Hardware requirement

Sl. No.	Equipment	Quantity
1	PC systems (latest configurations with speakers)	20
2	Laser Printers	03
3	Networking (Structured) with cat 6e / wireless 24 Port switches / Wireless Router I/O Boxes for networking(as required)	03
4	Broad Band Connection	01

Software Requirement: Linux, Libre Office / Open Office / Kingsoft Office / any equivalent software.

Note:

1. Students: Computers ratio in the Lab should be strictly 1:1 for a batch of twenty Students.

FOR PRACTICE AND FINAL EAXM

Note: *One Question from Unit-I and Unit-II*

UNIT-I

1. Identify Physical components of a Computer System.
2. Demonstrate the basic formatting features in Text Editors.
3. Create two file in a folder and place the shortcut of these files on the desktop.
4. Demonstrate how search engine may be used in browsing Internet.
5. Create an email account
6. Create and Send an email with a picture attachment.
7. Demonstrate how documents can be downloaded using Internet.
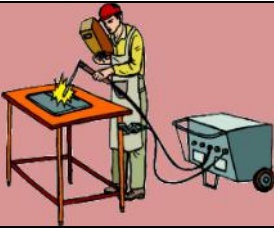
UNIT-II

1. Using Word Processor Application create a Business Letter.
2. Using Word Processor Application create a Personal Letter.
3. Using Word Processor Application create a letter head for company.
4. Using Word Processor Application create a Simple Newsletter with minimum of three columns. Insert a Clip art in the newsletter.
5. Using Word Processor Application create a Resume for a Job application.
6. Using Word Processor Application create the cover page of a Project Report (use Word Art, insert Picture Image).
7. Prepare the class time table for your class using Word Processor Application.
8. Using Spreadsheet Application, create a worksheet with five columns. Enter ten records and find the sum of all columns using auto sum feature.
9. You have a monthly income of Rs.11000. Your monthly expenditures are Rent- Rs 3500, Food- Rs. 1500, Electricity- Rs.110, Phone- Rs. 160, and Cable TV-Rs. 300. Prepare a worksheet with the Monthly Income, the Monthly Expenditures listed and summed, monthly savings amount (what's left over each month) calculated, and the amount saved per day (assuming 30 days in a month).Use Spreadsheet Application.

10. Using Spreadsheet Application, create a worksheet containing the pay details(containing Basic pay, DA, HRA ,Other Allowance , Deductions- PF,PT, Insurance, Gross and Net salary) of the employees using formulas.

11. Using Spreadsheet Application, create a Simple Bar Chart to highlight the sales of a company for three different periods.

12. Using Spreadsheet Application, create a Pie Chart for a sample data and give legends.

13. Using presentation tool, Create a simple Presentation consisting of 4-5 slides about Input and Output Devices.

14. Create a presentation about a book containing Title, Author, Publisher and Contents.

15. Create an automated (timings & animation) Presentation with five slides about different Models of Computers. Use Presentation tool.

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

	Course Title: **BASIC WORK SHOP PRACTICE-I**	Course Code: **15ME14P**
	Credits (L:T:P) : **0:2:4**	Core/ Elective: **Core**
	Type of course: **Demonstration & Practice**	Total Contact Hours: **78**
CIE- 25 Marks		SEE-50 Marks

Prerequisites: NIL

COURSE OBJECTIVES

1. Students able to understand different tool &equipment for work shop practice.
2. Students acquire skills for the preparation of different Carpentry/fitting/welding models.
3. Students able to understand the safety precaution in the workshop
4. Student acquires skills of Application orientated tasks.

COURSE OUTCOMES

On successful completion of the course, the students will be able to attain CO:

Course Outcome		CL	Linked practices	Linked PO	Teaching Hrs
CO1	Ability to prepare simple wooden joints using wood working tools	*U/A*	ALL wood joint excises	1,2,3,4,5,8,9,10	22
CO2	Ability to Produce Fitting jobs as per specified dimensions	*U/A*	ALL fitting joint excises	1,2,3,4,5,8,9,10	28
CO3	Ability to prepare simple lap, butt, T-, joint and Corner joints using arc welding equipment.	*U/A*	ALL welded joint excises	1,2,3,4,5,8,9,10	28
				Total sessions	**78**

COURSE-PO ATTAINMENT MATRIX

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
BASIC WORK SHOP PRACTICE- I	3	3	3	3	3	-	-	3	3	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.
Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

COURSE CONTENTS

UNIT:I	CARPENTRY PRACTICE	CONTACT HOURS:22 Hours

Study of the joints in roofs, doors, windows and furniture available in Polytechnic

Hands-on-exercise:
1. Demonstration of different wood working machines/ Power Tools
of different wood working process, like planning, marking, Chiseling, Grooving, turning of wood etc.
2. Exercise on One simple Wood work joints like Mortise and tennon, dovetail joint by sawing, planning and cutting.

UNIT:II	FITTING SHOP	CONTACT HOURS:28 Hours

Hands-on-exercise
1. Demonstration of different fitting tools and drilling machines and power tool
2. Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc.
3. Exercise on One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc.

UNIT:III	WELDING PRACTICE	CONTACT HOURS:28 Hours

Hands-on-exercise
Study of the tools used in Arc and Gas welding practice.

1. Demonstration of different welding tools / machines.
2. Demonstration on Arc Welding, Gas Welding, gas cutting and rebuilding of broken parts with welding.
3. Exercise on One simple job involving butt, lap, Tee and corner joint.

NOTE: FOR PRACTICAL CLASSES BATCH STRENGTH IS LIMITED TO 15 TO 20.

REFERENCES
1. Ramesh Babu.V., "Engineering Practices Laboratory Manual", VRB Publishers Private Limited, Chennai, Revised Edition, 2013 – 2014.
2. Jeyachandran.K.,Natarajan.S. andBalasubramanian.S., "A Primer on Engineering PracticesLaboratory", Anuradha Publications, 2007.
3. Bawa.H.S., "Workshop Practice", Tata McGraw Hill Publishing Company Limited, 2007.
4. RajendraPrasad.A. andSarma.P.M.M.S., "Workshop Practice", SreeSai Publication, 2002.
5. Kannaiah.P. andNarayana.K.L., "Manual on Workshop Practice", Scitech Publications, 1999.

SUGGESTED LIST OF STUDENT ACTIVITYS

Note: the following activities or similar activities for assessing CIE (IA) for 10 marks (Any one)

1. Each student should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned Instructor and Foreman with an intimation to HOD
2. *Each student should conduct different activity and no repeation should occur*

1	Take the students for local body Carpentry works observe the carpentry practices followed in preparation of furniture/wood joints and Submit hand written report of 500 words
2	Take the students for local body Fitting works observe the fitting practices followed in preparation of fitting joints and Submit hand written report of 500 words
3	Take the students for local body welding works observe the welding practices followed in preparation of welding joints and Submit hand written report of 500 words

Course Delivery:

The course will be delivered through Demonstration and Shop practices

Course Assessment and Evaluation Scheme:

	What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment meth	CIE	IA	Students	Activities	10	Report	1,2,3
				Record- Average marks of all graded exercises to be computed.	15	Graded exercises	1,2,3
	SEE	End Exam		End of the course	50	Answer scripts at BTE	1,2,3
Indirect Assessment	Student Feedback on course		Students	Middle of the course		Feedback forms	1,2,3Delivery of course
	End of Course Survey			End of the course		Questionnaires	1,2, 3Effectiveness of Delivery of instructions & Assessment Methods

Note: 1. The activity related exercises shall be evaluated as per the Rubrics developed by the concerned department related to the course.

2. The course related graded exercises to be evaluated as per performance mentioned in SEE scheme of evaluation.

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No	Bloom's Category	% Weightage
1	**Understanding**	**40**
2	**Applying the knowledge acquired from**	**50**
3	**Analysis**	**05**
4	**Evaluation& Creating new knowledge**	**05**

Note to IA verifier: ***The following documents to be verified by CIE verifier at the end of semester***

1. Student suggested activities report for 10 marks
2. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

SCHEME OF VALUATION

Note: Questions for the Semester End Exam will consist of
    i.   One Welding Model. - **15 marks**
    ii.   Any One Model from Fitting OR Carpentry- **30 marks**

Sl. no.	Performance	Fitting/ carpentry	Welding	Max.Marks
1	Listing of tools and operations.	05	05	10
2	Planning and marking	05	---	05
3	Performing of basic operations.	10	10	20
4	Dimensional accuracy	10	-----	10
5	Oral	-----	-----	05
	TOTAL	**30**	**15**	**50**

Tools-Fitter Section

Sl. No.	Name of equipment(Fitting shop)	Numbers Required as per norms
1.	Flat file 14″ rough bastard file	20
2.	Try square 6″	20
3.	Triangular file 10″ rough	20
4.	Half round file 10″ rough	20
5.	Hack saw frame solid 12″	20
6.	Center punch	20
7.	Ball peen hammer 11/2 Lbs	20
8.	Flat chisel 6″	20
9.	Smooth file 10″ flat	20
10.	Bench vice 8″	20
11.	Leg vice 6″	10

12.	Power hack saw	01
13.	Bench grinding	01
14.	Bench drilling machine up to 12mm cap	01
15.	Drill bit up to 12mm straight shunk	04
16.	Tap set and die set up to 1″	01
17.	Vernier caliper	10
18.	Spring divider	20
19.	Steel scale	20
20.	Vernier height gauge	01
21.	Surface plate 2x3 feet	02
22.	Number punch	01
23.	Anvil	20
24.	V block	02

Carpentry Tools required for –

Sl. No	Name of equipment(Carpentry shop)	Numbers Required as per Norms
1.	Carpenter bench vice	20
2.	G or C clamp 6″	20
3.	Marking gauge	20
4.	Try square 19mmx4″	20
5.	Wooden mallet	20
6.	Firmer chisel 2″	20
7.	Firmer chisel 3/4″	20

Sl. No.		Numbers
8.	Mortise chisel 1/2″	20
9.	Metal jack plane 9″	20
10.	Beveled square 6″	20
11.	Hand saw or cross cut saw	20
12.	Steel scale 12″	20

Tools- welding

Sl. No.	Name of equipment(Welding shop)	Numbers Required as per norms
1.	Arc welding transformer up to 300Amps	03
2.	Welding shield	20
3.	Ball peen Hammer 11/2 Lbs	10
4.	Chipping Hammer	10
5.	Wire brush	10
6.	Anvil	01
7.	Hand Gloves	05
8.	Flat tongs	10
9.	Steel scale	10
10.	Flat file 14″ rough bastard file	10
11.	Oxygen cylinder	01
12.	Acetylene cylinder	01
13.	Gas welding torch	05
14.	Spark lighter	05
15.	Gas welding goggles	10
16.	Gas cutting torch	02

17.	Try square 6"	10

MODEL QUESTIONS FOR PRACTICE AND SEE

DEPARTMENT OF MECHANIACL ENGG.

COURSE TITTLE:**BASIC WORKSHOP PRACTICE-1**

TIME: 3 HOURS   MARKS:50

One Welding Model is compulsory and any one   Model from Fitting OR carpentry

(Out of two models 30 marks for Fitting OR carpentry and 15 marks for welding)

FOR CARPENTRY SHOP

1.

Figure   shows drawing of a bridle joint. Copy the figure and make the joint using the given wooden piece.
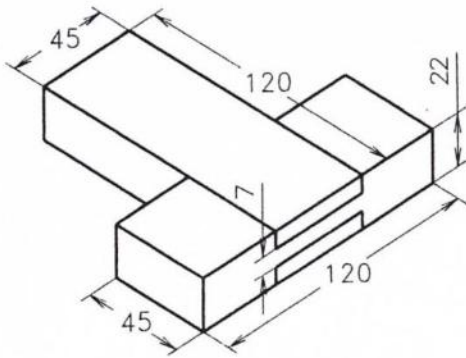
2.

Make the following models, the allotted time is 3 hours:

Figure   shows drawing of a dove-tail (halved) joint. Copy the figure and make the joint using the given wooden piece.
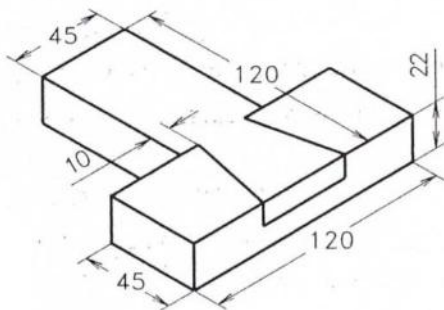
3.

Copy the sketch of the cross (halved) joint given in Figure ` and then make the joint using the given wooden piece.

45
22
120
45
120
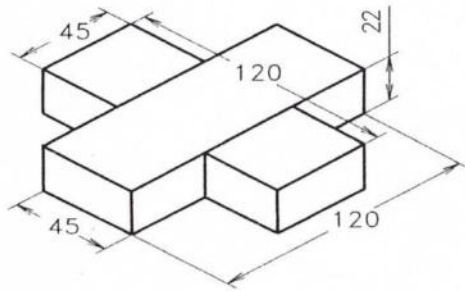
4.

Make a mortise and tenon joint of size shown in Figure using the given wooden piece. Also prepare a dimensioned neat sketch of the joint.

45
120
22
7
120
45
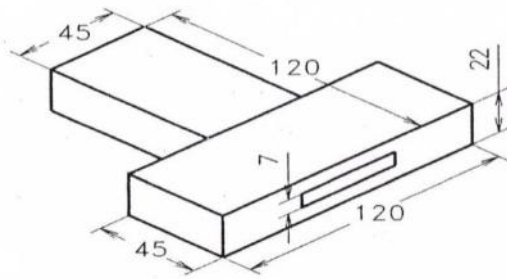
5.

Example

Make a Tee (halved) joint of the dimensions given in Figure using the given wood piece. The time allotted is 3 hours.

45
120
22
120
45
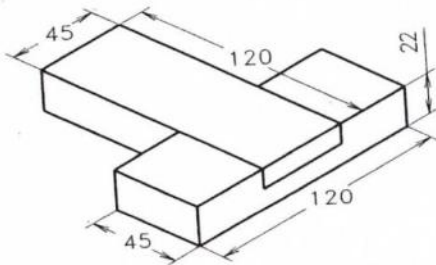
FOR FITTING SHOP

1.

Example

*Make a square joint of the dimensions given in Figure   using the given MS flat.
The time alloted is 3 hours.*
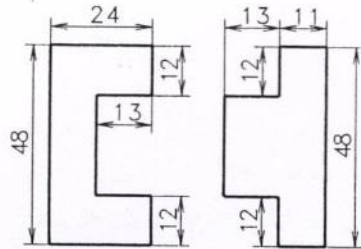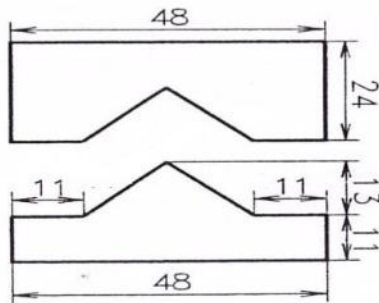
2.   3.
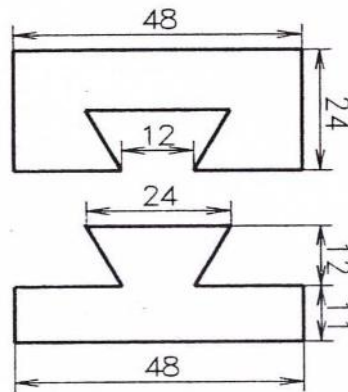
4.

Figure   gives drawing of a trapezoidal joint. Copy the figure and make
the model using the given MS flat piece.
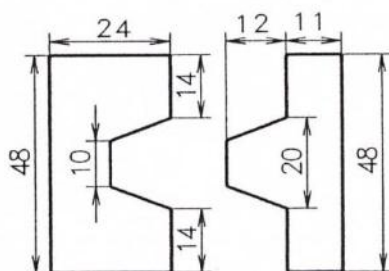
5.

Copy the sketch of the stepped joint given in Figure   Then make the joint
using the given MS flat piece.
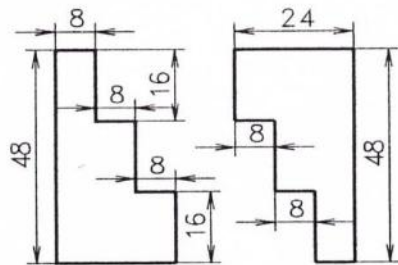
FOR WELDING SHOP

Copy the given sketch of the joint ,then make the joint using the given
MS flat piece.
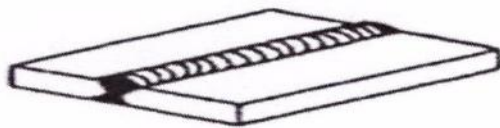
A. BUTT JOINT
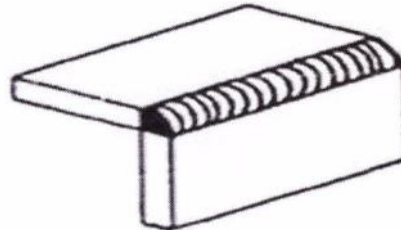
B. CORNER JOINT
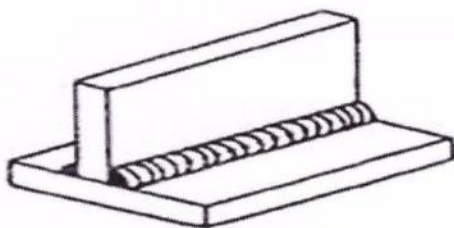
C. TEE JOINT

D. LAP JOINT

MODEL QUESTIONS FOR VIVA VOCE

CARPENTRY SHOP

1. Differentiate between soft wood and hard wood.
2. Give the list of the common names of timber suitable for carpentry work.
3. Describe the term plywood. How it is obtained as large size sheets.
4. What are the marking tools used in wood working.
5. What is meant by marking gauge? How it is used for marking.
6. Give a list of the saws used for cutting wood.
7. What is cross cut saw and tenon saw.
8. What are the types of chisels used for wood working?
9. What is meant by mallet? What is the use of mallet?
10. Give the list of the plaining tools used in carpentry shops.
11. Describe briefly the construction of use of a wooden jack plane.
12. Name the types of work holding devices used for carpentry work.
13. Explain the use of bench vice.
14. Describe the working principle of band saw and circular saw.
15. What are the common defects in timber?
16. Mention the important carpentry tools.
17. What are the marking and measuring tools used in carpentry?
18. Mention the different types of saws and explain.
19. What is spokes have?
20. What is boring tools? And its uses.
21. What are the striking tools and its uses?
22. What are the holding tools and its uses?
23. What is uses of the Rasps and Pincer
24. What are the carpentry processes used in wooden construction.
25. Mention the types carpentry joints

FITTING SHOP
1. Give a list of types of tools used in fitting operations.
2. Explain the types of work holding devices used in fitting.
3. Describe briefly the types of files used in fitting.
4. Explain the construction of a hack saw.
5. What are the types of cold chisels and for what purposes they are used.
6. Describe briefly the types of hammers used.
7. Define the term twist drill; distinguish a drill from a reamer.
8. What is a surface plate? For what purpose it is used.
9. What are the types of tools used for marking?
10. Explain the use of steel rule and a vernier caliper.
11. Explain the use of the different types of inside and outside calipers.
12. What is the use of combination set?
13. Describe how a micrometer is used for measuring a size.
14. Mention the commonly used in bench and fitting work.
15. Name the parts of a hand hammer.
16. What are the classifications of hammers?
17. What is the use of the flat, cross-cut, half round, diamond point, side chisels.
18. What is chipping?
19. Name the different parts of a file.

20. What is single cut and double cut of a file.
21. Mention the most commonly used shapes in files.
22. What is filing and mention the method of filing.
23. What is cross filing, straight filing and draw filing
24. What is a scraper and mention types of scraper.
25. What is the use of hacksaw and mention its types.
26. Mention the tools used for making.
27. What are the uses of Surface plate, Scriber, Punch, V-block, Angle plate, andtrysquare?

WELDING SHOP
1. What is welding
2. How u classify welding.
3. What is arc welding
4. What is an arc
5. What is the equipment used for arc welding.
6. How you set the voltage in arc welding
7. What is normal temperature for arc welding?
8. What are latest techniques used in arc welding.
9. What is an edge preparation?
10. Which type of electrode used in arc welding?
11. What is gas welding?
12. Name the different gases used in gas welding.
13. What are the applications of gas welding?
14. What is the equipment used in gas welding.
15. What is a flame?
16. Name the different types of flames.
17. What are the differences between Arc & Gas welding?
18. Which type of welding is used for sheet metals?
19. What are the defects in welding?
20. What are the precautions to be taken for welding?
21. Name the different safety devices used in welding
22. Name the different joints in welding.
23. What is a torch? Which welding used the torch?
24. What is Nozzle?
25. What is filler material in welding?
26. What are differences between welding & soldering?

Course Title: **ENGINEERING MATHEMATICS – II**		Course Code	: **15SC02M**
Semester	: **II**	Course Group	: **Core**
Teaching Scheme (L:T:P)	: **4:0:0**(in hours)	Credits	: **4 Credits**
Type of course	: **Lecture + Assignments**	Total Contact Hours	: **52**
CIE	: **25 Marks**	SEE	: **100 Marks**
Programmes: **Common to all Engineering Diploma Programmes**			

Pre-requisites:

Engineering Mathematics-I, in First Semester Diploma curriculum.

Course Objectives:

1. Apply the concept of straight line and conic section in engineering field.
2. Determine derivatives of functions involving two variables.
3. Apply the concepts of differentiation in physics and engineering courses.
4. Evaluate the integrals of functions of two variables.
5. Apply the concepts of definite integrals and its application over a region.
6. Solve the ODE of first degree, first order in engineering field.

Course Contents:

Topic and Contents	Hours	Marks
Unit-1: COORDINATE GEOMETRY	08hr	23
a. **Straight lines:** Different forms of equations of straight lines: $y = mx + c$, $y - y_1 = m(x - x_1)$, $y - y_1 = \left(\frac{y_2 - y_1}{x_2 - x_1}\right)(x - x_1)$. General equation of a line $ax + by + c = o$ (graphical representation and statements) and problems on above equations. Equation of lines through a point and parallel or perpendicular to a given line. Problems.	04 hr	
b. **Conic Section:** Definition of conic section. Definition of axis, vertex, eccentricity, focus and length of latus rectum. Geometrical representation of parabola, ellipse and hyperbola: Equations of parabola $y^2 = 4ax$,	04hr	

Equation of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ and Equation of hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$(without proof of above 3 equations). Equations of parabola, ellipse and hyperbola with respect to x-axis as axis of conic. Finding axes, vertices, eccentricity, foci and length of lattice rectum of conics. Problems on finding the above said equations with direct substitution.		
UNIT – 2: DIFFERENTIAL CALCULUS	15hr	39
Differentiation. Definition of increment and increment ratio. Definition of derivative of a function. Derivatives of functions of x^n, $\sin x$, $\cos x$ and $\tan x$ with respect to 'x' from first principle method. List of standard derivatives of $cosec x, sec x, cot x, \log_e x, a^x, e^x$......etc. Rules of differentiation: Sum, product, quotient rule and problems on rules. Derivatives of function of a function (Chain rule) and problems. Inverse trigonometric functions and their derivatives. Derivative of Hyperbolic functions, Implicit functions, Parametric functions and problems. Logarithmic differentiation of functions of the type u^v,where u and v are functions of x.Problems. Successive differentiation up to second order and problems on all the above types of functions.		
UNIT – 3: APPLICATIONS OF DIFFERENTIATION.	07hr	17
Geometrical meaning of derivative. Derivative as slope. Equations of tangent and normal to the curve y = f(x) at a given point- (statement only). Derivative as a rate measure i.e.to find the rate of change of displacement, velocity, radius, area, volume using differentiation. Definition of increasing and decreasing function. Maxima and minima of a function.		
UNIT-4: INTEGRAL CALCULUS.	12hr	30
Definition of Integration. List of standard integrals. Rules of integration (only statement) $1. \int kf(x)dx = k \int f(x)dx.$ $2. \int \{f(x) \pm g(x)\}dx = \int f(x)dx \pm \int g(x)dx$ problems. Integration by substitution method. Problems. **Standard integrals of the type**		

$$1. \int \frac{dx}{x^2 + a^2} = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + c \qquad 2. \int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1}\left(\frac{x}{a}\right) + c.$$

$$3. \int \frac{dx}{x\sqrt{x^2 - a^2}} = \frac{1}{a}\sec^{-1}\left(\frac{x}{a}\right) + c$$

(1 to 3 with proof)

$$4. \int \frac{dx}{x^2 - a^2} = \frac{1}{2a}\log\left(\frac{x-a}{x+a}\right) + c \quad \text{if } x > a > 0.$$

$$5. \int \frac{dx}{a^2 - x^2} = \frac{1}{2a}\log\left(\frac{a+x}{a-x}\right) + c \quad \text{if } a > x > 0. \qquad (4 \& 5 \text{ without proof})$$

and problems on above results Integration by parts of the type $\int x^n e^x dx$, $\int x\sin x dx$, $\int x\cos x dx$, $\int x\log x dx$, $\int \log x dx$, $\int \tan^{-1} x\, dx$, $\int x\sin^2 x\, dx$, $\int x\cos^2 x\, dx$ where n=1, 2. Rule of integration by parts. Problems

UNIT – 5: DEFINITE INTEGRALS AND ITS APPLICATIONS	05 hr	22
Definition of Definite integral. Problems on all types of integration methods. Area, volume, centres of gravity and moment of inertia by integration method. Simple problems.		
UNIT – 6: DIFFERENTIAL EQUATIONS.	05 hr	14
Definition, example, order and degree of differential equation with examples. Formation of differential equation by eliminating arbitrary constants up to second order. Solution of O. D. E of first degree and first order by variable separable method. Linear differential equations and its solution using integrating factor.		
Total	52	145

Course Delivery:

The Course will be delivered through lectures, class room interaction, exercises, assignments and self-study cases.

Course outcome:

On successful completion of the course, the student will be able to:
1. Formulate the equation of straight lines and conic sections in different forms.
2. Determine the derivatives of different types of functions.
3. Evaluate the successive derivative of functions and its application in tangent, normal, rate measure, maxima and minima.
4. Evaluate the integrations of algebraic, trigonometric and exponential function.
5. Calculate the area under the curve, volume by revolution, centre of gravity and radius of gyration using definite integration.
6. Form and solve ordinary differential equations by variable separable method and linear differential equations.

Mapping Course Outcomes with Program Outcomes:

CO	Course Outcome	PO Mapped	Cognitive Level	Theory Sessions	Allotted marks on cognitive levels			TOTAL
					R	U	A	
CO1	Formulate the equation of straight lines and conic sections in different forms.	1,2,3,10	R/U/A	08	6	5	12	23
CO2	Determine the derivatives of different types of functions.	1,2,3,10	R/U/A	15	12	15	12	39
CO3	Evaluate the successive derivative of functions and its application in tangent, normal, rate measure, maxima and minima.	1,2,3,10	R/U/A	07	6	5	6	17
CO4	Evaluate the integrations of algebraic, trigonometric and exponential function	1,2,3,10	R/U/A	12	9	15	6	30
CO5	Calculate the area under the curve, volume by revolution, centre of gravity and radius of gyration using definite integration	1,2,3,10	R/U/A	05	6	10	6	22
CO6	Form and solve ordinary differential equations by variable separable method and linear differential equations.	1,2,3,10	R/U/A	05	3	5	6	14
		Total Hours of instruction		52	**Total marks**			145

R-Remember; U-Understanding; A-Application

Course outcomes –Program outcomes mapping strength

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Engineering Maths-II	3	3	3	-	-	-	-	-	-	3

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3

If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2

If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1

If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Reference Books:

1. NCERT Mathematics Text books of class XI and XII.
2. Higher Engineering Mathematics by B.S Grewal, Khanna publishers, New Delhi.
3. Karnataka State PUC mathematics Text Books of I & II PUC by H.K. Dass and Dr. Ramaverma published by S.Chand & Co.Pvt. ltd.
4. CBSE Class Xi & XII by Khattar & Khattar published PHI Learning Pvt. ltd.,
5. First and Second PUC mathematics Text Books of different authors.
6. E-books:www.mathebook.net
7. www.freebookcentre.net/mathematics/ introductory-mathematics -books.html

Course Assessment and Evaluation:

Method		What	To whom	When/where (Frequency in the course)	Max Marks	Evidence collected	Contributing to course outcomes
DIRECT ASSMENT	*CIE	Internal Assessment Tests	Student	Three tests (Average of Three tests to be computed).	20	Blue books	1 to 6
		Assignments		Two Assignments based on CO's (Average marks of Two Assignments shall be rounded off to the next higher digit.)	5	Log of record	1 to 6
				Total	25		
	*SEE	Semester End Examination		End of the course	100	Answer scripts at BTE	1 to 6
INDIRECT ASSESSMENT		Student feedback	Student	Middle of the course	-NA-	Feedback forms	1 to 3, delivery of the course
		End of Course survey		End of course		Questionnaire	1 to 6, Effectiveness of delivery of instructions and assessment methods

*CIE – Continuous Internal Evaluation   ***SEE** – Semester End Examination
Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering	31
2	Understanding	41
3	Applying the knowledge acquired from the course	25
	Analysis Evaluation	3

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM	**ENGINEERING MATHEMATICS –II**	20
	Year:	Course code: **15SC02M**	

Name of Course coordinator :   Units:__ CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Model Question Paper:

II Semester Diploma Examination
ENGINEERING MATHEMATICS –II
(For All Engineering Diploma Programmes)
Time: 3 Hours][Max. Marks: 100

NOTE: i)Answer any 10 questions from section A, 8 questions from section B and 5 questions from
section-C

ii) Each question carries 3 marks in section A.

 ii) Each question carries 5 marks in section B.

iii) Each question carries 6 marks in section C.

SECTION-A

1. Find the equation of the line passing through the point (2,-3) with slope 1/3.
2. Find the equation of parabola with vertex (2,0) and focus (5,0)
3. Differentiate: $(3x + 8)^7$ with respect to x.
4. If $y = \cos^{-1} x$ show that $\frac{dy}{dx} = \frac{-1}{\sqrt{1-x^2}}$.
5. If $y = x^x$, find $\frac{dy}{dx}$.
6. If $y = \frac{1+\sin x}{1-\sin x}$ find $\frac{dy}{dx}$.
7. Find the equation to the tangent to the curve $2x^3 + 5y - 4 = 0$ at (-2,4).
8. The volume of the sphere is increasing at the rate of 6cc/sec. Find the rate of
change of radius when the radius is 3 cm.
9. Integrate: $(2x + 1)(x + 5)$ with respect to x
10. Evaluate: $\int \tan^2 x dx$
11. Evaluate: $\int \frac{\cos x}{1+\sin x} dx$
12. Evaluate: $\int_0^{\pi/4} (\sec^2 x + 1) dx$.
13. Find area bounded by the line $x + 2y = 0$, x- axis, and ordinates $x = 0,$ and $x = 4$ by
integration.
14. Form differential equation for curve $y^2 = 4ax$

SECTION – B

1. Find the equation of line passing through the point (2,5) and (-3,2).
2. Differentiate $\sqrt{x} + \log x + \sin^{-1} x + e^{\tan x} - a^x$ with respect to x.
3. Differentiate $\tan x$ with respect to x using first principal method.
4. If $y = \sinh 3x \cosh 2x$ then find $\frac{dy}{dx}$.
5. If $S = t^3 - t^2 + 9t + 8$, where S is distance travelled by particle in t seconds. Find the
velocity and acceleration at t = 2 sec.
6. Integrate: $\frac{1}{x} - \tan x + e^{-3x} + \frac{1}{1+x^2} + 5$ with respect to x.
7. Evaluate: $\int \frac{(1+\log x)^2}{x} dx$
8. Evaluate: $\int x \sin x dx$

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9. Evaluate: $\int_0^{\pi/2} \cos 5x \cos 3x \, dx$

10. Evaluate: $\int_0^{\pi/2} \cos^3 x \, dx$

11. Solve the differential equation $\sin^2 y \, dx - \cos^2 x \, dy = 0$

SECTION – C

1. Find the equation of median through B in a triangle with vertices A(-1 ,3), B(-3, 5) and C(7,-9)

2. Find the equation of hyperbola, given that vertices are $(\pm 7, 0)$ and eccentricity, e=4/3

3. If $x^y = a^x$, show that $\frac{dy}{dx} = \frac{x \log_e a - y}{x \log_e x}$.

4. If $y = e^{\tan^{-1} x}$ then show that $(1 + x^2)\frac{d^2y}{dx^2} + (2x - 1)\frac{dy}{dx} = 0$.

5. Find the maximum and minimum values of the function $f(x) = 2x^3 - 21x^2 + 36x - 20$.

6. Evaluate: $\int \tan^{-1} x \, dx$

7. Find the volume of solid generated by revolving the curve $y = \sqrt{x^2 + 5x}$ between x=1 & x=2.

8. Solve the differential equation $x\frac{dy}{dx} - 2y = 2x$

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Question Paper Blue Print:

Course: **ENGINEERING MATHEMATICS – II** Course Code**: 15SC02M**

UNIT NO		HOURS	Each questions to be set for 3 Marks Section - A	Each questions to be set for 5 Marks Section - B	Each questions to be set for 6 Marks Section- C	Weightage of Marks
1	a	4	01	01	01	23
	b	4	01	--	01	
2		15	04	03	02	39
3		07	02	01	01	17
4		12	03	03	01	30
5		05	02	02	01	22
6		05	01	01	01	14
	TOTAL	52	14	11	08	145
Questions to be answered			**10**	**08**	**05**	**100**

Guidelines to Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weight age of model fixed for each unit.
2. The question paper pattern provided should be adhered to

   Section-A: 10 questions to be answered out of 14 questions each carrying 03 marks.

   Section-B: 08 questions to be answered out of 11 questions each carrying 05 marks.

   Section-C: 05 questions to be answered out of 08 questions each carrying 06 marks.
3. Questions should not be set from the recapitulation topics.

Model Question Bank:

| Course Title: **ENGINEERING MATHEMATICS – II** | Course Code: **15SC02M** |

UNIT-1: STRAIGHT LINES AND CONIC SECTION:

3 MARK QUESTIONS

1. Find the equation of the straight line passing through (2,3) and having slope 5.
2. Find the slope and x-intercept and y-intercepts of the line $2x + 3y - 11 = 0$.
3. Find the vertex and focus of the parabola $(y - 2)^2 = 8x$.
4. Show that the lines 3x-2y+2=0, 2x+3y+7=0 are perpendicular.
5. Find the eccentricity of the ellipse $\frac{x^2}{64} + \frac{y^2}{9} = 1$

5 MARK QUESTIONS

1. Find the equation to the line passing through the point (6,-4) and perpendicular to the line 7x-6y+3=0.
2. Find the equation to the line passing through the point (2,3) parallel to the line joining the points (-8,-6) & (2,-4).
3. Find the equation of straight line inclined at 135o to the x-axis having y-intercept 2/3.
4. Find the equation of straight line joining the points (2,3) & (-4,6).
5. Find the equation of the line passes through (-3,-2) which is perpendicular to x-axis.

6 MARK QUESTIONS

1. Find the equation to the median of the triangle through the vertex A with vertices A(-1,3), B(-3,5) &C(7,-9).
2. The vertices of a quadrilateral taken in order are A(1,2), B(2,1),C(3,4) & D(-1,-2). Find the equation to the diagonal BD.

3. Obtain the equation of the hyperbola in the form $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, whose eccentricity is 8 and distance between the foci is 12.
4. Find the equation of the ellipse with length of major axis is 8 and minor axis is 3.
5. Find the equation to the line passing through point (3,-2) and perpendicular to the line joining points (5,2) &(7,-6).

UNIT-2: DIFFERENTIATION:

3 MARK QUESTIONS

1. Find $\frac{dy}{dx}$, if $y = 2x^2 - 3x + 1$.

2. Differentiate $x\tan x$ with respect to x.

3. Find $\frac{dy}{dx}$, if $x^2 + y^2 = 25$

4. Find $\frac{dy}{dx}$ if $x = ct, y = \frac{c}{t}$,

5. If $y = 4ax$, find $\frac{d^2y}{dx^2}$.

5 MARK QUESTIONS:

1. Differentiate the function x^n by method of first principle.
2. Find $\frac{dy}{dx}$ if $y = 6x^3 - 3\cos x + 4\cot x + 2e^{-x} - \frac{5}{x}$.
3. Find $\frac{dy}{dx}$ if $y = \frac{\cos x + \sin x}{\cos x - \sin x}$
4. Find $\frac{dy}{dx}$ if $y = (\cos x)^{\sin x}$
5. If $y = \tan^{-1} x$, prove that $(1 + x^2)y_2 + 2xy_1 = 0$

6 MARK QUESTIONS:

1. Find $\frac{dy}{dx}$ if $y = \frac{x\log x}{1+\sin x}$

2. Find $\frac{dy}{dx}$ if $x = a\cos^3 \theta, y = a\sin^3 \theta$ at $\theta = \pi/4$.

3. Find $\frac{dy}{dx}$ if $y = x^{x^{x^{x^{\cdot^{\cdot^{\infty}}}}}}$.

4. If $y = \tan^{-1}\left(\frac{1+x}{1-x}\right)$, find $\frac{dy}{dx}$.

5. If $y = e^{m\sin^{-1}x}$, prove that $(1 - x^2)y_2 - xy_1 - m^2y = 0$

UNIT-3 APPLICATIONS OF DIFFERENTIATION

3 MARK QUESTIONS

1. Find the slope of the tangent to the curve $x^2 + 2y^2 = 9$ at a point $(1, 2)$ on it.
2. Find the slope of the normal to the curve $y = 2 - 3x + x^2$ at $(1, 0)$.
3. The law of motion of a moving particle is $S = 5t^2 + 6t + 3$ where 'S' is the distance in metres and 't' time in seconds. Find the velocity when t=2.
4. Find the rate of change of area of a circle with respect to its radius.
5. Show that the curve $2x^3 - y = 0$ is increasing at the point $(1, 2)$.

5 MARK QUESTIONS

1. For a moving body vertically upwards, the equation of motion is given by $S = 98t - 4.9t^2$. When does the velocity vanish?
2. Find the equation to the tangent to the curve $y = 2x^2 - 3x - 1$ at $(1,-2)$.
3. A circular patch of oil spreads on water and increases its area at the rate of 2 sq.cm/min. find the rate of change of radius when radius when radius is 4 cm.
4. The volume of the spherical ball is increasing at the rate of 36π cc/sec. Find the rate at which the radius is increasing. When the radius of the ball is 2cm.
5. Find the max value of the function $y = x^3 - 3x + 4$.

6 MARK QUESTIONS

1. Find the max & min values of the function $y = x^5 - 5x^4 + 5x^3 - 1$.
2. Find the equation of normal to the curve $y = x^2 + 2x + 1$ at $(1,1)$.
3. If S is the equation of motion where $S = t^3 - 2t^2$ find its acceleration when velocity is 0.
4. The volume of sphere is increasing at 3c.c per second. Find the rate of increase of the radius, when the radius is 2cm.
5. Water is flowing into a right circular cylindrical tank of radius 50 cms at the rate of 500π cc/min. Find how fast is the level of water going up.

UNIT-4: INTEGRATION

3 MARK QUESTIONS

1. Evaluate: $\int (x^2 + x + 1)\, dx$.
2. Evaluate: $\int \cot^2 x\, dx$
3. Evaluate: $\int e^{5x+8}\, dx$
4. Evaluate: $\int \frac{1}{2x+5}\, dx$
5. Evaluate: $\int \sin^5 x \cos x\, dx$

5 MARK QUESTIONS

1. Evaluate $\int \left(x^4 - \frac{1}{x} + \cosec^2 x - e^{-2x} + \cos x \right) dx$.
2. Evaluate: $\int \cos^3 x \, dx$
3. Evaluate: $\int \sin 6x \cos 2x \, dx$
4. Evaluate: $\int \log x \, dx$
5. Evaluate: $\int \frac{(\tan^{-1} x)^3}{1+x^2} dx$

6 MARK QUESTIONS

1. Evaluate: $\int (\tan x + \cot x)^2 dx$.
2. Evaluate: $\int (x+1)(x-2)(x-3) dx$
3. Evaluate: $\int x^2 \cos x \, dx$
4. Prove that $\int \frac{dx}{x^2 + a^2} = \frac{1}{a} \tan^{-1} \left(\frac{x}{a} \right) + c$
5. Evaluate: $\int \frac{1}{9\sin^2 x + 4\cos^2 x} dx$

UNIT-5: DEFINITE INTEGRATION AND ITS APPLICAITON.

3 MARK QUESTIONS

1. Evaluate: $\int_2^3 (2x+1) \, dx$.
2. Evaluate: $\int_0^{\pi/4} \sec^2 x \, dx$.
3. Evaluate: $\int_0^2 e^x \, dx$
4. Evaluate: $\int_0^1 \frac{(\sin^{-1} x)^2}{\sqrt{1-x^2}} dx$.
5. Evaluate: $\int_0^{\pi/2} \cos x \, dx$.

5 MARK QUESTIONS

1. Evaluate: $\int_0^{\pi/2} \sin 3x \cos x \, dx$.
2. Evaluate: $\int_0^{\pi} \frac{\cos x}{1+\sin^2 x} dx$.
3. Evaluate: $\int_0^1 x(x-1)(x-2) \, dx$.
4. Find the area bounded by the curve $y = x^2 + 1$ the x-axis and ordinates $x = 1, x = 3$.
5. Find the volume of the solid generated by the revolving of the curve $y^2 = x^2 + 5x$ between the ordinates x=1, x=2 about x-axis.

6 MARK QUESTIONS

1. Evaluate: $\int_0^1 \frac{\cos(\tan^{-1} x)}{1+x^2} dx$.
2. Find the area between the curves $y = x^2 + 5$ and $y = 2x^2 + 1$.
3. Find the volume of ellipsoid generated by revolving $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ between the ordinates $x = \pm a$ about x-axis.
4. Find the centre of gravity of a solid hemisphere.
5. Determine the moment of inertia of a uniform rod of length 2l, Cross-sectional area "a" about an axis perpendicular to the rod and passing through the mid-point of the rod.

UNIT-6: INTEGRATION

3 MARK QUESTIONS

1. Write the order and degree of the differential equation $\left(\frac{dy}{dx}\right)^8 + 3\frac{d^2y}{dx^2} - ye^x = 0$.
2. Form the differential equation by eliminating arbitrary constants in $y = m\,e^{2x}$.
3. Solve $xdx + ydy = 0$.
4. Solve $\frac{dy}{1+y^2} = \frac{dx}{1+x^2}$.
5. Solve $e^x dx + dy = 0$.

5 MARK QUESTIONS

1. Form the differential equation by eliminating arbitrary constants A and B in $y = Ae^x + Be^{-x}$.
2. Form the differential equation by eliminating arbitrary constants in $y = a\cos mx + b\sin mx$.
3. Solve $(1 + y)dx + (1 + x)dy = 0$.
4. Solve $\frac{dy}{dx} + 3y = e^{2x}$.
5. Solve $\frac{dy}{dx} + y\tan x = \cos x$

6 MARK QUESTIONS

1. Solve $x(1 + y^2)dx + y(1 + x^2)dy = 0$.
2. Solve $\sec^2 x \tan y\, dx + \sec^2 y \tan x\, dy = 0$.
3. Solve $x\frac{dy}{dx} + y = x^3$
4. Solve $\frac{dy}{dx} + 3y = e^{2x}$.
5. Solve $\frac{dy}{dx} + 2y\cot x + \sin 2x = 0$

Course: ENGINEERING MATHEMATICS - II

Course code: 15SC02M

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1	Dr. D.S. Prakash	Asst. Director (LRDC)	DTE, Bengaluru
2	Dr.MokaShekhu	Lecturer (Selection Grade /Science)	Government Polytechnic, Channasandra, Bengaluru
3	Sri.Sathyanaraya Dixit	Lecturer (Selection Grade /Science)	PVP Polytechnic, Bengaluru
4	Sri. Guruprasad V	Lecturer (Selection Grade /Science)	APS Polytechnic, Somanahalli
5	Dr.RajasekharHeera	Lecturer/Science,	Government Polytechnic, Gulbarga.

Curriculum Review committee

	Name	Designation	Institution
1	Dr.MokaShekhu	Lecturer (Selection Grade /Science)	Government Polytechnic, Channasandra, Bengaluru
2	Sri.Sathyanaraya Dixit	Lecturer (Selection Grade /Science)	PVP Polytechnic, Bengaluru

Government of Karnataka
Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title	:**APPLIED SCIENCE**	Course Code	: **15SC03S**
Semester	: **I / II**	Course Group	: **Core**
Teaching Scheme in Hrs (L:T:P)	: **4:0:0**	Credits	: **4 Credits**
Type of course	: **Lecture &Assignments**	Total Contact Hours	: **52**
CIE	: **25 Marks**	SEE	: **100 Marks**
Programme: **Common to all Engineering Diploma Programmes**			

Prerequisite:

Dynamics, Heat, Sound, Matter, recent trends in Physics, Basic chemistry in Secondary Education.

Course Objective:

1. Learn concepts of Units, Laws of vectors, parallel forces, moment of force, couple.
2. Learn the fundamentals of properties and behavior of the materials
3. Learn the concepts of heat and thermodynamics.
4. Enhance theoretical and practical principles with applications of sound wave.
5. Understand different types of communication systems.
6. Develop awareness about corrosion, materials, and energy sources in engineering field.

Course Content:

UNIT I:MECHANICS   (08 Hrs)

Units and Measurements: Definition of unit, types of unit (fundamental and derived)
SI units: Definition, Basic and supplementary units, advantages.
Measuring Instruments: Vernier calipers, principle and least count, diagram of vernier calipers with labeling the parts. Screw gauge(pitch, ZE, ZC), principle and least count, diagram of screw gauge with labeling the parts, simple problems.

Scalars and Vectors: Definition of scalar and vector with examples, representation of a vector, definition of resultant, equilibrium and equilibrant. Laws of vectors: Statement of law of parallelogram of forces, Converse law of triangle of forces, Lami's theorem. Deriving an expression for magnitude and direction of resultant of two vectors acting at a point. Resolution of vectors, mentioning rectangular component of resolution of vector.

Experimental verification of law of parallelogram of forces, Converse law of triangle of forces, Lami's theorem. Simple problems on laws of vectors

Parallel forces. Types of parallel forces, Moment of force: definition, S.I unit, types and examples. Couple: definition with examples. Moment of a couple. Conditions of equilibrium of coplanar parallel forces, applications. Experimental verification of Conditions of equilibrium of coplanar parallel forces using moment bar and simple problems.

UNIT-2: PROPERTIES OF SOLIDS AND LIQUIDS: (10 Hrs)

Properties of solids: Definitions of deforming force, elasticity and plasticity, examples for elasticity and plasticity, definition of stress and its types with examples and its S.I unit, definition of strain and its types with examples, elastic limit, Hooke's law, stress - strain graph with explanation. Modulie of elasticity and its types, derivation of an expression for Young's modulus of a material. Definition of Compressibility and factor of safety. Simple problems on stress, strain and Young's modulus.

Properties of liquids: Definition of thrust and pressure with S.I units. Derivation of expression for pressure at a point inside the liquid at rest, simple problems.

Energy of liquid in motion: Kinetic, Potential energies and Pressure energy in moving liquid. Bernoulli's theorem: statement and expression (No derivation). Cohesive and adhesive forces, angle of contact.

Surface Tension: Definition of surface tension and its S.I unit, factors affecting surface tension, applications of surface tension, capillarity and its applications.

Viscosity: Types of flow of liquid, definition of stream line flow and turbulent flow, definition of viscosity, expression for coefficient of viscosity, experimental determination of coefficient of viscosity of water, effect of temperature on viscosity. List of applications of viscosity. Simple problems.

UNIT III: HEAT AND PROPERTIES OF GASES.   (07Hrs)

Concept of heat & temperature: Definitions of heat and temperature with S.I units, definition of Specific heat of substance with S I unit, equation for specific heat of a substance (no derivation).

Transmission of heat: Definitions of conduction, convection and radiation with examples, definition of thermal conductivity, derivation of co-efficient of thermal conductivity(K) and its S.I unit. Applications of conduction, convection and radiation, simple problems on K.

Gas laws: Statement of Boyle's law, Charle's law, Gay-Lussac's law, derive the relation between them (PV=nRT), definition of C_p and C_v ,relation between them (Mayer's equation no derivation), simple problems on Boyle's law and Charle's law.

Thermodynamics: Definition of thermodynamics, Laws of thermo dynamics: Zeroth law, I^{st} law and IInd law (only statement), types of thermodynamics process: isothermal process, adiabatic process.

UNIT IV: WAVE MOTION   (10Hrs)

Simple Harmonic Motion: Definition of periodic motion with example, definition of Simple Harmonic Motion, representation of S.H.M with respect to particle in circular motion, derivation of displacement of a particle executing S.H.M. Definitions of period, frequency, amplitude, in case of vibrating particle.
Wave: Definition of wave, wave period(T), wave frequency (n or f), wave amplitude (a), wave length(λ) and wave velocity (v) in case of wave motion. Derive the relation between v, n and λ. simple problems.
Types of waves: Mechanical and Non mechanical waves with examples. Definition of longitudinal and transverse waves, differences.
Propagation of sound waves in air: Newton's formula for the velocity of sound in air and Laplace's correction to it, various factors affecting velocity of sound in air. Simple problems.
Vibrations: Free vibrations, Forced vibration, Damped vibrations and Un-damped vibrations with examples. Resonance with examples. Laws of transverse vibrations of stretched string, derivation of equation for fundamental frequency of vibrations of stretched string. Simple problems.
Experiment to determine the unknown frequency of a given tuning fork by absolute and comparison methods using sonometer.
Stationary waves: Formation of stationary waves and their characteristics. Experimental determination of velocity of sound in air by using resonance air column apparatus.
Beats: Formation of Beats, definition of beat frequency, its applications.

UNIT V:MODERN PHYSICS   (07Hrs)

Electromagnetic waves: Definition, generation of electromagnetic waves and their properties.

Electromagnetic spectrum: Definition, classification and its applications.

Lasers: Principle and listing the types of Laser, properties of Laser, applications.
Nano-Technology: Definition of Nano-Technology, advantages and dis-advantages of nano-Technology.

Advance Communication Systems: Basic elements of communication systems with block diagram, List commonly used terms in electronic communication systems.

Satellite communication: Introduction, advantages and disadvantages,
Optical fiber: principle and applications.

UNIT VI: INDUSTRIAL CHEMISTRY   (10 Hrs)

Electrolysis: Definition of electrolyte, types of electrolytes with examples, definition of electrolysis. Arrhenius theory of electrolytic dissociation. Mechanism of Electrolysis. Faradays laws of Electrolysis: state and explain.
Corrosion: Definition, necessary conditions for corrosion, electrochemical theory of corrosion, list the preventive methods of corrosion.
Batteries: Basic concept, classification and applications of batteries.
Fuel cells: Definition, mentioning the types and advantages.
Metallurgy: Definitions of minerals, ore, flux, slag, alloys. Purpose of making alloys, composition and uses of alloys.
Polymers: Definition and classification of polymers, methods of polymerization and applications.
Composite materials: Definition, types, advantages and dis-advantages of composite materials.
Solutions: Definition of solute, solvent, solutions. Saturated and unsaturated solutions, concentration of solutions: normal, molar and molal solutions, simple problems on concentration of solution.
pH Value: Hydrogen ion concentration and concept of pH, definition of pH of solution, pH scale, applications of pH in different fields.

Course Delivery:

The Course will be delivered through lectures, class room interaction and exercises.

Course Outcome:

On successful completion of the course the student will be able to:

1. Determine the dimensions of objects using measuring instruments and analyze vector in mechanics.
2. Create knowledge of properties of matter applicable to engineering.
3. Apply the concepts of thermal properties of matter and gas laws related to engineering.
4. Analyse the different concepts of waves and vibration in the field of engineering.
5. Analyse the recent trends in physics related to engineering.
6. Apply the basic concepts of chemistry in the field of engineering.

Mapping Course Outcomes with Program Outcomes:

CO –PO mapping

	Course Outcome	PO Mapped	Cognitive Level	Theory Sessions	Allotted marks on cognitive levels			TOTAL
					R	**U**	**A**	
CO1	Determine the dimensions of objects using measuring instruments and analyze vector in mechanics	**1,2,3,4,9**	**R/U/A**	**08**	8	10	6	**24**
CO2	Create knowledge of properties of matter applicable to engineering.	**1,2**	**R/U/A**	**10**	6	15	6	**27**
CO3	Apply the concepts of thermal properties of matter and gas laws related to engineering	**1,2,3,9**	**R/U/A**	**07**	4	10	6	**20**
CO4	Apply the different concepts of waves and vibration in the field of engineering.	**1,2,3,9**	**R/U/A**	**10**	4	10	18	**32**
CO5	Apply the recent trends in physics related to engineering.	**1,2,6**	**R/U/A**	**07**	4	10	6	**20**
CO6	Apply the basic concepts of chemistry in the field of engineering.	**1,2,6**	**R/U/A**	**10**	4	20	6	**30**
		Total Hours of instruction		**52**	Total marks			**153**

R-Remember; U-Understanding; A-Application

Course outcomes –Program outcomes mapping strength

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Applied Science	3	3	3	1	-	2	-	-	2	-

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Reference Books:

1. Principle of physicsfor class XI and XII by V.K.Mehata and Rohit Mehta, as per Karnataka state PUC syllabusS.Chand and Company, New Delhi
2. Engineering chemistry for Diploma by Ranjan Kumar Mahapatra (PHI Learning Pvt. Ltd., New Delhi)
3. Basic Physics by Kongbam Chandramani Singh (PHI Learning Pvt. Ltd., New Delhi)
4. Principle of physics by P.V.Naik (PHI Learning Pvt. Ltd. New Delhi)

Website:

1. www.rsc.org/Education/Teachers/resources/Inspirational/…/4.3.1.pdf
2. www.nanogloss.com/nanotechnology/advantages and disadvantages
3. www.freebookcentre.net/physics/ introductory-physics-books.html

e-books:

1. Introduction to physics – II, Robert P Johnson.
2. Lecture notes physics university of Rochester.
3. Text book of Physics poynting J.H Thomson sir J.J.

Course Assessment and Evaluation:

<table>
<tr><th colspan="3">What</th><th>To Whom</th><th>Frequency</th><th>Max Marks</th><th>Evidence Collected</th><th>Course Outcomes</th></tr>
<tr><td rowspan="3">Direct Assessment</td><td rowspan="3">CIE (Continuous Internal Evaluation)</td><td>I A Tests</td><td rowspan="2">Students</td><td>Three tests (average of three tests will be computed)</td><td>20</td><td>Blue Books</td><td>1 to 6</td></tr>
<tr><td>Class room Assignments</td><td>Two Assignments based on CO's

(Average marks of Two Assignments shall be rounded off to the next higher digit.)</td><td>05</td><td>Log of Activity</td><td>1 and 6</td></tr>
<tr><td></td><td>TOTAL</td><td>25</td><td></td><td></td></tr>
<tr><td></td><td>SEE (Semester End Examination)</td><td>End Exam</td><td>Students</td><td>End Of the Course</td><td>100</td><td>Answer Scripts at BTE</td><td>1 to 6</td></tr>
<tr><td rowspan="2">Indirect Assessment</td><td colspan="2">Student Feedback on course</td><td rowspan="2">Students</td><td>Middle Of The Course</td><td colspan="2">Feedback forms</td><td>1 to 3 delivery of the course</td></tr>
<tr><td colspan="2">End Of Course Survey</td><td>End Of The Course</td><td colspan="2">Questionnaire</td><td>1 to 6 Effectiveness of delivery of instructions and assessment</td></tr>
</table>

***CIE** – Continuous Internal Evaluation   ***SEE** – Semester End Examination
Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year	Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM	**APPLIED SCIENCE**	20
	Year:	Course code:15SC03S	

Name of Course coordinator :   Units:___ CO's:_____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal Choice may be given for each CO at the same cognitive level (CL).

Question Paper Blue Print:

Course Title	:APPLIED SCIENCE	Course Code	: 15SC03S

Name and Unit No.	Allotted Hours	Questions to be set for (2marks) PART - A	Questions to be set for (5marks) PART - B	Questions to be set for (6marks) PART - C
Mechanics I	08	04	02	01
Properties of Solids and Liquids II	10	03	03	01
Heat and properties of gases III	07	02	02	01
Wave motion IV	10	02	02	03
Modern Physics V	07	02	02	01
Industrial chemistry VI	10	02	04	01
Total	**52**	**15**	**15**	**8**

Guidelines for Question Paper Setting:

1. The question paper must be prepared based on the blue print without changing the weightage of model fixed for each unit.
2. The question paper pattern provided should be adhered to

Part – A: 10 questions to be answered out of 15 questions each carrying 02 marks

Part – B: 10 questions to be answered out of 15 questions each carrying 05 marks.

Part – C: 05 questions to be answered out of 08 questions each carrying 06 marks.

Model Question Paper:

I Semester Diploma Examination
APPLIED SCIENCE
(Common for All Engineering Programmes)

Time: 3 Hours][Max Marks: 100

*Note***:** i) Answer any 10 questions from section A, each carry 02marks.
ii) Answer any 10 questions from section B, each carry 05 marks.
iii) Answer any 05 questions from section C, each carry 06 marks.

SECTION – A

1. Define Unit.
2. Differentiate scalars and vectors.
3. Define Resultant of forces.
4. Define moment of couple.
5. Define plasticity.
6. Define compressibility.
7. Define viscosity of liquid.
8. Define specific heat of substance.
9. Define thermodynamics.
10. Define time period.
11. Define beats.
12. Define Electro-magnetic waves.
13. Define Nano-Technology.
14. Define electrolyte.
15. Define composite materials.

PART-B

1. Draw a neat diagram of Vernier calipers and label its parts.
2. Write the condition for equilibrium of coplanar parallel forces with an example.
3. Explain stress-strain graph.
4. Define K.E of liquid in motion. State Bernoulli's theorem.
5. Define capillarity? Write any three application of surface tension.
6. State 1st law of thermodynamics. Explain isothermal & adiabatic process.
7. State the three gas laws.(Boyle's law, Charle's law & Gay-Lussac law)

8. Explain mechanical &non- mechanical waves with examples.
9. Distinguish between longitudinal & transverse waves.
10. Write any three advantages and two disadvantages of F.M.
11. Write the principle of laser. Lists its properties.
12. Explain the mechanism of electrolysis of HCL.
13. Write the basic concepts of batteries. Mention any three applications of batteries.
14. Distinguish between minerals and ore. Write any three applications of pH.
15. Define composite materials. Write the advantages of composite materials.

PART-C

1. Derive an expression for magnitude and direction of resultant of two forces acting at a Point.
2. Describe an   experiment to determine coefficient of viscosity of water by Poiseuille's method.
3. 1.25cc volume of a gas at 15^0C &755mm of mercury pressure. Calculate volume at NTP.
4. Derive an expression for fundamental frequency of transverse vibrations of stretched string.
5. Describe an experiment to find the unknown frequency of the given tuning fork using sonometer   by comparison method.
6. Calculate the velocity of sound in air at 25^0C & 75cm of mercury pressure, if the density of air at 0^0C & 76cm of mercury pressure is 1.29kgm^{-3}. (given γ=1.41 for air).
7. Write the basic elements of communication system with block diagram.
8. Explain any two methods of polymerization.

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Model Question Bank:

Course Title :**APPLIED SCIENCE**	Course Code : **15SC03S**

UNIT – I : MECHANICS

PART – A (02MARKS QUESTIONS)

1. Define unit of a physical quantity.
2. Define fundamental and derived units.
3. List supplementary units in S.I systems.
4. Define S.I units give two eg of S.I, basic units.
5. Define least count of measuring instrument.
6. Write the principle of Vernier calipers and screw gauge.
7. Define least count of Vernier calipers?
8. Define pitch of a screw.
9. Define ZE and ZC in screw gauge.
10. Define scalar quantity & give its examples.
11. Define vector quantity & give its examples.
12. Write the relation between resultant and equilibrant.
13. State law of parallelogram of vectors.
14. State Converse law of triangle of forces.
15. State Lami's theorem.
16. Define moment of force.
17. Write the two rectangular component of a vector.
18. Write how moment of force is measured.
19. Discus why the handles of the doors and windows are fixed at the end.
20. Define couple.
21. Define is moment of couple.
22. Write how you measure moment of couple.
23. Define equilibrium.
24. Write the conditions of equilibrium when number of co-planar parallel forces acting on a body.
25. Define like & unlike parallel forces.

PART – B (05 MARKS QUESTIONS)

1. Mention seven basic units and two supplementary units of SI system.
2. Draw a neat diagram of Vernier calipers and label its parts.
3. Draw a neat diagram of Screw Gauge and label its parts.
4. Explain parallel forces with their types.

5. List two types of moment of force. Write any three applications of couple.
6. Write the advantages of S.I system.
7. Mention the difference between scalars and vectors.
8. State Converse law of triangle of forces; write the line diagram & equation of Converse law of triangle of forces.
9. State Lami's theorem, write the line diagram & equation of lami's theorem
10. Define moment of force, write the equation to measure moment of force & give its examples.

PART – C (06 MARKS QUESTIONS)

1. Derive an expression for magnitude and direction of resultant of two forces acting at a point.
2. Derive an expression for horizontal and vertical components of force acting at an angle θ with   horizontal.
3. Write the conditions for equilibrium of coplanar parallel forces acting on a rigid body with equations & diagram.
4. Describe an experiment to verify law of parallelogram of forces.
5. Describe an experiment to verify Converse law of triangle of forces.
6. Describe an experiment to verify Lami's theorem.
7. Describe an experiment to verify the conditions of equilibrium of co-planar parallel forces using moment bar.
8. A main scale is divided into 0.5 mm the length of vernier attached to it is 12mm and is divided into 25equal parts. Calculate the value of 1vsd and L.C of vernier.
9. In Vernier calipers, main scale is divided into 1mm;9division of main scale is divided into 10 equal parts on Vernier scale. In a setting zero of Vernier scale lies between 4.8cm and 4.9cm, and 7th division of vernier coincide with the main scale division. What is the total reading?
10. A screw gauge has a pitch of 0.5mm and 50 divisions on head scale. The reading when jaws touch is +5div. When gripping a wire the reading is 3 turns and 17 div. What is the diameter of the wire?
11. The resultant of two equal forces acting at a right angle to each other is 1414N.Findthe magnitude of each force.
12. Two forces of 5kg wt. and 10kg wt. acts at right angles to one another. Find the magnitude and direction of the resultant forces.
13. Two unlike parallel forces equal to 20N and 12N acts at two points A and B on a rigid body. Find the magnitude and direction of their resultant and the point where it acts if AB=0.8m
14. Two like parallel forces equal to 80N and 100N act on a body at two points A and B. If AB=0.6m,find the magnitude and the point where there resultant acts.
15. Three forces P, Q and 100 N acting on a body in equilibrium. If the angles opposite to P and Q are 120^0 and 150^0 respectively. Find the magnitude of P and Q.

UNIT II: PROPERTIES SOLIDS & LIQUIDS

PART – A (02MARKS QUESTIONS)

1. Define plasticity.
2. Define elasticity.
3. Define deforming force.
4. Define restoring force.
5. Define stress.
6. Write the types of stress.
7. Define strain.
8. Write the type of strain.
9. Define elastic limit.
10. State Hooke's law.
11. Define Young's modulus.
12. Define Bulk modulus.
13. Define Rigidity modulus.
14. Define compressibility? Write its S.I unit.
15. Write S.I units of stress and strain.
16. Define pressure of liquid.
17. Write equation for the pressure at a point inside the liquid at rest.
18. State Bernoulli's theorem.
19. Define cohesive force.
20. Define Adhesive force.
21. Write reason why glue stick to paper?
22. Define angle of a contact.
23. Name the type of angle of a contact formed for water and glass, water and mercury.
24. Define surface tension.
25. List the factors affecting surface tension.
26. Define capillarity.
27. Write any four applications of capillarity.
28. List the applications of surface Tension.
29. Write the equation used to determine surface tension of water by capillary raise method.
30. Define viscous force.
31. Give two examples of viscous liquid.
32. Define co-efficient of viscosity. Write its S.I unit.
33. List the factors affecting viscosity of liquid.
34. Write the effect on viscosity of gas if temperature is increased.
35. Write any four applications of viscosity.
36. List the types of flow of liquid.

PART – B   (05 MARKS QUESTIONS)

1. Explain elasticity with an example.
2. Define elasticity and list three types of modulei of elasticity.
3. Define strain. Write the types of strain. Give e.g. for each type of strain.
4. Define stress. Write the types of stress. Give e.g. for each type of stress.
5. Define elastic limit. State Hooke's law? Write its mathematical form .
6. Explain stress-strain graph.
7. Define compressibility and factor of safety. Write the SI unit of stress.
8. Define thrust and pressure, write their SI units.
9. Define K.E and P.E of liquid. State the Bernoulli's theorem.
10. Define cohesive and adhesive force with an example.
11. Define pressure energy and angle of contact.
12. Define two types of flow of liquid with an example.
13. Define angle of a contact. What type of angle of contact is formed for water and glass, water and mercury? List the factors affecting surface tension.
14. Define capillarity. Write any four applications of capillarity.
15. Write the difference between stream line flow and turbulent flow of liquids.
16. Define viscosity and write the effect of temperature on viscosity of liquid & gas.
17. Define stress and explain the types of stress.
18. Define strain and explain the types of strain.
19. State Hooke's law? List any three applications of viscosity.
20. Define surface tension. Mention any three factors affecting surface tension.

PART – C (06 MARKS QUESTIONS)

1. Derive an expression for young's modulus of elasticity.
2. Derive an expression for pressure at any point inside the liquid at rest.
3. Derive an expression for co-efficient of viscosity of liquid.
4. Describe an   experiment to determine   the surface tension of water by capillary rise method.
5. Describe an   experiment to determine coefficient of viscosity of water by Poiseuille's method.
6. A uniform wire of length 0.5m and diameter 0.0006m when stretched by a mass of 5kgextends by 0.0004m. Calculate Young's modulus of wire.
7. A wire of length 1m is fixed at one end and a mass of 1kg is hung from free end, the area of cross section of the wire is 2.5×10^{-6} m^2 and the Young's modulus of the material of the wire is 2×10^{11} Nm$^{-2.}$ Calculate stress, strain and extension of the wire.
8. A spring 60cm long is stretched by 2cm by the application of a load 200g. What will be the length when the load of 500g is applied (given g = 980cm/s^2).

9. A rectangular tank is 3m long,2m wide and 1.5m in height, it contains water to a depth of 1m,the density of water is 1000kg/m³. Calculate the pressure at the bottom of the tank.

10. Calculate the pressure at the bottom of a swimming pool 10m wide if the water is 3m deep, the density of water is 1000kg/m³.

11. A square plate of 6cm side moves parallel to another plate with a velocity of 10cm/s, both the plates being immersed in water (η = 0.01poise). If the distance between the plates 0.5mm.Calculate the viscous force.

12. In a certain experiment on the flow of water through a capillary tube, the following data were obtained. Volume of water coming out per minute = 15cc; pressure head of water = 30cm
Length of tube = 25cm; radius of tube = 0.05cm; calculate coefficient of viscosity of water(g=980cm/s², density=1gm/cc)

13. A castor oil of viscosity 98.6NS/ m²   fills the space between two horizontal plates1cm apart. If the lower plate is stationary and upper plate is moving horizontally with a velocity of 3m/s . Find the tangential force per unit area.

UNIT-III: HEAT AND PROPERTIES OF GASES.

PART – A (02MARKS QUESTIONS)

1. Define heat & write SI unit of heat.
2. Define temperature & write SI unit of temperature.
3. Define specific heat of substance & write its SI unit.
4. Define conduction of heat.
5. Define convection of heat.
6. Define Radiation of heat.
7. Define Thermal conductivity.
8. Define specific heat of a gas at constant volume.
9. Define specific heat of a gas at constant pressure.
10. State Boyle's law.
11. State Charle's law.
12. State Gay-Lussac's law
13. Define isothermal process.
14. Define adiabatic process.
15. Define thermodynamics.
16. State zeroth law of thermodynamics.
17. State Ist law of Thermodynamics.
18. State IInd law of Thermodynamics
19. Write Mayer's equation.

PART – B   (05 MARKS QUESTIONS)

1. Write any five differences between heat & temperature.

2. Define heat, temperature & specific heat of Substance. Write Mayer's equation for gas.
3. Define conduction, convection, radiation and thermal conductivity.
4. Write any five applications of conduction.
5. Write any five applications of convection.
6. Write any five applications of radiation.
7. Define Cp & Cv , write the relation between them.
8. Define conduction, write applications of conduction.
9. Define convection, write applications of convection.
10. Define radiation, write applications of radiation..
11. State 1st law of thermodynamics, explain isothermal & adiabatic process.
12. Derive an expression for coefficient of thermal conductivity (K).
13. Compare the three modes of transfer of heat.
14. State the three gas laws. (Boyle's law, Charle's law & Gay-Lussac's law).
15. State zeroth law, 1st law& 2nd law of thermodynamics.

PART – C   (06 MARKS QUESTIONS)

1. With usual notations prove that pv = nRT
2. Define thermal conductivity. Derive an equation for co-efficient of thermal conductivity (K).
3. Define specific heat of a substance. Derive an equation for specific heat of substance.
4. Describe an experiment to verify Boyle's law.
5. The volume of a gas at 27^0c at2 atmospheric pressure is 2 liters.
   If the pressure is double & absolute temperature is reduced to half.
   What will be the new volume of gas?
6. A sealed glass bulb contains air at 30^0C at normal pressure. The bulb is immersed in an oil bath &heated gradually. Find the temperature in degree centigrade at which the bulb bursts if it can withstand a maximum pressure of 3.5atm.
7. The volume of certain mass of a gas at STP is $2x10^{-4}$ m^3. Find its volume at 27 ^{0}C at pressure $2.2x10^5$ Pa.
8. The volume of a gas at 15^0C is1.25cc   &755mm of mercury pressure. Calculate volume at NTP.
9. How much heat is required to raise the temperature of 5kg of copper from 27^0C to its melting point of 1063^0C? Given that specific heat of copper is 400 J/k^{0}C.
10. A hot iron ball of mass 0.2kg is dropped into 0.5g of water at 10^0C. The resulting temperature is 30^0C. Calculate the temperature of the hot ball. Specific heat of iron = 336J/kg^{0}C and specific heat of water = 4200J/kg^{0}C.
11. A silver rod 0.15m long has cross-sectional area of 0.0003m^2. If one end is maintained at 10^0C and other end at 75^0C. How much heat will flow through the rod in 5 minutes? Given that co-efficient of thermal conductivity of silver = 406 J/ms^{0}C.

UNIT-IV: WAVE MOTION

PART – A (02MARKS QUESTIONS)

1. Define frequency and amplitude of a vibrating particle.
2. Wrote   the relation between frequency and time period.
3. Define periodic motion with example.
4. Define S.H.M with example.
5. Write the equation for displacement of the particle in S.H.M.
6. Define wave motion.
7. Define wave period, wave frequency.
8. Write the relation between wave velocity, wavelength & wave frequency
9. Define non mechanical wave. Give an example.
10. Define mechanical wave. Write two types of Mechanical wave
11. Define transverse wave & give an example.
12. Define longitudinal wave & give an example.
13. Write any two differences between transverse wave and longitudinal wave.
14. Write two characteristics of transverse wave.
15. Write two characteristics of longitudinal wave.
16. Write Newton's equation for velocity of sound in a medium and name the terms involved in the equation.
17. Write the Newton's Laplace equation for velocity of sound in air
18. Write the effect of pressure on velocity of sound in air.
19. Write the effect of temp on velocity of sound in air.
20. Write the equation for velocity of sound in air at 0°c.
21. Write the effect of humidity on velocity of sound in air.
22. Define free and forced vibration.
23. Define natural frequency.
24. Define resonance.
25. Give any two practical examples of resonance.
26. Define how stationary waves are produced?
27. Write any two characteristics of stationary waves.
28. Define nodes and antinodes.
29. Write the difference between stationary waves and progressive waves.
30. Write the fundamental note in vibration of stretched string.
31. Write the formula for the fundamental frequency of vibration of stretched string.
32. State the law of tension as applied to the vibration of stretched string.
33. State the law of length as applied to the vibration of stretched string.
34. State the law of mass per unit length as applied to the vibration of stretched string.
35. Define beats.
36. Define beat frequency.
37. Write any two applications of beats.

38. Write how beat frequency can be calculated?

PART-A (05 MARKS QUESTIONS)

1. Define period, frequency & amplitude of vibrating particle.
2. Explain mechanical &non mechanical waves with examples.
3. Define longitudinal waves & transverse waves.
4. Define beat and beat frequency.
5. Obtain the relation between v, n and λ.
6. Define periodic motion & SHM with example in each.
7. Derive an expression for displacement of a particle executing SHM.
8. Define wave period, wave frequency, wave amplitude, wave length and wave velocity.
9. Distinguish between longitudinal & transverse waves.
10. Explain propagation of sound waves in air with practical example.
11. Describe Newton's formula for velocity of sound in air.
12. Explain Newton's formula for velocity of sound in air and hence Laplace correction to it.
13. Explain various factors affecting velocity of sound in air.
14. What is stationary wave? Mention the characteristics of stationary waves.
15. Why the soldiers are asked to break steps while marching across bridges.

PART- C (06 MARKS QUESTIONS)

1. Derive an expression for displacement of a particle executing SHM
2. Derive an expression for velocity of wave in terms of its frequency and wavelength.
3. Derive an expression for fundamental frequency of vibrations of stretched string.
4. Describe an experiment to determine the velocity of sound in air at room temperature by resonance air column method.
5. Describe an experiment to find the unknown frequency of the given tuning fork using sonometer by comparison method.
6. Describe an experiment to determine frequency of Turing fork by absolute method using sonometer.
7. A wave of frequency 600MHZ travels at a speed of 3×10^8 m/s. Calculate its wavelength &calculate the frequency of same type of wave whose wavelength is 40m.
8. If the frequency of tuning fork is 500Hz & velocity of sound is 300m/s. Find how far sound travels while the fork completes 25 vibrations.
9. Calculate the velocity of sound in air at $25^0 C$ & 75cm of mercury pressure, if the density of air at $0^0 C$ & 76cm of mercury pressure is 1.29kgm^{-3}. (Given γ=1.41 for air).
10. Calculate the speed of sound at $-50^0 C$ & at $+100^0 C$, given speed of sound   at $0^0 c$ is 332 m/s.
11. The density of air at NTP is 1.293 kgm^{-3}&γ=1.402. Calculate the frequency of a tuning fork which emits sound of wavelength 0.75m at 26^0 c.
12. A string of length 2m is stretched by a force of 3200N. If the frequency of vibration is

100Hz. Find the mass of the string.

13. A string has length of 0.3m & weight 2×10^{-3}kg. What must be the tension in the string so that when vibrating string transversely, it has a fundamental frequency 320 Hz?

14. A Sonometer wire of 0.5m long vibrates in two segments & is stretched by a force of 5kg wt. Calculate the frequency of the note emitted. (g=9.8m/s^2 linear density of the wire=0.018kg/m).

15. The frequency of Sonometer wire is doubled when the tension is increased by 12kg wt. Find the original tension.

UNIT V: MODERN PHYSICS

PART – A (02MARKS QUESTIONS)

1. Define electromagnetic waves.
2. State two characteristics of electromagnetic waves.
3. Write how electromagnetic waves are produced?
4. Define electromagnetic spectrum.
5. Write any two uses of electromagnetic spectrum.
6. Write the principle of LASER.
7. List any two types of LASER.
8. Write any two principle of LASER.
9. Write any two applications of LASER.
10. Define nanotechnology.
11. Write two advantages of nanotechnology.
12. Write two disadvantages of nanotechnology.
13. Write what do you mean by communication?
14. Write the basic elements of communication system.
15. List any two commonly used terms in electronic communication system.
16. Write two advantages of communication satellite.
17. Write two disadvantages of communication satellite.
18. Define optical fiber.
19. Write the principle of optical fiber.
20. Write two advantages of optical fiber.

PART-B   (05 MARKS QUESTIONS)

1. Describe the generation of electromagnetic waves.
2. Write any five properties of electromagnetic waves.
3. Explain how electromagnetic spectrum is classified?
4. Write any five applications of electromagnetic spectrum.
5. Explain the principle of LASER. List the properties of LASER.
6. Write any five advantages of LASER.
7. Write five advantages of nanotechnology.
8. Write advantages and disadvantages of nanotechnology.

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9. Write the block diagram of communication system.
10. List any five commonly used terms in electronic communication system..
11. Write five advantages of satellite communication.
12. Write any five disadvantages of satellite communication.
13. Write any five advantages of optical fiber.
14. Explain satellite communication. List any two disadvantages of satellite communication system.

PART- C (06 MARKS QUESTIONS)

1. Define electromagnetic waves. Write four properties of electromagnetic waves.
2. Define electromagnetic spectrum. Explain how electromagnetic spectrum is classified.
3. Write the applications of electromagnetic spectrum.
4. List six applications of LASER.
5. Write six advantages of nanotechnology.
6. Write what you mean by communication system. Write the block diagram of communication system..
7. Define satellite communication system. Write four advantages of satellite communication system.
8. Write the principle of optical fiber. Write four applications of optical fiber.

UNIT VI   INDUSTRIAL CHEMISTRY

PART – A (02MARKS QUESTIONS)

1.Define electrolysis.
2.Define electrolyte.
3.Write any four   examples of electrolyte.
4.Define strong and weak electrolyte.
5.Write any two postulates of Arrhenius theory of electrolytic dissociation.
6.State Faradays Ist law of electrolysis.
7.State Faradays IInd law of electrolysis.
8.Define corrosion.
9.List any two preventive methods of corrosion.
10.Define batteries.
11.Write any two applications of batteries.
12.Define fuel cells.
13.Write any two types of fuel cells.
14.Write any two advantages of fuel cells.
15.Define minerals.
16.Define ore.
17.Define flux.
18.Define slag.
19.Define   an alloy.
20.Write any two uses of alloys.

21. Define polymers.
22. Define polymerization.
23. Write any two applications of polymers.
24. List the methods of polymerization.
25. Define composite materials.
26. Write any two types of composite materials.
27. Write two advantages of composite materials.
28. Write two disadvantages of composite materials.
29. Define solute.
30. Define solvent.
31. Define solution.
32. Define saturated solution.
33. Define unsaturated solution.
34. Define concentration of a solution.
35. Define normal solution.
36. Define molar solution.
37. Define molal solution.
38. Define pH of a solution.
39. Write any two applications of pH.
40. Write hydrogen ion concentration in case of neutral solution.

PART-B   (05 MARKS QUESTIONS)

1. Explain the mechanism of electrolysis of HCl.
2. Define corrosion. Write the necessary condition of corrosion.
3. Write any five postulates of Arrhenius theory of electrolytic dissociation.
4. State Ist and IInd Faradays laws of electrolysis.
5. Write any five preventive methods of corrosion.
6. Write the classification of batteries. Write two applications of batteries.
7. Write two types of fuel cells. List any three advantages of fuel cells.
8. Define alloys. Write the purpose of making alloys.
9. Write the classification of polymers. Write any three applications of polymers.
10. Define composite material. Write any two advantages of composite materials.
11. Calculate the concentration of solution when 110gmof copper sulphate is dissolved in 550gm of a solvent.
12. Define pH of a solution. Explain acid, base, and neutral solution on the basis of pH value.

PART- C (06 MARKS QUESTIONS)

1. State and explain Faradays laws of electrolysis?
2. Explain the mechanism of electrolysis of HCL.
3. Define corrosion. Write the necessary condition for corrosion.
4. Write any six preventive methods of corrosions.
5. Explain the electrochemical theory of corrosion.

6. Mention what is battery? Write the applications of batteries.

7. Define fuel cells. Mention the types of fuel cells.

8. Write the advantages of fuel cells.

9. Define minerals, ore, flux, slag and alloys?

10. Write the composition steel. List three uses of alloys.

11. Explain any two methods of polymerization.

12. Write the applications of polymers.

13. Write the advantages and disadvantages of composite materials.

14. Define molar and normal solution. What is concentration of a solution?

15 .Write any six applications of pH.

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Government of Karnataka
Department of Technical Education, Bengaluru

Course: APPLIED SCIENCE
Course code: 15SC03S

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1	Mr. R B Pawar	Principal	Govt. Polytechnic, Bijapur
2	Mr. K.Nazeer Ahmed	Selection Grade Lecturer	Govt. Polytechnic, Mulbagilu
3	Mr. Liyakhat Ali Khan	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
4	Dr. HanumanthaNayak	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
5	Ms. Bhagirathi B N	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru

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Curriculum Review Committee

	Name	Designation	Institution
1	Mr. K.Nazeer Ahmed	Selection Grade Lecturer	Govt. Polytechnic, Mulbagilu
2	Mr. Liyakhat Ali Khan	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
3	Smt. Revathi	Selection Grade Lecturer	M.E.I. Polytechnic, Bengaluru

Course Title:	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	Course Code	: **15EE01E**
Semester	: **I / II/ III**	Course Group	: **Core**
Teaching Scheme (L:T:P)	: **4:0:0** (in Hours)	Credits	: **4 Credits**
Type of course	: **Lecture + Assignments**	Total Contact Hours	: **52**
CIE	: 25 Marks	SEE	: **100 Marks**
Programme: Mechanical (GL), Mechanical (Instr.), MTT, HPT, WSM, Automobile, Mechatronics, Printing Technology, Textile Technology, Ceramics, Mining Engg., Metallurgical Engg., Aeronautical Engineering.			

Pre-requisites	:Mathematics and Science in Secondary Education.
Course Objectives	:To introduce the concept of electrical current, voltage, power, energy, electrical circuits, magnetic fields, electromagnetic induction and alternating current. Introduction of Transformers, DC Generators, AC Generators and Motors, protective devices and Earthing. Introduction to Battery, UPS, electronic components and their applications.

Course Unit-wise Weightage of Marks:

Unit Nos.	Topics	Teaching Hours	SEE Max. Marks
1	Electricity and DC Circuits	10	30
2	Electromagnetism and DC Generators	6	15
3	AC Fundamentals, Transformers and AC Generators	10	30
4	Electric Motor Drives	9	25
5	Protective Devices, UPS and Estimation	8	20
6	Electronic Components and Applications	9	25
	Total	**52**	**145**

Course Outcomes

On successful completion of the course, the student will be able to:

1. Understand basics of Electricity and Ohm's law and DC circuits
2. Understand Faraday's laws of electromagnetic induction and DC Generator.
3. Understand AC fundamentals, AC generator and Transformer.
4. Differentiate the applications of DC & AC motors , necessity of starters.
5. Understand protective devices like Fuses, MCB, and ELCB and earthing and safety measures, Batteries and UPS.
6. Understand electronic components and their applications, working of rectifiers and logic gates.

Composition of Educational Components

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's Taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)	Total Marks (145)
1	Remembering	10	15
2	Understanding	70	100
3	Application	20	30
Total		**100**	**145**

Course Outcome linkage to Cognitive Level

Cognitive Level Legend: R- Remember, U- Understand, A- Application

	Course Outcome	CL	Linked PO	Teaching Hrs
CO1	Understand basics of Electricity and Ohm's law and DC circuits	*R/U/A*	1,2,10	10
CO2	Understand Faraday's laws of electro-magnetic induction and DC Generator.	*R/U*	1,2,10	6
CO3	Understand AC fundamentals, AC generator and Transformer.	*R/U/A*	1,2,10	10
CO4	Differentiate the applications of DC & AC motors, necessity of starters.	*R/U*	2,10	9
C05	Understand protective devices like Fuses, MCB, and ELCB and earthing and safety measures, Batteries and UPS.	*U/A*	1,2,10	8
C06	Understand electronic components and their applications, working of rectifiers and logic gates.	*U/A*	1,2,10	9
			Total sessions	**52**

COURSE CONTENT AND BLUE PRINT OF MARKS FOR SEE:

Unit No	Unit Name	Hour	Max. Marks per Unit	Questions to be set for (5marks) PART - A			Questions to be set for (10marks) PART - B			Marks weightage (%)
				R	U	A	R	U	A	
1	Electricity and DC Circuits	10	30	1	1	-	-	1	1	20
2	Electromagnetism and DC Generators	6	15	1	-	-	-	1	-	10
3	AC Fundamentals, Transformers and AC Generators	10	30	1	-	1	-	2	-	20
4	Electric Motor Drives	9	25	-	1	-	1	1	-	18
5	Protective Devices, UPS and Estimation	8	20	-	1	1	-	1	-	14
6	Electronic Components and Applications	9	25	-	1	-	-	1	1	18
	Total	**52**	**145**	**9 (45 Marks)**			**10 (100 Marks)**			**100**

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Basic Electrical and Electronics Engineering.	3	3	-	-	-	-	-	-	-	3

LEVEL 3- HIGHLY ADDRESSED, LEVEL 2-MODERATELY ADDRESSED, LEVEL 1-LOW ADDRESSED.
METHOD IS TO RELATE THE LEVEL OF PO WITH THE NUMBER OF HOURS DEVOTED TO THE COS WHICH ADDRESS THE GIVEN PO.
IF ≥40% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 3
IF 25 TO 40% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 2
IF 5 TO 25% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 1
IF < 5% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS CONSIDERED NOT-ADDRESSED.

Course Content:

Unit 1

Electricity and DC Circuits: Introduction to sources of electrical energy, advantages, effects of electric current and its applications. Electrical current, voltage, emf, potential difference, electric work, power, energy & their units and measuring instruments. Conductors, insulators and semiconductors. Resistance, Ohm's law and limitations, Problems on ohms law. .Problems on power and energy. Resistances connected in series, parallel, series and parallel combinations. Simple problems on resistance combinations..Horse Power and BHP

Unit 2

Electromagnetism: Magnetic field, Magnetic flux, Magneto motive force, flux density, Reluctance and their units. permeability. Faraday's laws, statically and dynamically induced EMF, self and mutual induced emf. Inductance, mutual inductance and their units.
DC Generator: Construction and working.

Unit 3

Fundamentals of AC Circuits: Sinusoidal voltage, current, amplitude, time-period, cycle, frequency, phase, phase difference, RMS value, Average value, form factor, and their units. Simple Problems. Capacitance, capacitive reactance, inductive reactance, impedance and their units. Power, power factor and units. Problems on reactance, impedance , power and power factor in series R-L,RC,RLC circuits. Difference between single phase and three phase power. Advantages of three phase power over singe phase power.
Transformers: construction working, application, ratings.
AC Generators: construction working, applications, ratings.

Unit 4

Electric Motor Drives: DC motors, types, applications and selection criteria. AC motors, single and three phase motors, selection criteria, FHP motors applications and selection criteria, applications of single phase and three-phase motors. Name plate details of single phase and 3 phase motors. Necessity of starters for AC motors, types and applications. Advantages of 3 phase motors over single phase motors. List out the motors used for following purposes; Mining, Printing, Textiles, Cement, Mechanical, Aeronautical and Chemical industries by giving selection criteria. Importance of Motor enclosures, types, and their applications.

Unit 5

Protective Devices, UPS& Estimation: Necessity of protective devices, ratings, rewireable, cartridge, and HRC fuses. Types of switches, MCB and ELCB. Necessity of electrical earthing and types. General safety precautions to prevent electrical accident, first aid in electric shock. Cell, battery, types of batteries, conditions of fully charged and discharged battery of lead acid battery, sealed maintenance free (SMF) battery. Selection of batteries.UPS, types, applications and selection criteria of UPS.
i)Plan and estimate the cost of electrical wiring for one 3mX3m room having consisting of 2 tube lights, 1 ceiling fan, 2 three pin socket.

ii) Plan and estimate the cost of electrical wiring for one lathe for three phase wiring with MCBs, starters, Iron clad switches, and HRC fuses.

Unit 6

Electronic Components and Applications: Intrinsic and extrinsic semiconductors, P and N type materials. Diode, types and their applications. Forward and Reverse bias characteristics of a Diode. Half wave ,full wave and bridge rectifiers without filter. Zener diode as a voltage regulator. Transistor (BJT)working, applications, and transistor as a switch.SCR working and industrial applications. Timers, applications. Relays, applications. Logic gates – OR,AND,NOT, EX-OR, NAND, and NOR, meaning and advantages of IC.

Reference Books:

1. ABC of Electrical Engineering by B. L. Theraja and A. K. Theraja, S Chand Publishers, New Delhi, 2014 Edition.
2. Basic Electrical and Electronics Engineering by S. K. Bhattacharya, Pearson Education India, 2012 Edition.
3. Electronic Devices and Circuits by I. J. Nagrath, PHI Learning Pvt. Ltd., 2007 Edition.
4. Basic Electrical Engineering byV. Mittle and ArvindMittle, McGrawHill Companies, 2005 Edition.

e-Resources

5. http://jenko.eu/marjan/fpp_izredni/knjiga_df/df_1_digital_concepts.pdf
6. http://www.facstaff.bucknell.edu/mastascu/elessonshtml/eeindex.html - Welcome to Exploring Electrical Engineering.
7. Fundamentals Handbook of Electrical Science, Module 1, Basic Electrical Theory, Department of Energy, U. S. Department of Energy, June 1992.
8. http://www.freeengineeringbooks.com/Electrical/Basic-Electrical-Engineering.php
9. http://www.electrical-engineering-portal.com

Course Contents with Lecture Schedule:

Lesson No./ Session No.	Contents	Duration
	Electricity and DC Circuits:	**10 Hours**
1.	Introduction to sources of electrical energy, advantages,	01 Hour
2.	Effects of electric current and its applications.	01 Hour
3.	Electrical current, voltage, emf, potential difference	01 Hour
4.	Electric work, power, energy & their units and measuring instruments.	01 Hour
5.	Problems on power and energy	01 Hour
6.	Conductors, insulators and semiconductors. Resistance.	01 Hour
7.	Ohm's law and limitations.	01 Hour
8.	Problems on ohms law	01 Hour
9.	Resistances connected in series, parallel, series and parallel combinations. Horse Power and BHP.	01 Hour
10.	Simple problems on resistance combinations.	01 Hour
	Electromagnetism and DC Generator	**6 Hours**
11.	Magnetic field, Magnetic flux, Magneto motive force	01 Hour
12.	Flux density, Reluctance and their units. Permeability.	01 Hour
13.	Faraday's laws, Statically and dynamically induced EMF,	01 Hour
14.	Self and mutual induced emf.	01 hour
15.	Inductance, mutual inductance and their units.	01 Hour
16.	DC Generator- construction and working	01 Hour
	Fundamentals of AC Circuits, Transformers, and AC Generators	**10 Hours**
17.	Sinusoidal voltage, current, amplitude, time - period, cycle, frequency,	01 Hour
18.	Phase, phase difference, RMS value, Average value, form factor, and their units. Problems on sinusoidal wave.	01 Hour

Lesson No./ Session No.	Contents	Duration
19.	Capacitance, capacitive reactance, inductive reactance, impedance and their units.	01 Hour
20.	Power, power factor and units. Difference between single phase and three phase power.	01 Hour
21.	Problems on reactance, impedance , power and Power factor.	01 Hour
22.	Advantages of three phase power over single phase power	01 Hour
23.	Transformers- construction and working,	01 Hour
24.	Transformers- ratings and applications.	01 Hour
25.	AC Generators- construction working,	01 Hour
26.	AC Generators-ratings and applications.	01 Hour
	Electric Motor Drives	**9 Hours**
27.	DC Motors, types, applications	01 Hour
28.	Selection criteria of DC motors.	01 Hour
29.	AC motors, single and three phase, Advantages of 3 phase motors over single phase motors.	01 Hour
30.	Selection criteria for AC motor selection	01 Hour
31.	FHP motors applications and selection criteria,	01 Hour
32.	Applications of single phase and three-phase motors.	01 Hour
33.	Name plate details of single phase and 3 phase motors. Necessity of starters for AC motors, types and applications.	01 Hour
34.	List out the motors used for following purposes; Mining, Printing, Textiles, Cement, Mechanical, Aeronautical and Chemical industries by giving selection criteria.	01 Hour
35.	Motor enclosures, importance and their applications.	01 Hour
	Protective Devices, Batteries ,UPS and Estimation	**8Hours**
36.	Necessity of protective devices. Types	01 Hour

Lesson No./ Session No.	Contents	Duration
37.	Rewire-able fuse, fuse cartridge, and HRC fuse. Types of switches, MCB and ELCB. and Ratings of protective devices.	01 Hour
38.	Necessity of electrical earthing and types. General safety precautions and electric shock treatment.	01 Hour
39.	Cell, battery, types of batteries, conditions of fully charged and discharged battery of lead acid battery	01 Hour
40.	Sealed maintenance free (SMF) battery. Selection of batteries.	01 Hour
41.	UPS, types, applications and selection criteria of UPS.	01 Hour
42.	Plan and estimate the cost of electrical wiring for one 3mx3m room consisting of 2 tube-lights, 1ceiling fan, 2 three pin socket.	01 Hour
43.	Plan and estimate the cost of electrical wiring for One lathe for three phase wiring with MCBs, starters, Iron clad switches, and HRC fuses.	01 Hour
	Electronic Components and Applications	**9 Hours**
44.	Intrinsic and extrinsic semiconductors, P and Ntype materials.	01 Hour
45.	Diode, types and their applications. Forward and Reverse bias characteristics of a Diode.	01 Hour
46.	Half wave and full wave bridge rectifiers without filter.	01 Hour
47.	Zener diode as a voltage regulator. Transistor (BJT) -working,	01 Hour
48.	Transistor types, applications, and transistor as a switch.	01 Hour
49.	SCR working and industrial applications.	01 Hour
50.	Timers, applications.	01 Hour
51.	Relays, applications.	01 Hour
52.	Logic gates–OR,AND,NOT, EX-OR, NAND, and NOR, advantages and applications of IC.	01 Hour

Course Delivery:

The Course will be delivered through lectures, classroom interaction, animations, group discussion, exercises and assignments.

Course Assessment and Evaluation

			What	**To Whom**	**Frequency**	**Max Marks**	**Evidence Collected**	**Course Outcomes**
Direct Assessment	**CIE (Continuous Internal Evaluation)**		I A Tests	Students	Three IA tests for Theory: (Average marks of Three Tests to be computed).	20	Blue Books	1 to 6
			Classroom Assignments		Student Activities	05	Log of Activity	1 to 6
					TOTAL	**25**		
	SEE (Semester End Examination)		End Exam	Students	End of the Course	100	Answer Scripts at BTE	ALL CO's
Indirect Assessment		Student Feedback on course		Students	Middle of The Course	Feed Back Forms		1-3 Co's
		End Of Course Survey			End of The Course	Questionnaires		All Co's

*CIE – Continuous Internal Evaluation   ***SEE** – Semester End Examination

Note: I.A. test shall be conducted for 20 marks. Average marks of three tests shall be rounded off to the next higher digit.

Note to IA verifier: ***The following documents to be verified by CIE verifier at the end of semester***
1. Blue books (20 marks)
2. Student suggested activities report for 5 marks and should be assessed on RUBRICS
3. Student feedback on course regarding Effectiveness of Delivery of instructions & Assessment Methods.

Suggested Student Activities:

Each Student has to prepare a self-hand written report of 3 pages or solved in a blue book considering any one of the following topics.

1. Using suitable meters/ instruments give the practical working circuits to measure Resistance, Current, Voltage, Power and Energy in DC and AC (Single phase) Circuits.
2. Report on different materials used for electromagnets with their properties.
3. Applications of Electro Magnetic Induction, statically induced and dynamically induced emf, self and mutual induced emfs.
4. Practical applications of Single Phase AC supply and Three phase AC supply with their operating voltages and other electrical parameters.
5. Report on types of starters and enclosures used for various industrial applications of AC motors.
6. Visit nearby Battery charging and inverter (UPS) shop or show room and prepare a report of the visit.
7. Visit nearby electronics shop/ market and identify the different diodes and rectifier with their ratings.
8. Prepare a wiring plan for a building/ lab/ room, etc.

MODEL OF RUBRICS / CRITERIA FOR ASSESSING STUDENT ACTIVITY (Course Coordinator)

Dimen sion	Scale					Students score (Group of five students)				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary	1	2	3	4	5
1	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	3				
2	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2				
3	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	5				
4	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks One activity on any one CO (course outcome) may be given to a group of FIVE students Grand Average/Total						14/4 =3.5 ≈4				

Dimension	Scale					Students score (Five students)				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary	1	2	3	4	5
1.Organisation	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed	3				
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles	2				
3.Conclusion	Poor	Less Effective	Partially effective	Summarises but not exact.	Most Effective	5				
4.Convensions	Frequent Error	More Error	Some Error	Occasional Error	No Error	4				
					Total marks	14/4=3.5 ≈4				

FORMAT OF I A TEST QUESTION PAPER (CIE)

Test/Date and Time	Semester/year		Course/Course Code	Max Marks
Ex: I test/6 th weak of sem 10-11 Am	I/II SEM			20
	Year:			

Name of Course coordinator :   Units:__
CO's:____

Question no	Question	MARKS	CL	CO	PO
1					
2					
3					
4					

Note: Internal choice may be given in each CO at the same cognitive level (CL).

Test/Date and Time	Semester/year	Course/Course Code		Max Marks
2ⁿᵈ Test/ 10ᵗʰ week, 9 Feb 16, 10-11 AM	I SEM, Mech. Engg.	**Basic Electrical and Electronics Engg.**		20
	Year: 2015-16	Course code: 15EE01E		

Name of Course coordinator:
Units Covered :3 and 4
Course Outcomes : 3 and 4
Instruction :(1). Answer all questions   (2). Each question carries five marks

Question No.	Question	CL	CO	PO
1	Define and state the units of i) Maximum value ii) Instantaneous value and iii) form factor.	R	3	1,2,10
2	Explain the construction of an AC Generator. OR A resistance of 100 Ω is connected in series with a capacitance of 150 µF. If this is connected to 200V, 50 Hz supply, find i) Impedance ii) Current and iii) Power factor	U A	3	1,2,10
3	State the necessity of Starters for AC Motors. List the types and applications.	R	4	2, 10
4	Explain the need of mechanical enclosures. List the types and applications. OR List out the applications of DC and AC Motors.	U U	4	2, 10

CL: Cognitive Level, R-Remember, U-Understand, A-Application, PO: Program Outcomes

Model Question Paper:

<div align="right">Code:15EE01E</div>

I /II Semester Diploma Examination
BASIC OF ELECTRICAL AND ELECTRONICS ENGINEERING

(Common for Mechanical (GL), Mechanical (Instr.), MTT, HPT, WSM, Mechatronics, Printing Technology, Textile Technology, Ceramics, Mining Engg., Metallurgical Engg..)

Time: 3 Hours]   **[Max Marks: 100**

*Note***:**   i) Answer any SIX questions from PART - A. Each question caries 5 marks.

               ii) Answer any SEVEN Questions from PART - B. Each question caries 10 marks.

PART – A

1. State the Sources of Electrical Energy.

2. Define and mention the SI units of i) Electric Current ii) Voltage

3. State Faraday's First and Second Laws of Electromagnetic Induction.

4. Define i) RMS value ii) Average value and write equations.

5. State the working principle of a Transformer.

6. State Five applications of DC motors.

7. Write the name plate details of a three phase Induction Motor.

8. Distinguish between MCB and ELCB.

9. State the advantages of Integrated Circuits over discrete components.

PART – B

10. a. State Ohm's Law and mentions the limitations.   4

     b. Three resistances of 6 Ω, 4 Ω and 10 Ω are connected in series, across supply of 100 V, Find   i) Effective resistance of the circuit.

                 ii) Total current in the circuit.

                 iii) Current through each resistance   6

11. a. Define i) Electric Power ii) Electric Energy   and mention the meters used to measure them.   4

b. A house consists of two bulbs of 100W each, three bulbs of 60W each and one

fluorescent lamp of 40W. If they are used for 4 hours a day, find monthly consumption charges at Rs. 2.70 per unit. 6

12. a. Define with SI Units. i) Magnetic Flux ii) Magneto motive Force.   4
     b. Distinguish between Statically Induced and Dynamically Induced emf.   6

13. a. Explain the construction of DC Generator.   4
 b. Draw a sinusoidal waveform and mark the following
       i) Maximum value
       ii) Instantaneous value
       iii) cycle   6

14.a. State Five advantages of 3-phase power supply over 1-phase power supply.   5
     b. Explain the construction of an AC Generator.   5

15. a. State Five applications of FHP motors.   5
b. State the necessity of starters for 3-phase induction motors and list the types.   5

16. a. State the advantages of three phase motors over single phase motors.   5
b. Explain the need for different motor enclosures and state the applications. 5

17. a. State any five general electrical safety precautions.   5
b. Mention the conditions for fully charged and discharged lead acid battery.   5

18. a. Explain the selection criteria of an un-interrupted power supply (UPS).   4
b. Distinguish between Intrinsic and extrinsic semiconductors.   6

19. a. Explain the working of a full wave diode bridge rectifier with a neat sketch.   5
b. Draw the logic symbol and write the truth table for

   i) NAND gate and ii) NOR gate.   5

Model Question Paper Bank

Course Title:	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**	Course Code	: **15EE01E**

All the questions carry 5 marks each.

Unit 1 - Electricity and DC Circuits

Cognitive Level: REMEMBER

1. State the Sources of Electrical Energy.
2. State Five effects of Electrical Current with an example each.
3. Define and mention the SI units of i) Electric Current   ii) Voltage.
4. Define and mention the SI units of i) Potential Difference ii) Resistance
5. Define i) Electric Current ii) Voltage and mention the meters used to measure them.

Cognitive Level: UNDERSTAND

6. Mention any five applications of Electrical Energy.
7. State five advantages of electrical energy over other forms of energy.
8. Distinguish between Conductors and Insulators.
9. Distinguish between Conductors and Semi-conductors.
10. State Ohm's Law and mentions its limitations.
11. State and explain Ohm's Law.
12. Define Horse power and Brake Horse power

Cognitive Level: APPLICATION

13. Determine the equivalent resistance of three resistances R1, R2 and R3 when
14. connected in series across a supply voltage of V volts.
15. Determine the equivalent resistance of three resistances R1, R2 and R3 when connected in parallel across a supply voltage of V volts.
16. Three resistances of 6 Ω, 4 Ω and 10 Ω are connected in series, across supply of 100 V, Find i) Effective resistance of the circuit.
    ii) Total current in the circuit.
    iii) Current through each resistance
    iv) Voltage drop across each resistance.
17. Define i) Electric Power ii) Electric Energy and mention the meters used to measure them.
18. Define Electric Power and write the three equations of electrical power with current, voltage and resistance.
19. A 100 watt lamp is used for 6 hours and a 60 watt lamp is used for 4 hours a day. Find   i) Energy consumed per month and

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ii) Cost of energy if each unit costs Rs.2.70

20. A house consists of two bulbs of 100W each, three bulbs of 60W each and one fluorescent lamp of 40W. If they are used for 4 hours a day, find monthly consumption charges at Rs. 2.70 per unit.
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Unit 2 – Electromagnetism

Cognitive Level: REMEMBER

21. Define with SI units. i) Flux density ii) Reluctance.
22. Define with SI units. i) Magnetic flux ii) Magneto Motive Force.
23. Define with SI units i) Permeability ii) Reluctance.
24. Define with SI units a) Inductance b) Mutual inductance

Cognitive Level: UNDERSTAND

25. State Faraday's First and Second Laws of Electromagnetic Induction.
26. Distinguish between Statically Induced and Dynamically Induced e.m.f.
27. Distinguish between self-induced and mutual-induced e.m.f.
28. Explain with a sketch statically induced emf with an example.
29. Explain with a sketch dynamically induced emf with an example.
30. Explain the construction of DC Generator.
31. Explain the working of a DC Generator.

Unit 3 - Fundamentals of AC Circuits

Cognitive Level: REMEMBER

32. Define i) RMS value ii) Average value and write equations.
33. Define the following with reference to a sinusoidal waveform
    a) Maximum value
    b) Instantaneous value
    c) Form factor.
34. Define with equations, i) Capacitive reactance ii) Inductive reactance.
35. What is a transformer? State its applications.
36. What is an AC generator? State its applications.
37. Define with SI units. i) Frequency and ii) Time period.

Cognitive Level: UNDERSTAND

38. Explain with illustration i) phase and ii) phase difference.
39. Draw a sinusoidal waveform and mark the following
    i) Maximum value
    ii) Instantaneous value

iii) cycle

iv) Time Period.

40. The instantaneous value of current is given by i = 50 sin 520 t, find Instantaneous value at t = 5ms ,Maximum value, Frequency and Time period
41. Explain Impedance, mention the SI unit and also write the equation.
42. Explain the construction of an AC Generator.
43. State the working principle of a transformer.

Cognitive Level: APPLICATION

44. A resistance of 100 Ω is connected in series with a capacitance of 150 μF. If this is connected to a 200 V, 50 Hz supply, Find Capacitive reactance. Impedance of the circuit, Power factor, and Current
45. A resistance of 20 is connected in series with a inductance of 0.07 H . If this is connected to a 200V, 50 Hz supply, find   Inductive reactance, Impedance, Power factor, and current
46. Define power factor and explain its effect on electrical power.
47. Compare between three phase power supply and single phase power supply.
48. State Five advantages of three phase power supply over single phase power supply.
49. Explain the working principle of an AC generator.
50. Explain the construction of a transformer.
51. Write the ratings of a typical transformer.
52. Write the ratings of a typical AC generator.

Unit 4 - Electric Motor Drives

Cognitive Level: REMEMBER

53. What is a DC motor? List the types of DC motors.
54. State five applications of DC motors.
55. What is an AC motor? List the types of AC motors.
56. State the applications of single phase AC motors.
57. State the applications of three phase AC motors.
58. State the necessity of starters for three phase induction motors and list the
59. types.
60. State the advantages of three phase motors over single phase motors.

Cognitive Level: UNDERSTAND

61. Explain briefly the selection of DC motors.
62. Compare single phase and three phase AC motors.
63. Explain briefly the selection of single phase and three phase AC motors.
64. What is FHP motor? List the applications of FHP motors.

65. Explain briefly the selection of FHP motors.
66. What is the importance of name plate details of an AC motor. Give one
67. example for single phase and three phase AC motor.
68. State the necessity of starters for three phase AC motors and list the types and
69. applications.
70. List out the various industrial applications of DC motors.
71. List out the selection criteria of DC motors for various industrial applications.
72. List out the various industrial applications of AC motors.
73. List out the selection criteria of AC motors for various industrial applications.
74. Explain the need of mechanical enclosures for motors and state the applications.
75. List the different types of mechanical enclosures for motors with their applications.

Unit 5 - Protective Devices, UPS and Estimation

Cognitive Level: UNDERSTAND

76. Sate the meanings of over voltage, under voltage and normal voltage w.r.t AC.
77. Sate the meanings of over loading, over and short circuit currents.
78. What is fuse? List the types.
79. List the applications of re-wire able, cartridge, and HRC fuses.
80. List out the different types of switches with their symbols.
81. State the sequence of steps for shock treatment.
82. State the definitions of Cell and Battery. List the types of Batteries.
83. What are SMF batteries? List the advantages over conventional batteries.
84. What are the functions of UPS.

Cognitive Level: APPLICATION

85. Explain the necessity of Protective devices. List the types.
86. Distinguish between MCB and ELCB.
87. Explain the necessity of electrical Earthing. List types of earthing.
88. Explain the necessity of earthing an electrical equipment..
89. State any five general electrical safety precautions.
90. Explain briefly electric shock treatment.
91. Explain the ratings of Battery.
92. Differentiate Primary and Secondary Batteries.
93. Mention the conditions for fully charged and discharged Lead Acid Battery.
94. Explain the selection of batteries.
95. What is an UPS and its rating? List the different types.
96. Explain the selection criteria of an Un-interrupted Power Supply.
97. Plan and estimate the cost of electrical wiring for one 3mX3m room having consisting of 2 tubelights,1 ceiling fan, 2 three pin socket .
98. Plan and estimate the cost of electrical wiring for One lathe for three phase wiring with   MCBs, starters, Iron clad switches ,and HRC fuses

Unit 6 - Electronic Components and Applications

Cognitive Level: UNDERSTAND

99. What are semiconductors? List the properties.
100. What are semiconductors? List the types and applications.
101. What is a Diode. List the types and their applications.
102. With a neat diagram explain the working of half wave rectifier.
103. What is a transistor? Mention the types with their symbols.
104. Explain the operation of Zener diode as a Voltage Regulator.
105. List the applications of Timers.
106. What is a Relay. List the types.
107. List the applications of Relays.
108. What is an IC? State the advantages of Integrated Circuits over discrete
109. components.

Cognitive Level: APPLICATION

110. Distinguish between Intrinsic and Extrinsic semiconductors.
111. Explain P and N type semiconductors.
112. Explain the operation of PN junction Diode.
113. Explain the operation of Diode in no bias, forward and reverse bias conditions.
114. Explain the VI characteristics of Diode.
115. Explain with a neat sketch and waveforms the working of a full wave bridge
116. rectifier.
117. Explain the operation of NPN Transistor.
118. What is a BJT. List the applications of BJTs.
119. Explain with a neat circuit diagram the operation of Transistor as a Switch.
120. What is a SCR or Thyristor. Write the symbol. Also, list the industrial
121. applications of SCRs.
122. Explain with a simple diagram he operation of SCR.
123. What is a Timer. List the types.
124. Draw the logic symbol, write the truth table and Boolean expression for the
    following logic gates;
    a) NOT
    b) OR
    c) AND
    d) NAND
    e) NOR
    f) EX-OR.

Course Title: **ENGINEERING GRAPHICS-II**	Course Code:**15ME21D**
Credits (L:T:P) : **0:2:4**	Core/ Elective: **Core**
Type of course: **Lectures & Practice**	Total Contact Hours: **78**
CIE- 25 Marks	SEE- 100 Marks

(Common to all Mechanical /AE/MTT/CH Programme)

Prerequisites: ENGINEERING GRAPHICS-I

COURSE OBJECTIVES

1. The course is aimed at developing Basic Graphic skills
2. Develop Skills In Preparation Of Engineering Drawings, their Reading And Interpretation

Course Outcomes:

On successful completion of the course, the students will be able to attain CO:

	Course Outcome	**CL**	**Linked units**	**Linked PO**	**Teaching Hrs**
CO1	Draw simple solids and sectional views of simple solids	*U/A*	1,2	1,2,3,9,10	**39**
CO2	Draw the development of simple utility articles	*U/A*	3	1,2,3,9,10	**15**
CO3	Draw Orthographic views of given machine component.	*U/A*	4	1,2,3,9,10	**12**
CO4	Develop the ability to draw the isometric view from the orthographic views of a given machine component.	*U/A*	5	1,2,3,9,10	**12**
				Total sessions	**78**

COURSE-PO ATTAINMENT MATRIX

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
ENGINEERING GRAPHICS-II	**3**	**3**	**3**	-	-	-	-	-	**3**	**3**

LEVEL 3- HIGHLY ADDRESSED, LEVEL 2-MODERATELY ADDRESSED, LEVEL 1-LOW ADDRESSED.
METHOD IS TO RELATE THE LEVEL OF PO WITH THE NUMBER OF HOURS DEVOTED TO THE COS WHICH ADDRESS THE GIVEN PO.
IF ≥40% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 3
IF 25 TO 40% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 2
IF 5 TO 25% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 1
IF < 5% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS CONSIDERED NOT-ADDRESSED.

COURSE CONTENT AND BLUE PRINT OF MARKS FOR SEE

Unit No	Unit Name	Hour	Questions to be set for SEE/MARKS			Marks weightage	weightage (%)
			R	U	A		
1	**Projection of solids**	21	--	10	30	40	27
2	**Section of solids**	18	--	--	30	30	21
3	**Development of Surfaces**	15	--	--	30	30	21
4	**Conversion of pictorial views into Orthographic views**	12	---	---	15	15	10
5	**Isometric projection**	12	---	---	30	30	21
	Total	78		10	135	145	100

Legend: R; Remember, U: Understand A: Application

COURSECONTENT

UNIT:I	PROJECTION OF SOLIDS	CONTACT HOURS:21 Hours

Introduction-Positioning of solids –Solid lying with base on HP- Solids lying with base or axis inclined to HP- Solids lying with one of the lateral faces on HP- Solids lying with one of their lateral edges on HP-Cylinder lying with its axis or base inclined to HP- Cone lying with its axis or base inclined to HP -Solid lying with their axis inclined to both HP and VP.

UNIT:II	SECTION OF SOLIDS	CONTACT HOURS: 18 Hours

Introduction to Sectioning –Representation of section planes-Section lines and hatching-Types of Section planes-True shape of a section-Sectioning of solid like cube, prism, pyramid, cylinder and cone -Obtaining true shape of section.

UNIT:III	DEVELOPMENT OF SURFACES	CONTACT HOURS: 15 Hours

Introduction to Development of surfaces-Development of lateral surfaces of cube, prism, cylinder, pyramid, and cone-Development of lateral surfaces of truncated prism, cylinder, pyramid, and cone-Development of lateral surfaces of Tray, Funnel.

UNIT:IV	CONVERSION OF PICTORIAL VIEWS INTO ORTHOGRAPHIC VIEWS	CONTACT HOURS: 12 Hours

Introduction –Guidelines for conversion of pictorial views into orthographic views-Illustrative problems.

UNIT:V	ISOMETRIC PROJECTIONS	CONTACT HOURS: 12 Hours

Principles of isometric projection – isometric scale – isometric views of simple solids – cube – prisms, pyramids, cylinder and cone - Conversion of orthographic views into isometric View -Drawing of Isometric views of machine parts.

TOTAL: 78 Hours

TEXT BOOK

1.K.R.Gopalakrishna*"Fundamentalsof Drawing"* Subhas Publications, 2010.
2.K.R.Gopalakrishna*"Engineering Drawing" (Vol. I & II),*Subhas Publications, 2014.

REFERENCES

1. R.K. Dhawan, *"A text book of Engineering Drawing",*S.ChandPublishers, Delhi,2010.
2.G.S. Phull and H.S.Sandhu, *"Engineering Graphics",* Wiley Publications, 2014.
3. K.Venugopal and V.Prabhu Raja, *"Engineering Graphics",* New Age International Private Limited, 2008.
4. M.B.Shah and B.C.Rana, *"Engineering Drawing",* Pearson Education, 2005.
5. BasantAgarwal and Agarwal.C.M.,*"Engineering Drawing",* Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.

Course Assessment and Evaluation Scheme:

		What		To whom	When/Where (Frequency in the course)	Max Marks	Evidence collected	Course outcomes
Direct Assessment method		CIE	IA	Students	Graded Exercises	25	Drawing Sheets	1,2,3,4,
		SEE	End Exam		End of the course	100	Answer scripts at BTE	1,2,3,4,
Indirect Assessment		Student Feedback on course		Students	Middle of the course		Feedback forms	1, 2,3 ,4 Delivery of course
		End of Course Survey			End of the course		Questionnaires	1,2,3,4,Effectiveness of Delivery of instructions & Assessment Methods

NOTE:THIS SUBJECT SHOULD THOUGHT IN A BATCH OF 15 TO 20 STUDENTS,TEACHER ALOTTED PER BATCH HAS TO MONITER, EVALUATE OR ASSESS THE STUDENTS.

Diploma in Mechanical Engineering
2nd semester
Course title: **Engineering Graphics-II (Conventional)**

Time: 4 Hrs.   Max. marks: 100

Note: Part –A is compulsory. Answer ANY TWO full questions from Part-B,C& D

Part –A

1. A hexagonal pyramid of 25 mm side of base and height 55 mm rests with one of its   10
triangular faces on HP and the axis parallel to VP. Draw its top and front views.

Part –B

2. Draw the projection of a pentagonal prism of base side 25mm and axis length 45mm resting on a corner such that the two base edges passing through it make equal inclination with HP and its base inclined at 60° to HP and the axis appears to be inclined at 30° to VP in the top view.--15

3. A cone of base diameter 50mm and altitude 70mm is lying with one of its generators on HP and the axis appears to be inclined to VP at an angle of 40 degree in the top view. Draw its top and front views. -- 15

4. A cylinder 60 mm diameter and 80 mm long stands with its base on HP. A section plane Perpendicular to VP and inclined at 60° to HP cuts the axis at a point 28 mm from its top end. Draw the sectional top view and true shape of the section.   --15

Part –C

5. A hexagonal pyramid of base side 30 mm and axis 65 mm rests on its base on the HP with one of its base edges perpendicular to VP. A cutting plane perpendicular to VP and inclined at 45° to HP meeting the axis 25 mm from the vertex. Draw the sectional top view and true shape of the section.   -- 15
.

6. A vertical cone 40 mm diameter of base and height 50 mm is cut by a section plane perpendicular to VP and inclined at 30° to HP so as to bisect the axis of the cone. Draw the development of the lateral surface of the truncated cone.   --15

7. A square pyramid of 30mm edges of base and height 50mm rests on its base on HP with one of its base edges parallel to VP. It is cut by a sectional plane perpendicular to VP and inclined at45° to HP bisecting the axis. Draw the development of the truncated pyramid.--15

Part –D

8. Draw the three principal views of the component as shown in the figure.   --15

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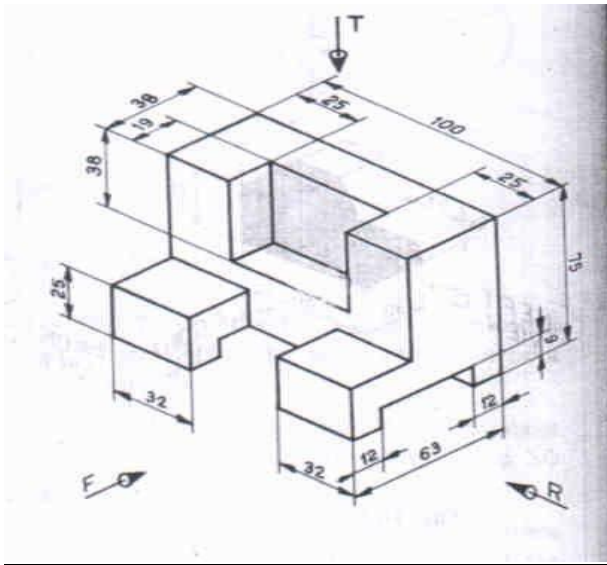
9. Draw the isometric view of the machine component whose orthographic views are given below:
-- 15

All dimensions in mm
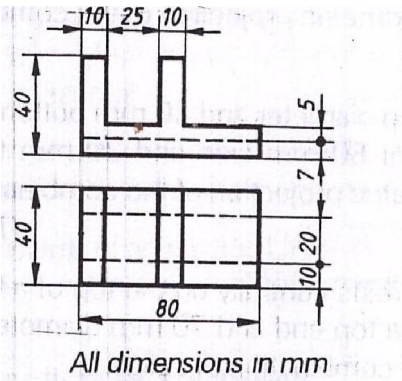
10. Draw the isometric projection of a frustum of a cone of 40 mm top diameter, 80 mm bottom diameter and 60 mm height.   --15

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__Course title:__ __Engineering Graphics-II (Conventional)__

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CO 1:DRAW SIMPLE SOLIDS

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__LEVEL:UNDERSTANDING__

(10Marks Questions)

1. A triangular prism of base edge 40mm and height 65mm rests with one of its base edges on HP so that the axis of the prim is inclined at 30° with HP. Draw the projections when the axis of the prism is parallel to VP.
2. A square prism of base edge 40mm and height 65mm rests with one of its base edges on HP. The axis of the prism is inclined at 45° to HP and parallel to VP. Draw the top and the front views of the prism.
3. A pentagonal prism of base 35mm and height 60mm has its base edge on HP. Draw the projections if the base of the prism is inclined at 30° to the HP. The axis of the prism is parallel to the VP.
4. A Hexagonal prism of base 35mm and height 60mm is resting with its base edge on HP so that the axis is inclined at 45° and parallel to VP. Draw its projections.
5. The axis of the square prism of base edge 40mm and height 60mm is inclined at 30° to HP and parallel to the VP. Draw the projections when the prism is placed with one of its corners on HP. The two adjacent base edges containing this corner are equally inclined to HP.
6. A pentagonal prism of base 35mm and axis height 60mm is resting with one of its base corners on HP such that the axis is inclined at 30° to the HP. Draw the projections when the axis of the prism is parallel to VP.
7. A triangular pyramid of base edge 40mm and height 65mm is resting with one of its base edges on HP so that the axis of the pyramid is parallel to VP and inclined at 45° to HP. Draw the projections.
8. Draw the projections of a hexagonal pyramid resting with one of its base edges on HP such that the axis of the pyramid is inclined at 30° to HP. The hexagonal pyramid has its base edges as 35mm and axis height as 60mm.
9. A pentagonal pyramid of base edge 35mm and axis height 65mm rests with one of its base corners on HP so that the axis of the pyramid is inclined at 45° to the HP. Draw the projections if the axis of the pyramid is parallel to the VP.
10. A square pyramid of base 40mm and axis height 65mm rests with its triangular lateral surfaces on HP so that the axis of the pyramid is parallel to the VP. Draw the projections.
11. A hexagonal pyramid is resting with one of its triangular lateral surfaces on HP. Draw the projections if its base edges are 40mm and the axis height is 65mm.
12. A pentagonal pyramid of base edge 40mm and axis 65mm rests with its slant edge on HP so that its axis is parallel to the VP. Draw the projections.
13. A cylinder of 40mm diameter and axis height 65mm rests with its points of the circumference on HP so that the axis is inclined at 45° to the HP and parallel to the VP. Draw the projections.
14. A cone of 40mm diameter and axis height 65mm is resting with points of the circumference on HP. Draw the projections if the axis of the cone is inclined at 30° with HP and parallel to VP.

15. A cone of 45mm diameter and axis height 60mm is resting with its end slant generator on HP so that the axis of the cone is parallel to VP. Draw the projections of the cone.

16. **A pentagonal prism of 30mm side of base and height 60mm rests with one of its edges of the base on HP such that the axis is inclined at 30° to HP and parallel to VP. Draw the top and front views.**

17. A hexagonal pyramid of 25mm side of base and height 60mm rests with one of its base edges on HP such that the base is inclined at 45° to HP, and the axis parallel to VP. Draw the top and front views.

18. A hexagonal pyramid of 25mm edge of base and height 60mm rests with one of its corners of the base on HP such that the base is inclined at 30° to it and the axis parallel to VP. The two of the base edges containing the corner on which the pyramid rests make equal inclinations with HP. Draw the projections.

19. A pentagonal prim of 30mm side of base and height 55mm rests with one of its rectangular faces on HP and the axis parallel to VP. Draw its projections.

20. Draw the top and front views of a triangular prism of 35mm side of triangular faces and height 60mm rest with one of its longer edges on HP such that the axis is parallel to VP and the rectangular face opposite to the slant edge on which the prism rests in perpendicular to VP.

21. Draw the top and front views of a pentagonal pyramid of side of base 30mm and height 60mm rests with one of its slant edges on HP and the axis parallel to VP.

LEVEL:APPLICATION   (15 MARKS)

22. A cube of 40mm edge rests on HP so that this edge is inclined at 45° to VP. One of the lateral surface is inclined at 45° to HP. Draw the top and front views of the cube.

23. An equilateral triangular prism of base side 25mm and 50mm long rests with one of the its shorter edges on HP so that the rectangular face containing the edge on which the prism rests inclined at 30° to the HP. The edge on which the prism rests is inclined at 60° to the VP. Draw its projections.

24. A pentagonal prism of base edge 30mm and 60mm long has its base edge on HP. The axis of the prism is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the top view and the front views of the prism.

25. A hexagonal prism of 30mm base edge and axis 60mm long is placed with one of its base edges on HP so that the axis is inclined at 30° to HP and the **axis appears to be inclined at 45° to VP.** Draw the projections when the base of the prism is nearer to the observer.

26. A square prism of base edge 40mm and 60mm long rests with one of its corners of the base so that the longer edge passing through this corner is inclined at 40° to the HP. Draw the projections if the axis appears to be inclined at 45° to the VP in the top view.

27. A square pyramid of base edge 40mm and 60mm long has one of its shorter edges on HP. The axis of the pyramid is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the projections if the apex is near to the observer.

28. A cylinder of 40mm diameter and axis height 60mm is resting with its ends of the base diameter on HP. The axis of the cylinder is inclined at 30° to the HP and appears to be inclined at 45° to VP. Draw the projections.

29. A cone of base diameter 50mm and axis 80mm lies on HP with its axis inclined at 45° to HP and appears to be inclined at 30° to the VP in the top view. Draw the top and front views of the cone.

30. A right cylinder is 50mm diameter of base and height 70mm. It rests such that the axis is **inclined at 30° and 45° to HP and VP respectively**. Draw the top and front views.

31. A cone of base 80mm diameter and height 100mm is lying with one of its generators on HP and its axis appears to be inclined at 40° to VP in the top view. Draw its front and top views.

32. **Draw the projections of a pentagonal prism 20mm side of base and axis 40mm long resting on a corner such that two base edges passing through it make equal inclinations with HP and its base is inclined at 60° to HP, and the axis appears to be inclined at 30° to VP in the top view.**

33. Draw the top and front views of a rectangular pyramid of sides of base 20x25mm and height 35mm when it lies with one of its triangular faces containing the longer edge of the base on HP. This longer edge of the base containing the triangular face lying on HP is inclined at 60° to VP in the top view with the apex of the pyramid nearer to VP.

34. A pentagonal pyramid 20mm side of base of 35mm altitude rests with one of its corners on HP such that the two base edges passing through the corner on which it rests make equal inclinations with HP. The axis is inclined at 45° to VP and 30° to HP. Draw the top and front views of the pyramid.

35. A hexagonal pyramid, base 30mm side and axis 60mm long has one of its slant edges on HP such that two of its triangular faces containing the slant edge on which it rests are equally inclined to HP. The top view of the axis appears to be inclined at 45° to VP. Draw its projections when its base is nearer to the observer than its apex.

36. A cone of base 60mm diameter and axis 80mm long rests on **HP with its axis inclined 45° an 30° with HP and VP respectively**. Draw the top and front views of the cone.

37. Draw the top and front views of a right cylinder of base 45mm diameter and 60mm long when it lies on HP, such that its axis is inclined at 30° to HP and the axis appears to be perpendicular to the VP in the top view.

CO 1:DRAW SECTIONAL VIEWS OF SIMPLE SOLIDS

LEVEL:APPLICATION

(15 Marks Questions)

1. A cube of 30 mm edges rests with a square face of HP such that one of its vertical square faces is inclined at 30° to VP. A section plane perpendicular to VP and inclined at 60° to HP passes through a point on the axis 5 mm below its top end. Draw its sectional top view, front view and true shape of the section.

2. A square prism of 45 mm side ofbase, height 90 mm rests with its base on HP such that one of the rectangular faces is inclined at 30° to VP. A section plane perpendicular to VP and inclined at 60° to HP passes through a point on the axis at a height of 70 mm. Draw the front view, sectional top view and true shape of the section.

3. A square prism side of base 40 mm and axis 60 mm long rests with its base on HP such that one of its rectangular faces is inclined at 30° to VP. A section plane perpendicular to HP and inclined at 60° to VP passes through the prism at a distance of 10 mm from the axis. Draw the top view, sectional front view and true shape of the section.

4. A pentagonal pyramid of 20 mm edge of base and 40 mm high stands vertically with its base on HP and an edge of the base perpendicular to VP. A section plane perpendicular to HP and inclined at 30° to VP cuts the pyramid such that it passes through the pyramid at a shortest distance of 5 mm from its axis and in front of it. Draw the top view, sectional front view and true shape of the section.

5. A triangular pyramid of 30 mm side of base and axis 45 mm long is placed with its base on HP such that an edge of the base is parallel to VP and nearer to it. A cutting plane inclined at 60° to HP and perpendicular to VP bisects the axis of the pyramid. Draw the front view, sectional top view and true shape of the section.

6. Draw the front view, sectional top view and true shape of the section of a hexagonal pyramid, 20 mm side of the base and 50 mm high resting with its base HP such that an edge of the base is parallel to VP. The pyramid is cut by a section plane perpendicular to VP and inclined at 30° to HP. Section plane bisects the axis of the pyramid.

7. A cylinder 60 mm diameter and 80 mm long stands with its circular base on HP. A section plane perpendicular to VP and inclined at 60° to HP cuts the axis at a point 28 mm from its top end. Draw front view, sectional top view and true shape of the section.

8. A cylinder of base diameter 45 mm and height rests on its base on HP. It is cut by a section plane perpendicular to VP and inclined at 30° to HP and meets the axis at a distance of 30 mm from the base. Draw the front view, sectional top view and true shape of the section.

9. A cone, diameter of base 60 mm and axis 70 mm long, is resting on its base on HP. It is cut by a section plane perpendicular to VP, inclined at 45° to HP and passing through a point on the axis 40 mm above the base. Draw the front view, sectional top view and true shape of the section.

10. A cone, base 60 mm diameter and axis 70 mm long, stands vertically with its base on HP. It is cut by a section plane perpendicular to VP, inclined at 45° to HP and is bisecting the axis. Draw the front view, sectional top view and true shape of the section. Name the true shape of the section.

11. A cone, base 60 mm diameter and axis 70 mm long, stands vertically with its base on HP. It is cut by a section plane whose vertical trace is perpendicular to VP and parallel to one of the end generators of the cone and passes at a distance of 15 mm from it. Draw the front view, sectional top view and true shape of the section. Name the true shape of the section.

12. A cone, base 60 mm diameter and axis 70 mm, stands vertically with its base on HP. It is cut by a section plane perpendicular to VP and inclined at 75° to HP, so as to cut the axis of the cone at a point 20 mm above the base. Draw the front view, sectional top view and true shape of the section. Name the true shape of the section.

13. A cone, base 60 mm diameter and axis 70 mm, stands vertically with its base on HP. The section plane perpendicular to HP and parallel to VP cuts the cone at a distance of 10 mm from the axis. The section

plane is in front of the axis of the cone. Draw top view, sectional front view and true shape of the section. Name the true shape of the section.

14. A square pyramid of base side 30 mm and axis length 60 mm is resting on HP on its base with one side of base inclined at 30° to VP. It is cut by a section plane inclined at 45° to HP and perpendicular to VP and passes through the axis at a distance 52 mm from the apex. Draw its front view, sectional top view and true shape of the section.

15. A pentagonal pyramid of base side 40 mm and axis length 75 mm is resting on HP on its base with one of its base side parallel to VP. It is cut by a section plane inclined at 35° to HP and perpendicular to VP and is bisecting the axis. Draw its front view, sectional top view and true shape of the section.

16. A pentagonal pyramid of base side 20 mm and altitude55 mm rests on its base on HP with one of the base edges being perpendicular to VP. It is cut by a section plane perpendicular to VP and inclined at 50° to the HP. The section plane meets the axis at 15 mm above the base. Draw its front view, sectional top view and true shape of the section.

17. A hexagonal pyramid of base side 25 mm and axis 50 mm long rests with its base on HP and an edge of its base is perpendicular to VP. It is cut by a section plane perpendicular to VP, inclined at 30° to HP and passing through a point on the axis 20 mm below the apex. Draw its front view, sectional top view and true shape of the section.

18. A hexagonal pyramid of base side 30 mm and altitude 70 mm rests with its base on HP and with a side of base is parallel to VP. It is cut by a section plane perpendicular to VP, inclined at 35° to HP and is bisecting the axis. Draw its front view, sectional top view and true shape of the section.

19. A hexagonal pyramid of base side 25 mm and axis 50 mm long rests with its base on HP such that one of the edges of its base is perpendicular to VP. It is cut by a section plane perpendicular to HP and inclined at45° to VP and passing through the pyramid at a distance of 10 mm from the axis. Draw its top view, sectional front view and true shape of the section.

20. A square prism side of base 40 mm and axis 60 mm long rests with its base on HP such that one of its rectangular faces is incline at 30° to VP. A section plane perpendicular to HP and inclined at 60° to VP passes through the prism at a distance of 10 mm from the axis. Draw its top view, sectional front view and true shape of the section.

21. A cube of 40mm edge rests on HP so that this edge is inclined at 45° to VP. One of the lateral surface is inclined at 45° to HP. Draw the top and front views of the cube.

22. An equilateral triangular prism of base side 25mm and 50mm long rests with one of the its shorter edges on HP so that the rectangular face containing the edge on which the prism rests inclined at 30° to the HP. The edge on which the prism rests is inclined at 60° to the VP. Draw its projections.

23. A pentagonal prism of base edge 30mm and 60mm long has its base edge on HP. The axis of the prism is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the top view and the front views of the prism.

24. A hexagonal prism of 30mm base edge and axis 60mm long is placed with one of its base edges on HP so that the axis is inclined at 30° to HP and the **axis appears to be inclined at 45° to VP.** Draw the projections when the base of the prism is nearer to the observer.

25. A square prism of base edge 40mm and 60mm long rests with one of its corners of the base so that the longer edge passing through this corner is inclined at 40° to the HP. Draw the projections if the axis appears to be inclined at 45° to the VP in the top view.

26. A square pyramid of base edge 40mm and 60mm long has one of its shorter edges on HP. The axis of the pyramid is inclined at 30° to the HP and appears to be inclined at 45° to the VP. Draw the projections if the apex is near to the observer.

27. A cylinder of 40mm diameter and axis height 60mm is resting with its ends of the base diameter on HP. The axis of the cylinder is inclined at 30° to the HP and appears to be inclined at 45° to VP. Draw the projections.

28. A cone of base diameter 50mm and axis 80mm lies on HP with its axis inclined at 45° to HP and appears to be inclined at 30° to the VP in the top view. Draw the top and front views of the cone.

29. A right cylinder is 50mm diameter of base and height 70mm. It rests such that the axis is **inclined at 30° and 45° to HP and VP respectively**. Draw the top and front views.

30. A cone of base 80mm diameter and height 100mm is lying with one of its generators on HP and its axis appears to be inclined at 40° to VP in the top view. Draw its front and top views.

31. Draw the projections of a pentagonal prism 20mm side of base and axis 40mm long resting on a corner such that two base edges passing through it make equal inclinations with HP and its base is inclined at 60° to HP, and the axis appears to be inclined at 30° to VP in the top view.

32. Draw the top and front views of a rectangular pyramid of sides of base 20x25mm and height 35mm when it lies with one of its triangular faces containing the longer edge of the base on HP. This longer edge of the base containing the triangular face lying on HP is inclined at 60° to VP in the top view with the apex of the pyramid nearer to VP.

33. A pentagonal pyramid 20mm side of base of 35mm altitude rests with one of its corners on HP such that the two base edges passing through the corner on which it rests make equal inclinations with HP. The axis is inclined at 45° to VP and 30° to HP. Draw the top and front views of the pyramid.

34. A hexagonal pyramid, base 30mm side and axis 60mm long has one of its slant edges on HP such that two of its triangular faces containing the slant edge on which it rests are equally inclined to HP. The top view of the axis appears to be inclined at 45° to VP. Draw its projections when its base is nearer to the observer than its apex.

35. A cone of base 60mm diameter and axis 80mm long rests on HP with its axis inclined 45° and 30° with HP and VP respectively. Draw the top and front views of the cone.

36. Draw the top and front views of a right cylinder of base 45mm diameter and 60mm long when it lies on HP, such that its axis is inclined at 30° to HP and the axis appears to be perpendicular to the VP in the top view.

LEVEL:APPLICATION

(15 Marks Questions)

1. A vertical square prism, side of the base 30mm and altitude 60 mm rests with its base on HP such that one of its rectangular faces makes an angle of 30° to VP. The prism is cut by a section plane perpendicular to VP and inclined at 60° to HP. The cutting plane bisects the axis of the prism. Develop the lower portion of the lateral surfaces of the prism.

2. A pentagonal prism 20 mm side of the base and height 55 mm stands vertically such that one of its rectangular faces is parallel to VP and nearer to it. Prism is cut by a cutting plane which is perpendicular to VP, inclined at 60° to HP and passes through one of the extreme corners of the top face of the prism. Develop the lower portion of the lateral faces of the prism so as to produce a one-piece development.

3. A vertical cylinder of base diameter 80 mm and axis length 100 mm is cut by a section plane perpendicular to VP and inclined at 45° to HP. Vertical trace of the section plane passes through the top end of one of the extreme generators. Develop the lower portion of the lateral surface of the cylinder.

4. A square pyramid of 30 mm side of the base and height 50 mm rests with its base on HP with one of the edges of the base parallel to VP. It is cut by a section plane perpendicular to VP and inclined at 45° to HP and bisecting the axis. Draw the development of the truncated pyramid.

5. A vertical cone 40 mm diameter of base and height 50 mm is cut by a section plane perpendicular to VP and inclined at 30° to HP so as to bisect the axis of the cone. Draw the development of the lateral surface of the truncated cone.

6. A pentagonal pyramid of side of base 30 mm and axis length 60 mm is resting on its base on HP with an edge of the base perpendicular to VP. It is cut by a section plane perpendicular to VP and parallel to HP and meets the axis at a distance of 30 mm from the vertex. Draw the development of remaining portion of the pyramid.

7. Draw the development of lower portion of a hexagonal pyramid of side 30 mm and height 60 mm resting on HP such that two of its base edges are perpendicular to VP. It is cut by a section plane perpendicular to VP and inclined at 40° to HP.

8. The frustum of a square pyramid has the following dimensions:
   i)   Side of the bottom square = 50 mm
   ii)   Side of the top square = 25 mm
   iii)   Height of the frustum = 70 mm.
   Draw the development of lateral surface of the pyramid.

9.Develop the lateral surface of the funnel shown in the figure:

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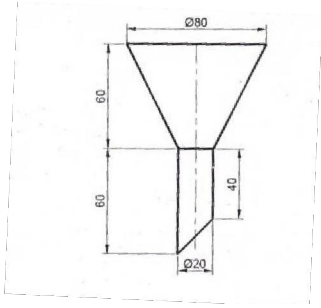
9. Draw the development of the tray shown in figure:
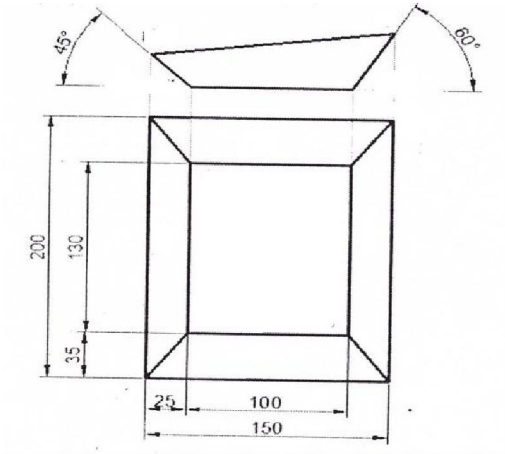
LEVEL:APPLICATION

(15 MARKS QUESTION)
.Draw the three principal views of the component as shown in the figure.
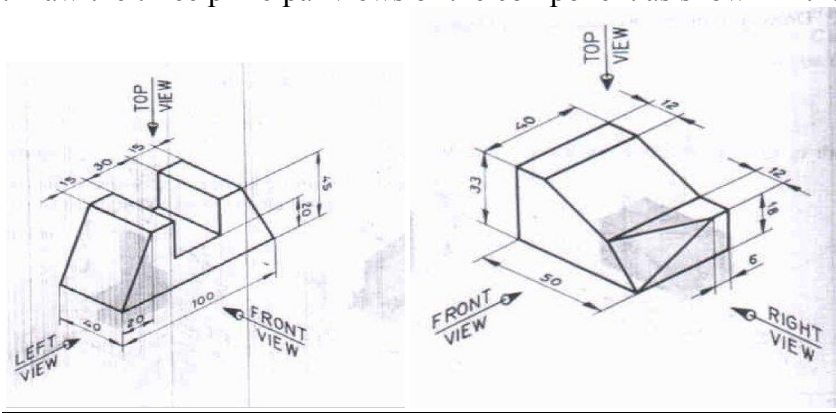
FIG-1   **FIG -2**
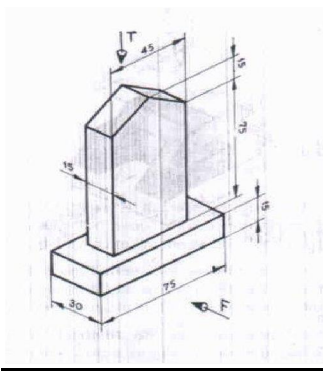
FIG-3
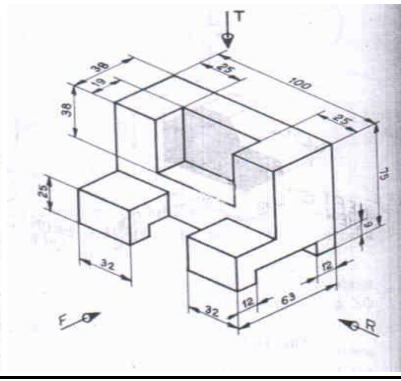
FIG -4
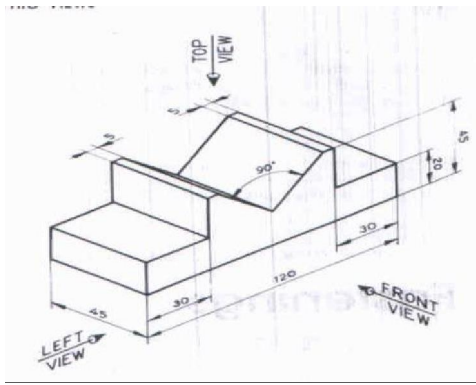
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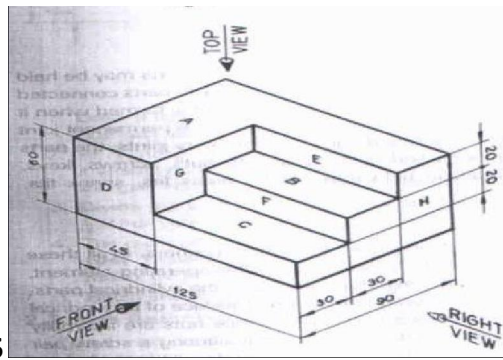
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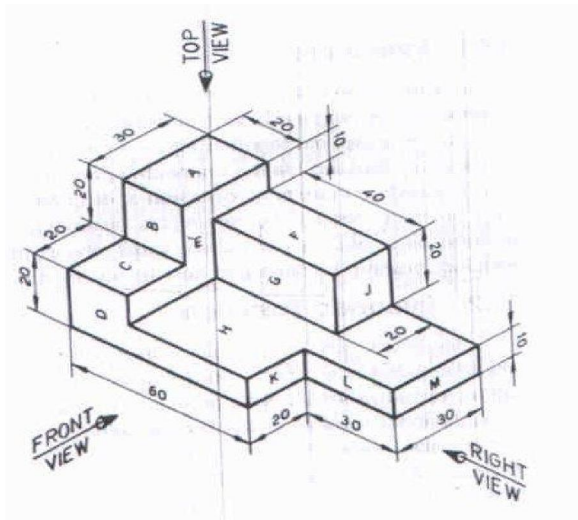
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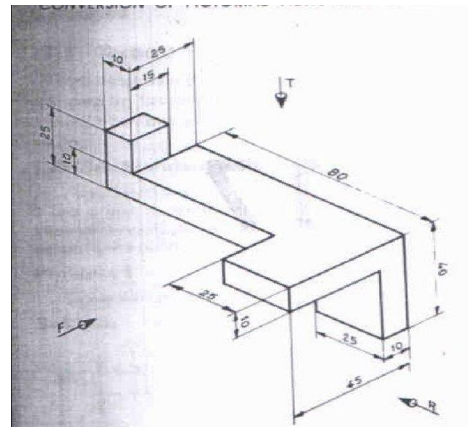
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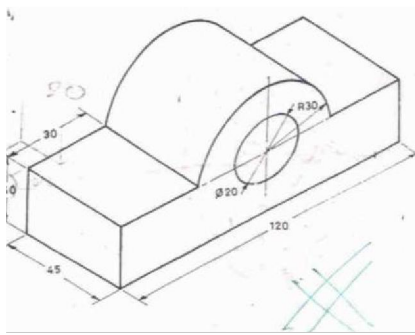
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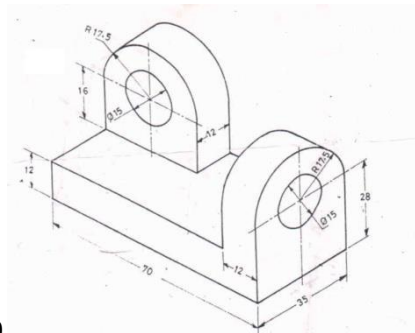
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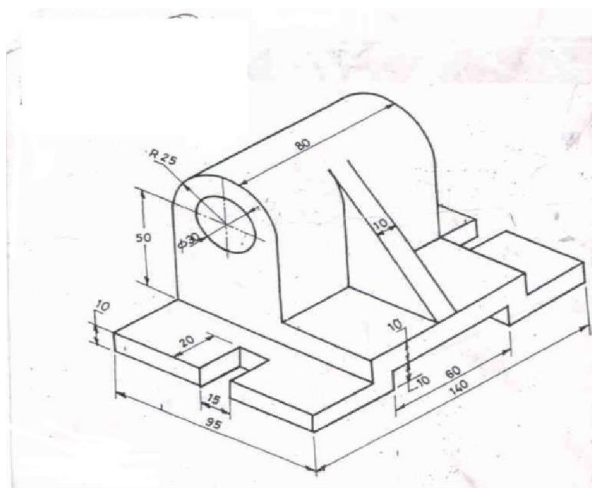
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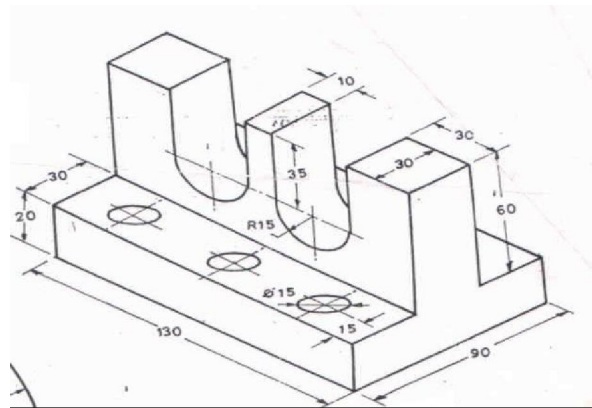
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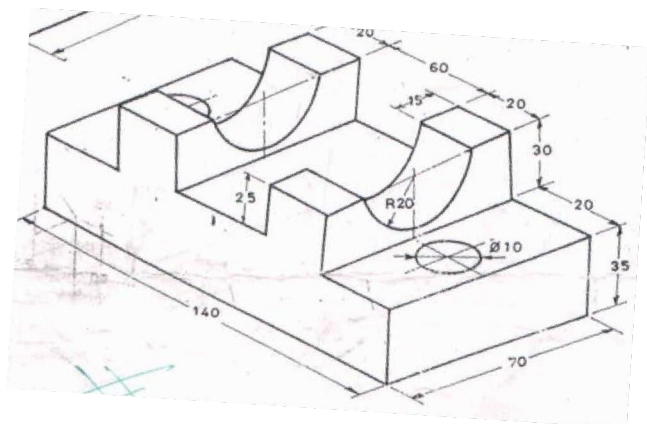
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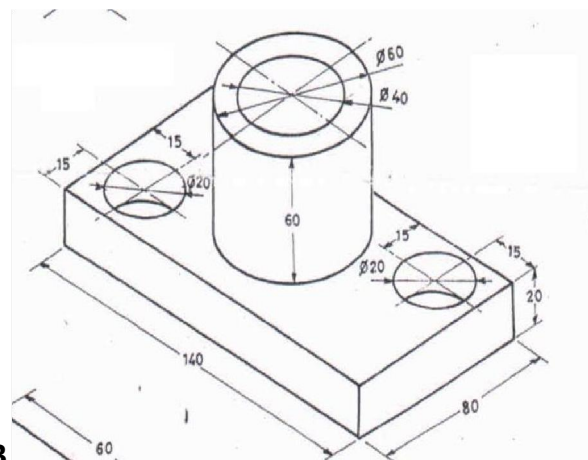
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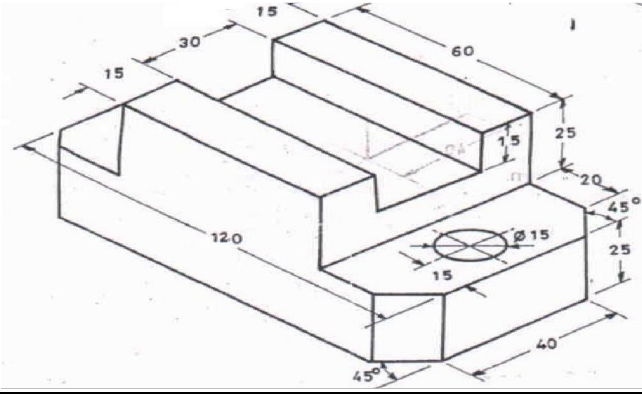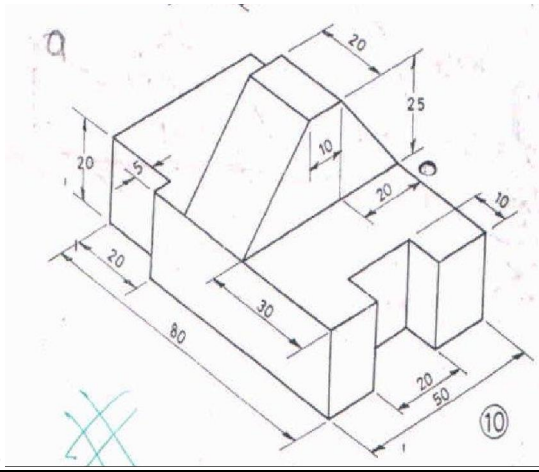
FIG-15   FIG-16

ALL DIMENSIONS ARE IN MM

LEVEL:APPLICATION

(15 MARKS QUESTION)
.Draw the isometric view of the machine component whose orthographic views are given below:
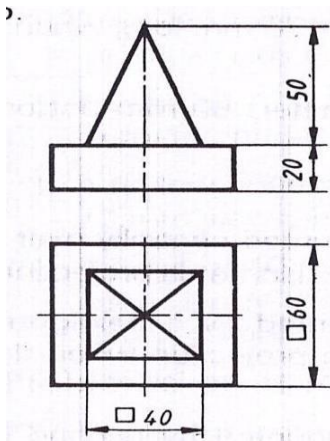
FIG-1   **FIG -2**   **FIG -3**
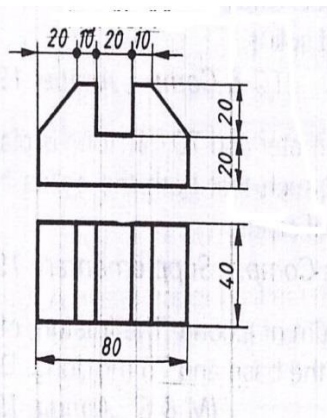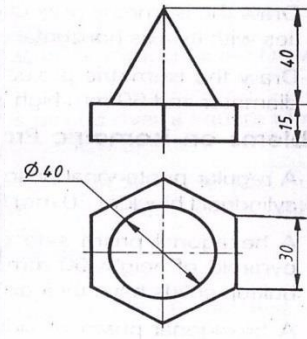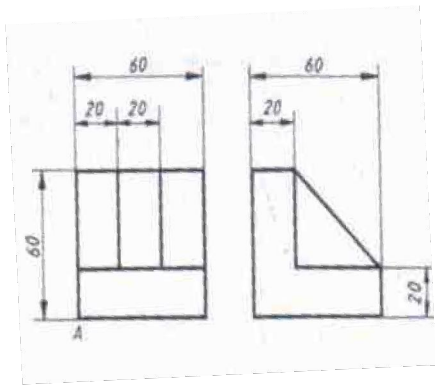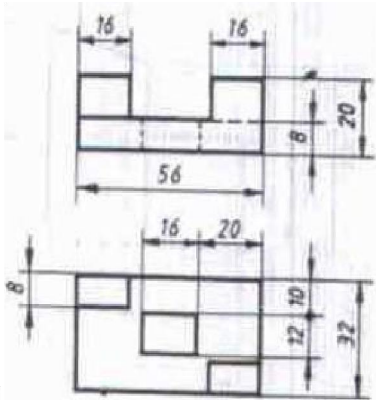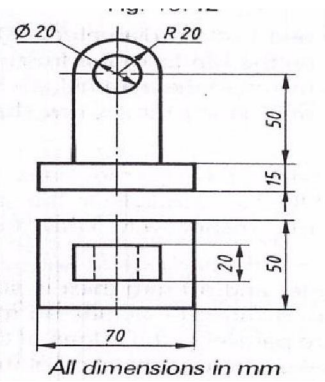
FIG-4   **FIG-5**   **FIG -6**
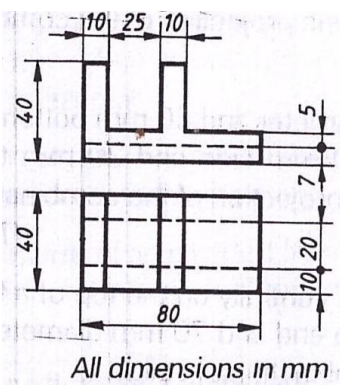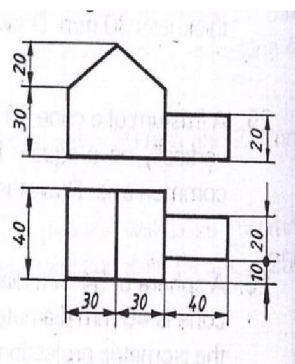
FIG-8   **FIG-9**
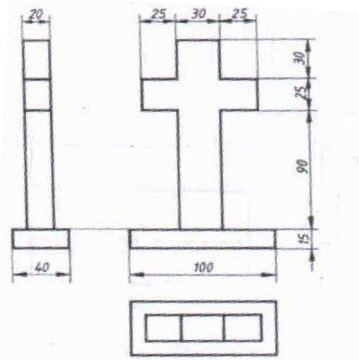
FIG-7
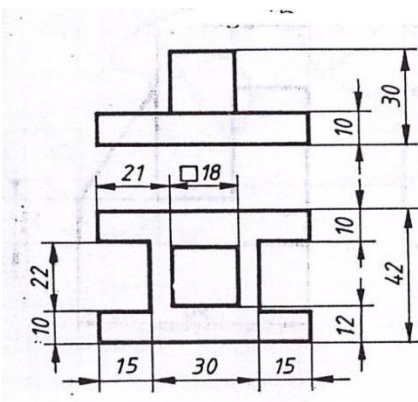
FIG-10FIG-11   **FIG -12**
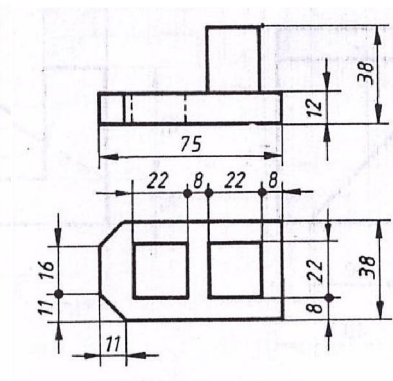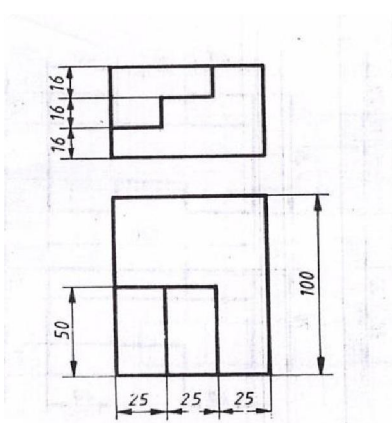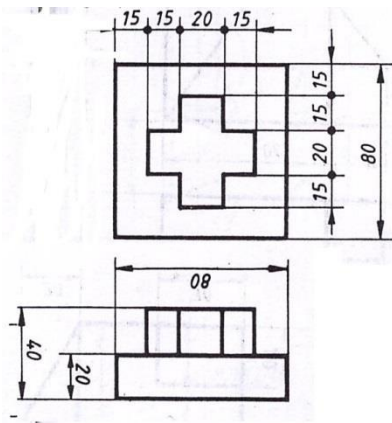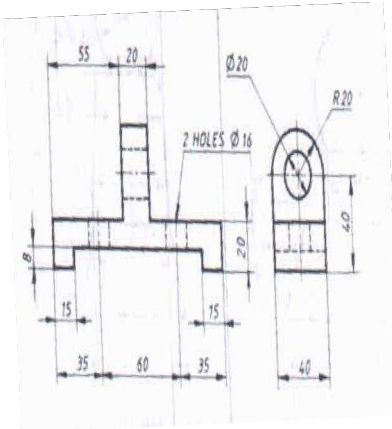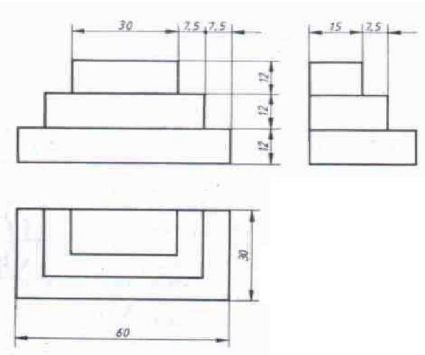
FIG-13   **FIG -14**   **FIG-15**
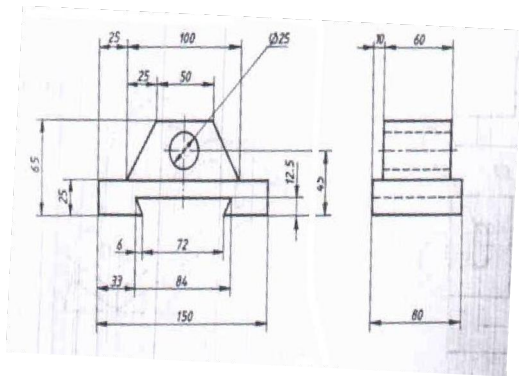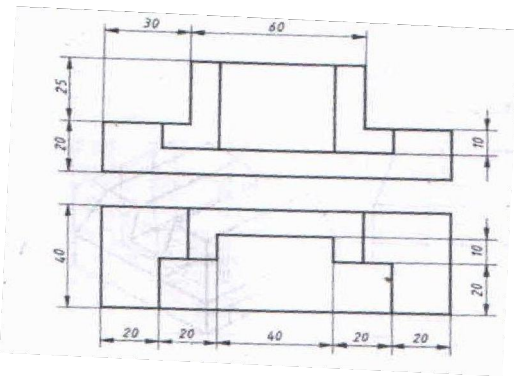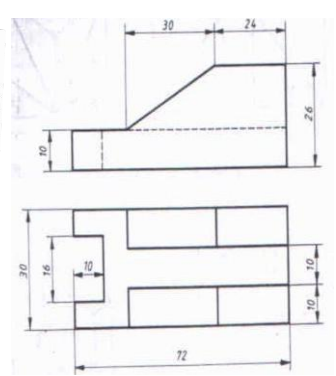
FIG-16FIG-17   **FIG-18**
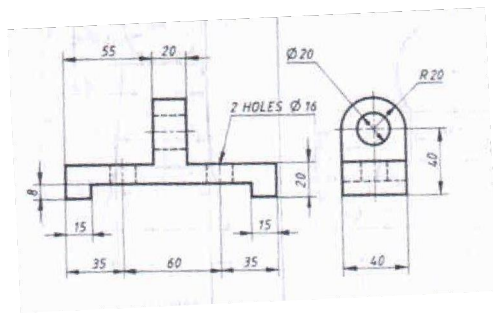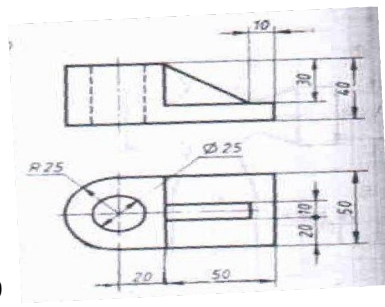
FIG-19   **FIG-20**

21. Draw the isometric view of a frustum of a cone of 40 mm top diameter, 80 mm bottom diameter and 60 mm height.
22. A cube of side 30 mm rests centrally on the top of another cube of side 60 mm. Draw the isometric view of the solid.
23. A square pyramid of base edge 50 mm and height 80 mm rests on the top of the cube of side 100 mm. Two sides of the base of the pyramid are parallel to the top edges of the cube. Draw the isometric view of the solid.
24. A cylindrical block of 40 mm diameter and length 50 mm is resting vertically on the centre of the cube of 70 mm side. Draw the isometric view of the combination of solids.

25. A square pyramid of base side 22 mm and height 20 mm rests centrally on the top of a cylinder of base diameter 40 mm and height 30 mm.

Course Title	:**APPLIED SCIENCE LAB**	Course Code	: **15SC04P**
Semester	: **I / II**	Course Group	: **Core**
Teaching Scheme in Hrs (L:T:P)	: **0:2:4**	Credits	: **3** Credits
Type of course	: **Tutorial & Practical**	Total Contact Hours	: **78**
CIE	: **25 Marks**	SEE	: **50 Marks**
Programme	: **Common to all Engineering Diploma Programmes**		

Prerequisite:

Applied Science theory in the current semester.

Course objective:

1. Learn to measure different dimensions of objects accurately using measuring instruments.
2. Enhance the vectorial concepts of concurrent forces.
3. Learn the concepts of properties of fluids.
4. Enhance the practical concept of resonance.

Experiments:

PART- A

1. **Vernier Calipers**:
   a) To determine the dimensions of given solid cylinder and hence calculate its volume.
   b) To determine the dimensions of given hollow cylinder and hence calculate its volume

   Activity: To calculate the density of material of given solid/hollow cylinder knowing its volume and mass.

2. **Screw Gauge**:
   a) To determine the thickness of given metal and glass plate.
   b) To determine the diameter of given thin wire and hence to calculate its volume.
   c) To determine the diameter of given metallic sphere and hence to calculate its volume.

   Activity: 1.To calculate volume of such half meter length wire.
   2. To calculate volume of such number (50 or 75 etc) of spheres.

3. **Laws of concurrent forces**:
   a) Verify the law of parallelogram of forces.

b) Verify the converse law of triangle of forces.

c) Verify Lami's theorem.

Activity: To determine the weight of given body using law of parallelogram of forces.

4. Moment bar:

To verify the conditions of equilibrium of coplanar parallel forces acting on a body.

Activity: To determine the weight of given body using moment bar.

PART-B

5. **Viscosity:**

    a) To determine the co-efficient of viscosity of water by poiseuille's method(for a given radius of capillary tube)

    Activity: To plot a graph of **ht** versus **V** and to find ht/**V** from slope.

6. **Sonometer**:

    a) To determine the frequency of given tuning fork by comparison method.

    b) To determine the frequency of given tuning fork by absolute method.

Activity: 1.Plot a graph of 'n' versus 'l' from the graph, find the frequency unknown Tuning fork

2.Plot a graph of $\sqrt{T}$versus 'l' from the slope of graph   find $\sqrt{T}$/l

3.To calculate linear density 'm' by knowing$\sqrt{T}$/l   and 'n'

7. Resonance:

a). To determine the velocity of sound in air at room temperature by using resonance air column apparatus. (for single resonating length)

   Activity:1. To calculate velocity of sound in air at 0^0 C.

2. To determine the unknown frequency of tuning fork.

8.**Surface Tension**:

a) To determine the Surface Tension of water by capillary rise method using

   Travelling Microscope. (radius of capillary tube is given)

Activity: Calculate radius of the capillary tube by knowing the surface tension of the liquid and height of liquid column in capillary tube.

9. **Boyle's law**:

a) To verify Boyle's law using Boyle's law apparatus.

Activity:1.To plot a graph of pressure versus volume

2. To plot a graph of 1/pressure versus volume.

Course outcome:

On successful completion of the course, the student will be able to:

1. Measure the various dimensions of given objects using instruments.
2. Apply the vector concepts in engineering.
3. Apply the acquired knowledge of fluid dynamics in the field of engineering.
4. Apply the concepts of wave motion in engineering.

Mapping Course Outcomes with Program Outcomes:
CO –PO mapping

	Course Outcome	Experiment linked	PO Mapped	Cognitive Level	Lab Sessions
CO1	Measure the various dimensions of given objects using instruments.	**1,2**	**1,2,3,4,9**	**U/A**	**24**
CO2	Apply the vector concepts in engineering.	**3,4**	**1,2,9**	**U**	**16**
CO3	Apply the acquired knowledge of fluid dynamics in the field of engineering.	**5,8,9**	**1,2,3,9**	**A**	**24**
CO4	Apply the concepts of wave motion in engineering.	**6,7**	**1,2,3,9**	**U**	**14**
Total Hours of instruction					**78**

U-Understanding; A-Application;

Course outcomes –Program outcomes mapping strength

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Applied Science lab	**3**	**3**	**3**	**1**	-	-	-	-	**3**	-

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.
If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3
If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2
If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1
If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.

Course Assessment and Evaluation:

		What	To Whom	Frequency	Max Marks	Evidence Collected	Course Outcomes
Direct Assessment	**CIE (Continuous Internal Evaluation)**	I A Tests	Students	Two IA tests for Practical (Average of Two Test marks will be computed)	10	Blue Books	1 to 4
		Record Writing		Record Writing (Average of Marks allotted for each expt.)	10	Record Book	1 to4
		Class room Assignments		Two Assignments based on CO's (Average marks of Two Assignments shall be rounded off to the next higher digit.)	05	Log of Activity	1 to 4
				TOTAL	25		
	SEE (Semester End Examination)	End Exam	Students	End of the Course	50	Answer Scripts at BTE	All the CO's
Indirect Assessment		Student Feedback on course	Students	Middle Of The Course	Feedback forms		1 to 2 delivery of the course
		End Of Course Survey		End Of The Course	Questionnaire		1 to 4 Effectiveness of delivery of instructions and assessment

Note: I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's Taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering and Understanding	35
2	Applying the knowledge acquired from the course	45
3	Analysis	05
4	Evaluation	05
5	Creating new knowledge	10

Reference Books:

1. Practical physics by pro. J.D.Belani and N.J.Belani. Published by Nebhandas Hiranand.
2. Practical physics by C.L. Arora. Published by S. Chand and company.
3. www.jac production.co.za

Model Question Bank:

Course: APPLIED SCIENCE LAB Course Code: 15SC04P

PART- A

1. Determine the dimensions of given Solid Cylinder using Vernier Caliper and hence calculate its volume.

2. Determine the dimensions of given Hollow Cylinder using Vernier Caliper and hence calculate its volume.

3. Determine the thickness of given metal and glass plate using screw gauge.

4. Determine the diameter of given thin wire using screw gauge and hence, to calculate its volume.

5. Determine the diameter of given metallic sphere using screw gauge and hence, calculate its volume.

6. Verify the law of parallelogram of forces.

7. Verify the converse of triangle law of forces.

8. Verify lami's theorem.

9. Verify the conditions of equilibrium of coplanar parallel forces using Moment bar.

PART- B

10. Determine the coefficient of viscosity of water by Poiseuille's method
    (For a given radius of capillary tube)

11. Determine the frequency of given tuning fork by comparison method using sonometer.

12. Determine the frequency of given tuning fork by absolute method using sonometer.

13. Determine the velocity of sound in air at room temperature by using resonance Air column Apparatus.

14. Determine the Surface Tension of water by capillary rise method.
    (For a given radius of capillary tube)

15. Verify Boyle's law using Boyle's law apparatus.

Scheme of Valuation for SEE (Semester End Examination)

Sl. no.	Performance	Max. Marks
1	Writing Observation, Tabular column, formula.	05x2=10
2	Conduction of experiment.	10x2=20
3	Calculation and Result.	05x2=10
4	Viva Voce.	10
	TOTAL	**50 Marks**

Note: The students will submit record books at the time of semester end exam.

Guidelines for Question Paper Setting

The question paper must be prepared by selecting **ONE** experiment from **PART – A** and **ONE** question from **PART – B**.

Specification of the Apparatus Required for Applied Science Lab

The following are the specification of the apparatus required for science lab, and number of apparatus required for the batch of 20 students.

Sl. No.	Name of the Apparatus	Specification	Required Number
1	Vernier calipers	With L.C 0.01cm having Metallic scale marked in cm, with objects :solid cylinder &hollow cylinder	10
2	Screw gauge	U-Shaped metallic frame with L.C 0.01mm with objects :glass plate, metal plate, thin wire and metallic sphere	10
3	Law of concurrent forces apparatus	Vertical Drawing Board fixed with pulleys. Weights 50g each with weight hangers set	10
4	Moment bar	Having two vertical metallic stands, two spring balances measuring up to 500 g .horizontal bar.	10
5	Surface tension apparatus	Traveling microscope, having L.C 0.005cm, both horizontal and vertical movement of telescope, eye piece with fine cross-wire, slow moving stand, beaker, with capillary tube	10
6	Viscosity apparatus	Aspiratory bottle, cork, capillary tube, stopwatch, measuring jar. With stand to keep Aspiratory bottle	10

		Wide bore glass tube mounted vertically in front of a scale graduated 0 to 60cm Zero corresponds to the inside of the closed (top) end of the tube Air is confined in the tube by a coloured oil contained in a metal pressure chamber Pressure chamber is fitted with a Bourdon type gauge calibrated 0 to 3.5kg cm² (0 to 50 lb/in²) actual pressure A valve is fitted to the air inlet tube from the pump As the pressure in the oil chamber is increased, oil level and its actual (total) pressure are directly indicated Tube is made of extra strong glass and is securely covered with transparent plastic on the front Overall height of apparatus approx. 690mm	
7	Boyle's law apparatus		05
8	Sonometer	Wooden box fixed with meter scale, pulley, metallic string, weight with weight hanger (500g each)	10
9	Resonance air column apparatus	Consists of a resonance tube brass N.P. 100cms, reservoir brass N.P. 250ml & meter scale both sides millimeters, which are mounted on wooden polished board. The reservoir is caged in wooden block that has sliding facility.	10
10	Electronic balance	0.1g accuracy 500g capacity	01
11	Tuning fork set	Set of eight tuning forks of different frequency blue steel(Ragg's type)	06

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Government of Karnataka
Department of Technical Education, Bengaluru
Course: APPLIED SCIENCE LAB
Course code: 15SC04P

Curriculum Drafting Committee 2015-16

	Name	Designation	Institution
1	Mr. R B Pawar	Principal	Govt. Polytechnic, Bijapur
2	Mr. K.Nazeer Ahmed	Selection Grade Lecturer	Govt. Polytechnic, Mulbagilu
3	Mr. Liyakhat Ali Khan	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
4	Dr. HanumanthaNayak	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
5	Ms. Bhagirathi B N	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru

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Curriculum Review Committee

	Name	Designation	Institution
1	Mr. K.Nazeer Ahmed	Selection Grade Lecturer	Govt. Polytechnic, Mulbagilu
2	Mr. Liyakhat Ali Khan	Selection Grade Lecturer	S.J. Govt. Polytechnic, Bengaluru
3	Smt. Revathi	Selection Grade Lecturer	M.E.I. Polytechnic, Bengaluru

Department of Technical Education
Board of Technical Examinations, Bengaluru

Course Title:	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB**	Course Code	: **15EE02P**
Semester	: **I /II/ III**	Course Group	: **Core**
Teaching Scheme (L:T:P)	: **0:2:4**(in Hours)	Credits	: **3 Credits**
Type of course	: **Tutorial + Practical**	Total Contact Hours	: **78**
CIE	: **25 Marks**	SEE	: **50 Marks**
Programme:	Mechanical (GL), Mechanical (Instr.), MTT, HPT, WSM, Mechatronics, Printing Technology, Textile Technology, Ceramics, Mining Engg., Metallurgical Engg**.**		

Pre-requisites	**:** Basic Electrical and Electronics Engineering theory in Diploma curriculum.
Course Objectives	**:** To provide practical knowledge about the DC &AC circuits, different wiring circuits, Battery, Relay, three phase AC motor, Panel board, semiconductor diodes, rectifiers and basic logic gates.

Course Outcomes:

On successful completion of the Course, the student will be able to:

1. Understand verification of Ohm's law experimentally.

2. Rig-up various wiring control circuits, panel board and meter board individually and test.

3. Rig-up circuits to measure power and energy in ac circuit.

4. Test and report the conditions and ratings of Battery.

5. Start and reverse the three phase induction motor.

6. Understand the operation of relay, diode circuits, rectifier circuits and logic gates

List of Graded Experiments:

1. Construct a suitable circuit to verify Ohm's law.
2. Rig up and test the wiring circuit to control a lamp and a three pin socket independently.
3. Rig up and test the wiring circuit to control two lamps independently.
4. Construct and test fluorescent lamp circuit.
5. Construct and test the staircase wiring circuit (control from 2 places).
6. Construct and test Meter board wiring using single phase Energymeter, MCB/ELCB, Kit-kat fuse and neutral link.
7. Build and test a circuit to measure power and power factor in a single phase ac circuit.
8. Construct a circuit to measure energy in KWh in a single phase ac circuit.
9. Construct a suitable circuit to start and reverse the direction of three phase induction motor using DOL/ Star-Delta/ Auto-Transformer starter.
10. Test and make a report of the fully charged and discharged conditions of a given Lead-acid battery.
11. Construct a circuit using a single Relay to turn ON a lamp connected to NC and to turn OFF another lamp connected to NO contacts of Relay.
12. Construct a circuit to obtain the forward bias characteristic of a Diode.
13. Construct and test Zener diode as a voltage regulator.
14. Build and test halfwave rectifier circuit.
15. Build and test full wave bridge rectifier circuit (without filter).
16. Construct a circuit to verify the truth tables of NOT,AND, OR, NOR and NAND gates.

17. Identify and draw the layout diagram for a simple PANEL BOARD/consisting of bus bars, CB/MCB/ELCB, meters, HRC fuses, magnetic contactors, cables, earthing points.

ReferenceBooks:

1. Experiments in Basic Electrical Engineering by S.K.Bhattacharya, New Age International Publications, 2007 Edition.
2. A Text book on Laboratory courses in Electrical Engg. by S.G. Tarnekar and P.K.Karbanda.

e-Resources:

1. http://www.scribd.com/doc/39578646/New-First-year-Electrical-lab-manual#scribd
2. http://mrcet.ac.in/newwebsite/pdfs/Labmanuals-13/ECE/LabManuals/ DC%20LAB% 20%28180%29%20II-I.pdf

Composition of Educational Components:

Questions for CIE and SEE will be designed to evaluate the various educational components (Bloom's taxonomy) such as:

Sl. No.	Educational Component	Weightage (%)
1	Remembering	20
2	Understanding	20
3	Application/ Analysis	60
Total		**100**

Mapping Course Outcomes with Program Outcomes:
(Course Outcome linkage to Cognitive Level)

	Course Outcome	Experiment linked	PO Mapped	Cognitive Level	Lab Sessions
CO1	Understand verification of Ohm's law experimentally.	1	2, 3, 8, 9, 10	R/U/A	3
CO2	Rig-up various wiring control circuits, panel board and meter board individually and test.	2,3,4,5,6,17	2, 3, 8, 9, 10	U/A	18
CO3	Rig-up circuits to measure power and energy in ac circuit.	7,8	2, 3, 8, 9, 10	U/A	6
CO4	Test and report the conditions and ratings of Battery.	10	2, 3, 8, 9, 10	U/A	3
CO5	Start and reverse the three phase induction motor	9	2, 3, 8, 9, 10	U/A	3
CO6	Understand the operation of relay, diode circuits, rectifier circuits and logic gates	11,12,13, 14,15,16	2, 3, 8, 9, 10	U/A	18

U-Understanding; A-application/ Analysis; App-Application

Course-PO Attainment Matrix

Course	Programme Outcomes									
	1	2	3	4	5	6	7	8	9	10
Basic Electrical and Electronics Lab	-	**3**	**3**	-	-	-	-	**3**	**3**	**3**

LEVEL 3- HIGHLY ADDRESSED, LEVEL 2-MODERATELY ADDRESSED, LEVEL 1-LOW ADDRESSED.
METHOD IS TO RELATE THE LEVEL OF PO WITH THE NUMBER OF HOURS DEVOTED TO THE COS WHICH ADDRESS THE GIVEN PO.
IF ≥40% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 3
IF 25 TO 40% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 2
IF 5 TO 25% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS ADDRESSED AT LEVEL 1
IF < 5% OF CLASSROOM SESSIONS ADDRESSING A PARTICULAR PO, IT IS CONSIDERED THAT PO IS CONSIDERED NOT-ADDRESSED.

Course Delivery:

The Course will be delivered through Tutorial, classroom interaction, group discussion, practical exercises and assignments.

Tutorial - 1Hr:

Staff-in-charge will
1. Explain the concept of experiment to be conducted.
2. Teach required selection of components/ meters/ equipment/ suitable wires for the experiment to be conducted.
3. Ask students to draw the circuit.
4. Give clear instructions about safety precautions to be followed while conducting experiment.

Conduction/ Execution- 2 Hr:

Student will rig up the circuit diagram and conduct experiment individually under the supervision of the staff-in-charge.

Course Assessment and Evaluation:

			To Whom	Frequency	Practical	Evidence Collected	Course Outcomes
Direct Assessment Method	**CIE (Continuous Internal Evaluation)**	I A Tests	Students	Two IA tests for Practical (Average marks of both the tests to be computed)	10	Blue Books	1 to 6
		Record Writing		Record Writing (Average of Marks allotted for each experiment.)	10	Lab Record	1 to 6
				Student activity	05	Log of Activity	1 to 6
				TOTAL	**25**		
	SEE (Semester End Examination)	End Exam	Students	End of the Course	50	Answer Scripts	1 to 6
Indirect Assessment Method		Student Feedback on course	Students	Middle of The Course	Feed Back Forms		1 to 3
		End of Course Survey		End of The Course	Questionnaire		1 to 6

*CIE – Continuous Internal Evaluation   ***SEE** – Semester End Examination

Note:
1. I.A. test shall be conducted as per SEE scheme of valuation. However obtained marks shall be reduced to 10 marks. Average marks of two tests shall be rounded off to the next higher digit.
2. Rubrics to be devised appropriately by the concerned faculty to assess Student activities.

Suggested Student Activities:

Each Student has to prepare a self-hand written report of 3 pages or solved in a blue book considering any one of the following topics.

1. Mini-Projects: Like preparing extension box, switch box and wiring models,
2. Make a plan of building wiring for a lab/ room, etc.

3. Visit nearby Battery charging shop or show room and prepare a report of the visit.
4. Prepare a report of the conditions of batteries available in the Polytechnic.
5. For given voltage, current, Ah ratings of individual cell, and required voltage and current rating of battery, prepare a report of calculations for number of cells and their method of connections.
6. List out the different protective devices used in your laboratories or house with their ratings.
7. List out the different types of wiring systems used in your laboratories or house with their representation.

MODEL OF RUBRICS / CRITERIA FOR ASSESSING STUDENT ACTIVITY (Course Coordinator)

Dimen sion	Scale					Students score (Group of five students)				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary	1	2	3	4	5
1	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	3				
2	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	2				
3	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	5				
4	Descriptor	Descriptor	Descriptor	Descriptor	Descriptor	4				
Note: Concerned faculty (Course coordinator) must devise appropriate rubrics/criteria for assessing Student activity for 5 marks **One activity on any one CO (course outcome) may be given to a group of FIVE students** **Grand Average/Total**						14/4 =3.5 ≈4				

Dimension	Scale					Students score (Five students)				
	1 Unsatisfactory	2 Developing	3 Satisfactory	4 Good	5 Exemplary	1	2	3	4	5
1.Organisation	Has not included relevant info	Has included few relevant info	Has included some relevant info	Has included many relevant info	Has included all relevant info needed	3				
2. Fulfill team's roles & duties	Does not perform any duties assigned	Performs very little duties	Performs partial duties	Performs nearly all duties	Performs all duties of assigned team roles	2				
3.Conclusion	Poor	Less Effective	Partially effective	Summarises but not exact.	Most Effective	5				
4.Conve nsions	Frequent Error	More Error	Some Error	Occasional Error	No Error	4				
					Total marks	14/4=3.5 ≈4				

Example only: MODEL OF RUBRICS / CRITERIA FOR ASSESSING STUDENT ACTIVITY-
Task given– Industrial visit and report writing

Scheme of Valuation for SEE(Semester End Examination)

Sl. No.	Particulars	Marks
1.	Identification of meters/ equipments/ wires/ tools/ etc.	05
2.	Writing Circuit diagram and Procedure*	10
3.	Conduction	20
4.	Results	05
5.	Viva-voce	10
	Total	**50**
*Question Paper will have any ONE question from the list of experiments.		

Model Question Bank:

Course Title: **BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB**	Course Code: **15EE02P**

1. Construct a suitable circuit to verify Ohm's law. Also plot Graph.
2. Conduct an experiment to find the Resistance of a given unknown Resistor.
3. Rig up and test the wiring circuit to control a lamp and a three pin socket independently.
4. Rig up and test the wiring circuit to control two lamps independently.
5. Construct and test fluorescent lamp circuit.
6. Construct and test the staircase wiring circuit (control from 2 places).
7. Conduct an experiment to control a lamp from two places.
8. Construct and test Meter board wiring using single phase Energy meter, MCB/ELCB, Kit-kat fuse and neutral link.
9. Conduct a suitable experiment to test the Meter board wiring circuit.
10. Build and test a circuit to measure power and power factor in a single phase ac circuit.
11. Construct a circuit to measure energy in KWh in a single phase ac circuit.
12. Conduct an experiment to measure the single phase energy consumed in KWh for the given electrical load.
13. Construct a suitable circuit to start and reverse the direction of three phase induction motor using DOL starter.
14. Construct a suitable circuit to start and reverse the direction of three phase induction motor using Star-Delta starter.
15. Construct a suitable circuit to start and reverse the direction of three phase induction motor using three phase auto-transformer starter.
16. Test and make a report of the fully charged and discharged conditions of a given Lead-acid battery.
17. Construct and test a circuit using a Relay to turn ON/ OFF a lamp connected to 230 Volts ac supply.
18. Conduct an experiment to control a lamp using a Relay.
19. Construct a circuit using a single Relay to turn ON a lamp connected to NC and to turn OFF another lamp connected to NO contacts of Relay.
20. Conduct an experiment to turn ON a lamp and turn OFF another lamp using a single Relay.
21. Construct a circuit to obtain the forward bias characteristic of a Diode.
22. Conduct an experiment to Plot the forward bias characteristic of a PN Junction Diode.
23. Construct and test Zener diode as a voltage regulator. Also, plot the Graph.
24. Build and test half wave rectifier circuit. Also, trace the input and output waveforms.

25. Build and test full wave bridge rectifier circuit (without filter). Also, trace the input and output waveforms.
26. Construct a circuit to verify the truth tables of NOT and AND gates.
27. Construct a circuit to verify the truth tables of OR, NOR gates.
28. Construct a circuit to verify the truth tables of NAND and AND gates.
29. Conduct an experiment to verify the truth tables of given logic gates.
30. Identify and draw the layout diagram for a simple PANEL BOARD consisting of bus-bars, CB/MCB/ELCB, meters, HRC fuses, magnetic contactors, cables, earthing points.

Lab Equipment Requirement:

Students Intake   :   60
Students per Batch   :   20

Sl. No.	Name of Equipment and Specification	Quantity Required
1	Dual Channel 30 V, 2 A continuously variable DC Regulated Power Supply with Current and Overload Protection	05 Nos.
2	+/- 15 V, 2 A, fixed DC Regulated Power Supply	05 Nos.
3	Portable Moving Coil DC Voltmeters a) 0 - 1 V b) 0 - 10 V c) 0 - 30 V	Each 05 Nos.
4	Portable Moving Iron AC Voltmeters a) 0 - 300 V b) 0 - 600 V	Each 05 Nos.
5	Portable Moving Coil DC Ammeters a) 0 - 100 mA b) 0 - 1 A c) 0 - 2 A	Each 05 Nos.
6	Portable Moving Iron AC Ammeters a) 0 - 2 A b) 0 - 5 A c) 0 - 10 A	Each 05 Nos.
7	Watt-meters a) 150/ 300V, 2 A, UPF b) 300/ 600 V, 5/ 10 A, LPF	Each 02 Nos.
8	Rheostats – 25 Ohms, 50 Ohms, 150 Ohms, 220 Ohms (all rated at 3 A)	Each 05 Nos.
9	Rheostat Loads s – 1 KW, 230 V	02 Nos.
10	Wire wound Resistors- 5 Ohms 2 Watts, 25 Ohms 5 Watts, 330 Ohms 2 Watts, 560 Ohms 2 Watts, etc.	Each 05 Nos.
11	Soldering Iron 60 W	05 Nos.
12	Fluorescent lamp sets	10 Nos.
13	Single Phase Energy meter 10 A, 230 V, 50 Hz, Digital type	05 Nos.
14	Multi-meter Digital ¾"	06 Nos.
15	Duel Trace Oscilloscope – 30 MHz	02 Nos.
16	Three Phase Induction Motors :1 HP – 440 V 50 Hz,2 HP – 440 V 50 Hz.	Each 02 Nos.
17	Three phase DOL, Star-Delta, Auto transformer starter	Each 02 Nos.
18	UPS 1 KVA	01 Nos.
19	Battery Lead-Acid type, 140 A-hr and Hydrometers	02 Nos.

Sl. No.	Name of Equipment and Specification	Quantity Required
20	I C Trainer kit	05 Nos
21	Digital IC's 7400, 7402, 7404, 7408, 7486 etc	Each 10 Nos.
22	Wooden Wiring board (2x3) ft	10
23	Wiring accessories a) PVC conduit - ¾" - 10 lengths b) Cap and casing - ¾" - 10 lengths c) Switches Single Pole- 5A, 230 V d) Switches two way – 5 A, 230 V e) 3 Pin Sockets 5A, 230 V f) Bulb Holders – 5 A, 230 V g) 3 Pin Plug 5A, 230 V h) 60 Watts Lamps i) 100 Watts Lamps j) 15 W CFL lamps k) Copper Wires of sizes 1.5 mm^2, 2.5 mm^2, 4 mm^2 – 1 coil each l) Gang boxes (1+1, 2+1, 2+2) m) Kit –Kat fuses 5A, 15 A n) MCB 16 A & 32 A/ 230 V, Single and Double Pole o) ELCB 16 A & 32 A/ 230 V, Double Pole p) Neutral link- 16 A, 230 V q) Screws of assorted sizes r) Testers	Each 10 Nos.
24	Electronic Components a) Diodes - BY 127 and IN 4001 b) Zener Diodes – 6.2 V, 5.6 V, 7.8 V c) Relays – solid state Sugar cube type, SPST, Coil 6V, Power circuit 230 V, 5 A. d) Spring Boards e) Bread Boards f) Tag Boards.	Each 10 Nos.
25	Simple PANEL BOARD/ CUBICAL consisting of bus-bars, CB/MCB/ELCB, meters, HRC fuses, magnetic contactors, cables, earthing points.	1 No