1028

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V Semester Diploma Examination, June/July-2023

TRANSPORTATION ENGINEERING

Time : 3 Hours] [Max. Marks : 100

Instruction : Answer any **one** full question from each section.

SECTION – I

1. (a) NHAI has planned to upgrade existing highway due to increase in traffic volume. You as a Civil Engineer explain the steps involved in realignment of highway project. **10**

(b) In a road stretch overtaking sight distance is not available due to obstruction to vision and from that place data is obtained as follows :

The speeds of overtaking and overtaken vehicles are 70 and 40 kmph, respectively on two way traffic road. The average acceleration during overtaking may be assumed as 0.99 m/sec^2.

(i) Calculate safe overtaking sight distance.

(ii) What is minimum length of overtaking zone ?

(iii) Draw a neat sketch of the overtaking zone and show the positions of the sign posts. **10**

2. (a) As you are a student an accident study project work is carried out in an existing road, hence interpret the objective and different causes of traffic accidents. **10**

(b) The consolidated data collected from speed and delay studies by floating car method on a stretch of urban road of length 3.5 km, running North-South are given below. Determine the average values of volume, journey speed and running speed of the traffic stream along each direction. 10

Trip No.	Direction of Trip	Journey time min-sec	Total stopped delay min-sec	No. of vehicle overtaking	No. of vehicles overtaken	No. of vehicles from opposite direction
1	N-S	6-32	1-40	4	7	268
2	S-N	7-14	1-50	5	3	186
3	N-S	6-50	1-30	5	3	280
4	S-N	7-40	2-00	2	1	200
5	N-S	6-10	1-10	3	5	250
6	S-N	8-00	2-22	2	2	170
7	N-S	6-28	1-40	2	5	290
8	S-N	7-30	1-40	3	2	160

SECTION – II

3. (a) As a Civil Engineer how do you compare rigid pavement and flexible pavement ? 10

(b) A soil sample was tested at laboratory which will be used as highway subgrade material and following index properties are obtained :

Passing 0.074 mm Sieve = 55%

Liquid Limit = 50%

Plastic Limit = 41%

(i) Classify the soil by HRB system.

(ii) Write the suitability of the soil as a subgrade material. 10

4. (a) For highway Wet Mix Macadam (WMM) construction starts by next month. As a project head you provide details of materials, construction procedure and quality control checks to be followed as per MORTH. 10

(b) The traffic studies and axle load distribution studies carried out during project preparation indicated that are

(i) 5600 commercial vehicles per day with rear axle loads in the range of 2500 to 3500 kg and growth rate of 6.5% p.a and

(ii) 1900 heavy commercial vehicles with rear axle loads in the range 11000 to 13000 kg and growth rate of 4.5%.

The road pavement is expected to be constructed in a period of 3 years after this study and the flexible pavement structure is to be designed for a life of 15 years. Determine value of CSA for design. 10

SECTION – III

5. (a) As a experienced highway engineer, how would you describe the requirements of highway drainage system ? **5**

(b) In a construction site ground water table problem has arised. Hence with a neat sketch interpret the method of lowering of ground water table in a pervious soil by providing subsurface drains. **5**

(c) Estimate the quantity of earthwork for the portion of road for a 400 m length from the following data : **10**

Chainage	25	26	27	28	29	30	31	32	33
Distance in mm	1000	1050	1100	1150	1200	1250	1300	1350	1400
RL of Ground	51.0	50.50	50.0	51.0	51.50	52.0	51.8	50.7	51.0

The formation level at 1000 chainage is 52.0 and the road is in a falling gradient of 1 in 200. The width of formation is 10 m and side slopes 2 : 1 in banking and 1.5 : 1 in cutting.

6. (a) For village a connecting road should be constructed for low volume of traffic, so as a site engineer produce detailed construction steps to be followed for cement concrete roads. **10**

(b) Estimate the quantities of the following items of works for the cross-section of 1 km length of road shown in fig-1.

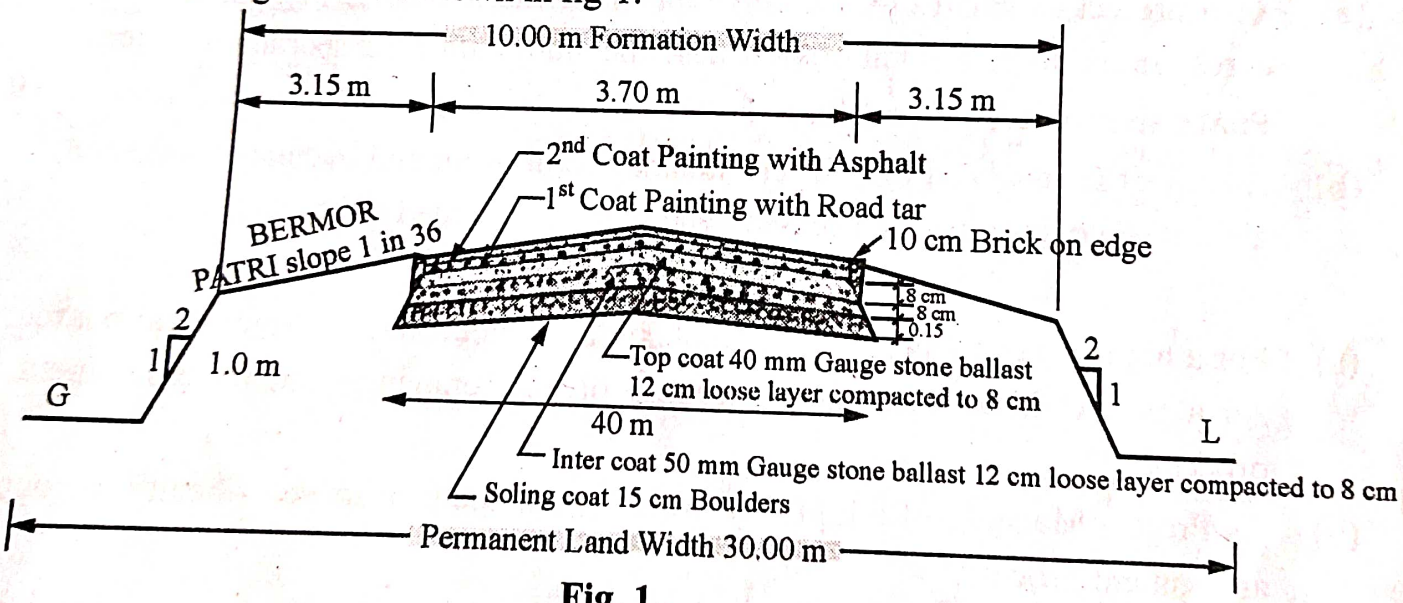

Fig. 1

(i) *Soling coat 15 cm boulders.*

(ii) *Inter coat 50 mm gauge stone ballast 12 cm loose layer compacted to 8 cm.*

(iii) *Top coat 40 mm gauge stone ballast 12 cm loose layer compacted to 8 cm.*

(iv) *1st coat painting with road tar.*

(v) *2nd coat painting with Asphalt.* **10**

SECTION – IV

7. (a) As site engineer of a railway construction with a neat sketch explain the marshalling yard. 10

(b) A new bridge construction is proposed across a river flowing. As an engineer write the factors you consider for selection of site for bridge construction. 10

8. (a) In a harbour when you working as engineer the depth availability of water reduced due to sitting. Hence briefly describe how dredging process is carried out. 5

(b) A new airport is proposed for a city as you're a Civil Engineer enumerate the factors you consider for selection of site for airport. 5

(c) A tunnel has constructed for a highway at Western Ghats of Karnataka. As your going to use tunnel can you describe the objects of tunnel lining and tunnel ventilation. 10

SECTION – V

9. (a) As a project of smart city the Government of India is upgrading various cities across India. In your point of view describe multi modal transportation system. Public transport (BRT & LRT) 10

(b) A project as assigned to your consultancy to perform and evaluate road safety audit. Hence describe the necessity and objective of road safety audit. 10

10. (a) For a highway construction need to obtain clearance from environmental board. As a project head write the procedure of environmental impact assessment process. 10

(b) As Project Manager of a highway project write the procedure of health impact assessment process. 10