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V Semester Diploma Examination, February/March-2023**ADVANCED MANUFACTURING TECHNOLOGIES****Time : 3 Hours]****[Max. Marks : 100****Instructions :** Answer one full question from each section.**SECTION – 1**

1. (a) The materials used in manufacturing of Automobiles / Locomotive have changed a lot now as compared to early years. With objectives of reducing weight and increase fuel efficiency, what are the advance materials used in manufacturing of Automobiles and Locomotives ? Justify your answer with material advantages and uses. 10
- (b) Discuss non-traditional manufacturing methods are better than traditional manufacturing methods. Justify your answer and also list advantages and disadvantages. 10
2. (a) Point out Super alloys and Ceramic materials used in high temperature applications. List the applications. 10
- (b) Discuss the important steps in Chemical Machining method. 10

SECTION – 2

3. (a) In additive manufacturing, the material properties are being established alongside the geometry of the part. There are different classes of materials used in additive manufacturing. Differentiate these different materials used in AM with respect to their properties and applications. 10

- (b) Uniform wares explores the advantages of additive manufacturing (AM) technology, pushing the boundaries of design in an industry traditionally centred around maintenance. What are the benefits of additive manufacturing? Differentiate the different technologies available in additive manufacturing and list their applications. 10
4. (a) An Electric discharge machining operation is being performed on 2 work materials, Tungsten & Zinc. Determine amount of metal removed in the operation after 1 hour at a discharge amperage = 20 Amps for each of these metals. The melting temperatures of tungsten & zinc are 6170°F & 420°F respectively. 10
- (b) Industrialist needs the engraving of letters on a wood, plastic & rubber materials using LASER. Discuss suitable machining process. 10

SECTION – 3

5. (a) The components which are manufactured by additive manufacturing technology known to have various internal defects, such as porosity, internal cracks, thermal stresses etc. which can be significantly affect the mechanical properties and safety of final parts. Therefore inspection methods are very much important. List different inspection methods adopted in AM. Discuss ultrasonic testing and write their advantages. 10
- (b) AM produced parts are being used in many applications. These parts are tested using non-destructive methods. Suggest the best non-destructive method used in this case. Present arguments to support your selection. 10
6. (a) Point out Non-destructive testing (NDT) important? List the benefits & need of NDT over DT (destructive testing) 10
- (b) Co-ordinate measuring machine & profile projector are necessity to reach higher standards in industries. Discuss working principle of CMM. 10

SECTION - 4

7. (a) Driverless vehicles and navigation systems are improving day after day and are contributing to boost the AGV (Automated guided Vehicle) market worldwide. Discuss the working principle of AGV. 10
- (b) Discuss the five levels of Automation in Advanced manufacturing. 10
8. (a) Automated storage and Retrieval systems (ASRs) are used in applications where high volumes of inventory move in and out of manufacturing or distribution operations. Discuss the working principle of ASRS. 10
- (b) A company requires to setup an Articulated robot and Cartesian Robots. Discuss how both Robots works. 10

SECTION - 5

9. (a) Discuss the working of Ultrasonic machining process. 10
- (b) Testing methods use capillary forces to find surface cracks or pores & make them visible. Discuss suitable process & justify. 10
10. (a) EDM (Electrical discharge machining) has been used in a wide variety of industrial applications ranging from cavity sinking to deburring and ability to machine high-strength alloys and hardened steel. Discuss the working of EDM. List the drawbacks. 10
- (b) Describe traditional and non-traditional machining processes. List the difference between traditional & non-traditional machining process. 10
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