

Reg. No. :

Question Paper Code : 51096

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Seventh/Ninth Semester

Aeronautical Engineering

OML 753 – SELECTION OF MATERIALS

(Common to: Aerospace Engineering/ Automobile Engineering/ Civil Engineering/ Industrial Engineering/ Industrial Engineering and Management/ Manufacturing Engineering/ Marine Engineering/ Mechanical Engineering/ Mechanical Engineering (Sandwich)/ Mechatronics Engineering/ Petrochemical Engineering/ Production Engineering/ Robotics and Automation/ Bio Technology/ Chemical Engineering/ Chemical and Electrochemical Engineering/ Food Technology/ Petrochemical Technology/ Petroleum Engineering/ Pharmaceutical Technology/ Plastic Technology/ Polymer Technology)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the different classifications of engineering materials?
2. What is a glass?
3. Name the applications where fatigue strength is required.
4. Give any two materials that show high fracture toughness.
5. What are the commercial techniques for processing plastic parts?
6. What is the importance of price and availability of materials in materials selection?
7. What is the use of Ashby material selection charts?
8. How to determine the molecular weight of polymers?
9. Give any two materials used for biomedical applications.
10. What are the uses of diamond films?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the procedure for selecting a material for particular application based on various factors.

Or

- (b) Explain the properties and applications of SMART materials.

12. (a) Explain the mechanical and magnetic properties of metals and ceramics with examples and applications.

Or

- (b) Explain the importance and how to improve the corrosion resistance of materials.

13. (a) Explain the steps involved in metal casting process in detail.

Or

- (b) Explain the methods for advanced ceramic processing.

14. (a) Explain the various testing methods used to determine the mechanical properties of metallic materials.

Or

- (b) Briefly explain the principle and purpose of different nondestructive inspection methods.

15. (a) Explain the materials used in electronic packaging applications with examples.

Or

- (b) Explain the ways to improve the wear resistance of materials.

PART C — (1 × 15 = 15 marks)

16. (a) Explain the concept of interaction between materials selection, design and manufacturing processes in detail.

Or

- (b) Explain the procedure for manufacturing composites for bike helmet applications.