

Reg. No. :

Question Paper Code : 21074

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

Seventh/Nineth Semester

Aeronautical Engineering

OML 751 – TESTING OF MATERIALS

(Common to : Aerospace Engineering/Automobile Engineering/Civil Engineering/Electrical and Electronics Engineering/Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Electronics and Telecommunication Engineering/Industrial Engineering/Industrial Engineering and Management/Instrumentation and Control Engineering/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 Engineering)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the purpose of material testing?
2. Name any two international material testing and standards organizations.
3. Toughness of the material can be determined using tensile testing Yes or No. Justify
4. What is Creep?
5. Why is pre-cleaning an important step before liquid penetrant test?
6. What is beam spreading in ultrasonic testing?
7. What is the maximum magnification of an optical microscope?
8. How do the magnetic property of a material determined?
9. What are the applications of differential thermal analysis?
10. State the working principle of X-ray Fluorescence.

PART B — (5 × 13 = 65 marks)

11. (a) Describe the procedure for selective of materials for particular application.
Or
(b) Describe any two testing standards used for mechanical testing and nondestructive testing of components.
12. (a) Explain the procedure for determining hardness of steel and aluminium alloy components.
Or
(b) Explain the procedure for fatigue testing of materials with its applications.
13. (a) Explain the principle and procedure for magnetic particle testing with required sketches.
Or
(b) Explain the principle and procedure of X-ray radiography with neat sketches.
14. (a) Explain the principle and working of Transmission Electron Microscopy technique.
Or
(b) Discuss the principle, applications, advantages and limitations of SEM and TEM.
15. (a) Discuss the details that can be obtained from Differential scanning calorimetry testing of samples.
Or
(b) Explain the principle and procedure of optical emission spectroscopy for determining the chemical composition of the metallic samples.

PART C — (1 × 15 = 15 marks)

16. (a) Explain the crucial role of nondestructive testing in quality assurance and real-time monitoring of defect generation in structural parts and industries.
Or
(b) Explain the principle, construction and working of optical microscopy with the importance of sample preparation for the metallography studies.