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Question Paper Code : 51094

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

Seventh/Ninth Semester

Civil Engineering

OML751 – TESTING OF MATERIALS

(Common to: Aeronautical Engineering/Aerospace Engineering/Automobile 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 Technology)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the different classifications of the material testing methods.
2. Write the importance of result analysis after material testing.
3. Which hardness testing method can be used for measuring the hardness of Aluminium alloys and high strength steels?
4. State the difference between endurance limit and fatigue strength.
5. List the applications and advantages of visual inspection.
6. Write the applications of acoustic emission testing.
7. What is the principle of X-Ray Diffraction?

8. Differentiate between macroscopic and microscopic observations.
9. Mention any four applications of Differential Scanning Calorimetry.
10. Draw a typical DSC curve showing the melting peak.

PART B — (5 × 13 = 65 marks)

11. (a) Describe the different classifications of materials and their relative properties in detail.

Or

- (b) With examples, explain the procedure for selecting a suitable material for a specific application.

12. (a) Explain the procedure for tensile testing and explain the details/properties that can be determined from the test.

Or

- (b) Explain with a neat sketch the different stages in creep curve and the mechanisms in each stage.

13. (a) Explain the working of a pulse echo A-scan ultrasonic test machine to find the defects in a component.

Or

- (b) Explain in detail the various steps involved in liquid penetrant testing with their advantages and limitations.

14. (a) Elucidate the principle and working of Scanning Electron Microscopy with the different operational modes.

Or

- (b) Briefly discuss the types, advantages and limitations of the electrical and magnetic characterization techniques.

15. (a) Discuss the principle and working of Differential Thermal Analysis and its applications.

Or

- (b) Explain the procedure for determining the composition analysis using Inductively Coupled Plasma technique.

PART C — (1 × 15 = 15 marks)

16. (a) Suggest and explain the suitable technique to detect the longitudinal and transverse cracks in a welded component.

Or

- (b) Explain the specimen preparation procedure for Transmission Electron Microscopy studies and the various modes of operation. List the advantages and applications.
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