

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024

Seventh Semester

Mechanical Engineering

20PROE907 - TESTING OF MATERIALS

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (MCQ) (20 × 1 = 20 Marks)

Answer ALL Questions

Marks *K-
Level* CO

1. The size of the testing is dependent on the _____
(a) Number of factors (b) Number of levels of each factor
(c) Number of iterations to be studied (d) All of the mentioned
1 K1 CO1
2. Standard test methods have been established by such national and international bodies as the _____
(a) ISO (b) BPO (c) ELC (d) BIS
1 K1 CO1
3. ISO has _____ official languages.
(a) 4 (b) 5 (c) 3 (d) 6
1 K1 CO1
4. _____ is used for measuring the hardness of brittle materials.
(a) Shore hardness test (b) Vickers hardness test
(c) Brinell hardness test (d) Rockwell hardness test
1 K1 CO1
5. Which of the following show a fatigue limit?
(a) Titanium (b) Cast iron (c) Magnesium (d) Al-Mg alloys
1 K1 CO2
6. In what terms, fatigue life is measured?
(a) Time of failures (b) Number of cycles of failure
(c) Stress of failure (d) Appearance of fracture
1 K1 CO2
7. Which of the following isn't a stage of creep?
(a) Transient creep stage (b) Fracture stage
(c) Constant creep stage (d) Steady stage creep stage
1 K1 CO2
8. Which of the following affects a Charpy test?
(a) Specimen gauges factor (b) Test machine frequency (c) Colour (d) Yield strength
1 K1 CO3
9. Wavelength of X-Rays ranges from _____.
(a) 0.01 to 10 nm (b) 100 to 1000 nm (c) 50 to 100nm (d) 100 to 1000nm
1 K1 CO3
10. What is used to provide a relatively constant image brightness throughout an exam in fluoroscopy?
(a) Light sensor (b) TV camera (c) XRII (d) All of the above
1 K1 CO3
11. Which of the following agents should not be used as an agent for fluoroscopy?
(a) Silver (b) Bismuth (c) Thorium (d) Tungsten
1 K2 CO3
12. The colour of fluorescent penetrant under the presence of a UV light is _____.
(a) Yellow-green (b) Red (c) Blue (d) Green
1 K2 CO3
13. The purpose of indexing in TEM is _____.
(a) to determine the crystal structure
(b) to identify the defects in the crystal lattice
(c) to improve the resolution in TEM images
(d) all of the mentioned
1 K2 CO4
14. SEM stands for _____.
(a) Scanning Emission Microscope (b) Scanning Electric Microscope
(c) Scanning Electron Microscope (d) None of the mentioned
1 K1 CO4

15. The purpose of image mode is to analyze ____ 1 K1 CO4
 (a) grain size (b) lattice defects
 (c) crystalline structure (d) Both grain size and lattice defects
16. Which source can emit a white or blue light that can alter the appearance of the sample? 1 K1 CO4
 (a) Incandescent lamp (b) Arc lamp (c) LED (d) Halogen lamp
17. In Atomic Absorption Spectroscopy, which of the following is the generally used radiation source? 1 K1 CO5
 (a) Tungsten lamp (b) Xenon mercury arc lamp
 (c) Hydrogen or deuterium discharge lamp (d) Hollow cathode lamp
18. Fluorescent X-ray spectrometers would require 1 K2 CO5
 (a) high-intensity X-ray tubes (b) low-intensity X-ray tubes
 (c) moderate-intensity X-ray tubes (d) None of the mentioned
19. In thermo mechanical analysis, the materials of probes are 1 K1 CO5
 (a) quartz glass (b) alumina (c) metals (d) All the mentioned
20. The reading of output when the sample and reference are at same temperature in differential thermal analysis is 1 K1 CO5
 (a) Negligible (b) Zero (c) Very high (d) Moderate

PART - B (10 × 2 = 20 Marks)

Answer ALL Questions

21. Define NDT. 2 K1 CO1
22. Differentiate precision and accuracy. 2 K2 CO1
23. Define true stress-strain. 2 K1 CO2
24. What is the role of SN curve in fatigue mechanism? 2 K1 CO2
25. Summarize the importance of NDT? 2 K2 CO3
26. Explain pulsed thermography. 2 K2 CO3
27. State the principle of SEM. 2 K1 CO4
28. State diffraction principle. 2 K1 CO4
29. Define differential thermal analysis. 2 K1 CO5
30. Explain chromatography technique. 2 K1 CO5

PART - C (6 × 10 = 60 Marks)

Answer ALL Questions

31. a) Summarize the various stages in development of testing in detail. 10 K2 CO1
OR
 b) Explain how you will represent the result analysis of testing. 10 K2 CO1
32. a) What are the types of hardness tests? Explain in detail about Brinell hardness test with suitable diagram. 10 K2 CO2
OR
 b) Explain the principle, working of Charpy test with its advantages and disadvantages. 10 K2 CO2
33. a) What is ultrasonic testing? Explain in detail. 10 K2 CO3
OR
 b) With suitable diagram, explain the working principle of radiography testing. 10 K2 CO3
34. a) Explain with suitable sketch, principle and working of SEM analysis. 10 K2 CO4

OR

b) What are the different types of spectroscopy? Explain in detail about Atomic Spectroscopy. 10 K2 CO4

35. a) Explain differential scanning calorimetry with its working principle and limitations. 10 K2 CO5

OR

b) Explain in detail about differential thermal analysis with its advantages and disadvantages. 10 K2 CO5

36. a) i) Differentiate X-Ray diffraction and Electron diffraction. 5 K2 CO4

ii) Differentiate between TGA, DTA and DSC. 5 K2 CO5

OR

b) i) What are the magnetic techniques used in material characterization? Explain in detail. 5 K2 CO4

ii) Explain the various loading conditions in thermo mechanical analysis. 5 K2 CO5