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Question Paper Code : 57553

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Fourth Semester

Mechanical Engineering

ME 6403 – ENGINEERING MATERIALS AND METALLURGY

**(Common to Automobile Engineering, Mechanical and Automation Engineering and also
common to Third Semester Manufacturing Engineering)**

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. State Gibbs phase rule.
2. Give the typical eutectic and eutectoid reactions.
3. What is austempering ?
4. Name any two shallow hardening processes.
5. Give the effects of Silicon on steel.
6. What are bearing alloys ? Give an example.
7. What is polymerization ?
8. State the advantages of fiber reinforced composites.
9. List the applications of engineering ceramics.
10. Distinguish between elasticity and plasticity.

PART – B (5 × 16 = 80 Marks)

11. (a) Explain with a neat sketch of iron-iron carbide equilibrium diagram and indicate all the phases. Also write the three important invariant reactions. (16)

OR

- (b) Explain the various classification of steels and Cast Iron with microstructure, properties and applications. (16)

12. (a) What is hardenability ? How is Jominy end quench test used to measure hardenability ? (16)

OR

- (b) Explain TTT diagram with neat sketch and indicate all the phases with microstructure. (16)

13. (a) Discuss the properties and the applications of the following :

(i) Tool steels (ii) HSLA (8 + 8)

OR

- (b) Explain age hardening of Al-Cu with the help of phase diagram. (16)

14. (a) What is polymerization ? Explain addition polymerization and condensation polymerization with examples. (16)

OR

- (b) What is strengthening mechanism ? Explain the strengthening mechanism of fiber-reinforced composites. (16)

15. (a) Define hardness. Explain Brinell and Rockwell hardness test with neat sketches. (16)

OR

- (b) Explain the mechanism of plastic deformation by slip and twinning with neat sketches. (16)