Reg. No.

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 A*l*-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)