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Code No. : 13504 O3

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (Mech. Engg.) II Year I-Semester Old Examinations, May/June-2018

Metallurgy and Material Science

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. List the different types of imperfections.
2. Sketch the difference between ductile and brittle fracture.
3. List any four applications of diffusion.
4. What is low cycle fatigue?
5. Discuss the cooling curve of binary isomorphous alloy.
6. Define the terms: ferrite and pearlite.
7. Differentiate between martempering and austempering.
8. List the various quenching media.
9. Discuss the charge materials in the cupola.
10. What is hadfield steel?

Part-B (5 × 10 = 50 Marks)
(All bits carry equal marks)

11. a) Explain the plastic deformation by slip and twinning with appropriate sketches.
b) What is Bauchinger effect in metals?
12. a) What are the effects of metallurgical variables on fatigue of metal?
b) Discuss the cumulative fatigue damage theory.
13. a) Choose any one binary non ferrous equilibrium diagram and explain its construction.
b) Discuss the peritectic, peritectoid and monotectic reactions.
14. a) Discuss the purpose and importance of heat treatment in metallurgy.
b) Discuss the differences between flame hardening and nitriding processes.
15. a) Explain the production of aluminium from its ore.
b) Explain the various types of brasses and their applications.
16. a) Bring out the differences between creep curve and stress rupture curve.
b) What are the effect of dislocations on plastic deformation of metals?
17. Answer any *two* of the following:
 - a) Sketch the Iron- Iron Carbide diagram and label all parts, phases and lines.
 - b) T.T.T Diagram.
 - c) Production of pig iron by blast furnace.

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