

Hall Ticket Number:

| | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|

Code No. : 13505 O

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (Mech. Engg.) II Year I-Semester Backlog Examinations, December-2017

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 differences between slip and twinning.
2. Write an equation showing the relation between yield stress and grain size diameter.
3. Show S-N curve for mild steel and aluminum.
4. Sketch the structure of fatigue fractured specimen.
5. Distinguish eutectic and eutectoid reaction using Fe-C diagram.
6. Sketch the microstructures of gray cast iron and spheroidal graphite cast iron.
7. Discuss age hardening of non-ferrous alloys.
8. What is annealing of metals?
9. List the raw materials used in blast furnace.
10. What is coke bed height in cupola?

Part-B (5 × 10 = 50 Marks)

(All bits carry equal marks)

11. a) Draw neatly the edge dislocation and screw dislocations. Explain the burger's circuit for the above dislocations.
b) Sketch the stress-strain diagram of ductile material and locate the fracture point. Explain the ductile fracture mechanism with appropriate sketches.
12. a) Describe the experimental determination of fatigue strength in the laboratory.
b) State and derive the Fick's second law of diffusion.
13. a) Draw Iron – Iron Carbide equilibrium diagram and label all parts, reactions, phases and temperatures.
b) Describe the microstructure, composition and applications of various plain carbon steels.
14. a) Mention various types of heat treatment process and explain any one process.
b) Identify the differences between flame hardening and induction Hardening.
15. a) Describe the L.D process of steel making.
b) Explain the stages of powder metallurgy.
16. a) List the differences between hot working and cold working of metals.
b) Draw creep curve and explain creep deformation mechanisms.
17. Answer any *two* of the following:
 - a) Sketch partial eutectic system phase diagram and describe the various phases, line and points
 - b) Differentiate between Annealing and Normalising processes.
 - c) What are the effects of alloying elements in Steels?

