Hall Ticket Number:

Code No. : 13515 O2

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E (Mech. Engg.: CBCS) III-Semester Backlog (Old) Examinations, December 2018

Metallurgy & 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. Mention the differences between Surface & Volume defects of crystals.
2. What is Hall – Petch Equation of metals?
3. Define fatigue limit.
4. What are the applications of Diffusion theory in Mechanical Engineering?
5. Explain lever rule in phase diagrams.
6. Outline the Properties and Applications of Nodular Cast Irons.
7. What is Austempering process?
8. What are the differences between Nitriding and Carbo-Nitriding?
9. Mention the basic steps in Powder Metallurgy.
10. Define Electro Slag Refining of Steels.

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

11. a) Sketch and explain edge and screw dislocations in crystals.
    b) Draw and explain stress-strain curve of mild steel.

12. a) How do you determine fatigue strength of metals experimentally?
    b) Explain the differences between creep curve and Stress – Rupture Curve.

13. a) Explain the construction and interpretation of any one thermal equilibrium diagram preferably Binary non-ferrous alloys.
    b) Explain briefly Eutectic, Eutectoid, Peritectic Reactions of Fe-C diagram.

14. a) Why heat treatment is carried out in Industry and explain with examples.
    b) Bring out the differences between Induction Hardening and Flame Hardening.

15. a) Describe the Production of Steel by Electric Arc Furnace.
    b) Describe composition, properties and applications of high speed steels.

16. a) Explain Bauchinger effect with the help of a Diagram.
    b) Describe the factors responsible to improve fatigue life of Metals.

17. Answer any **two** of the following.
    a) Manufacture of Cast Iron by Cupola.
    b) Age Hardening.
    c) Composition, Properties & Applications of Malleable Cast Iron and white cast Iron.

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