

FACULTY OF ENGINEERING

**B.E. 2/4 (M/P) I-Semester (Main) Examination,
November/December, 2009**

Subject : METALLURGY AND MATERIAL SCIENCE

Time : 3 Hours]

[Max. Marks : 75

Note : *Answer all questions from Part-A. Answer any five questions from Part-B.*

PART - A

(2.5x10=25 Marks)

1. What are the applications of Had-field manganese steel ?
2. Mention the applications of stress relief annealing.
3. Nitriding is a treatment suitable only for some steels. Why ?
4. Discuss about any one alloy of Cast-Iron.
5. What is polygonisation in Annealing a cold worked material ?
6. Explain the significance of Hall - patch equation.
7. Distinguish between Intergranular and Transgranular fracture.
8. What is critical resolved shear stress ?
9. What is Lever rule and what is its significance ?
10. Define and explain the following :
(a) Creep (b) Fatigue (c) Fracture

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| 11. | (a) | Discuss various types of imperfections in Solids. | 5 |
| | (b) | Discuss Griffiths theory of Brittle fracture. | 5 |
| 12. | (a) | Explain various methods of improving fatigue properties of materials. | 5 |
| | (b) | With a neat sketch discuss various Stages of Creep. | 5 |
| 13. | (a) | Explain the construction of a binary 'Isomorphos' phase diagram. | 6 |
| | (b) | What are the applications of phase diagrams. | 4 |
| 14. | (a) | What is Malleable Cast Iron ? Discuss the manufacture of Malleable Cast Irons. | 5 |
| | (b) | Discuss Normalising as heat treatment process and mention the applications. | 5 |
| 15. | (a) | Discuss any one method of production of Aluminium. | 5 |
| | (b) | What are the advantages of steel production by L.D process ? Discuss the process with a neat sketch. | 5 |
| 16. | (a) | Draw Fe-Fe ₃ C equilibrium diagram and lable all points, lines and areas. | 5 |
| | (b) | Discuss the properties and applications of Brass and Bronze. | 5 |
| 17. | Discuss the properties and applications of <i>any three</i> of the following : | | 10 |
| | (a) | High speed steels | |
| | (b) | Dual phase steels | |
| | (c) | S.G. Cast Irons | |
| | (d) | Monds | |
| | (e) | Al-Si alloys | |

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