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Name.....

Reg. No.....



**THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE [14 SCHEME]
EXAMINATION, NOVEMBER 2015**

ME 14 306 – METALLURGY AND MATERIAL SCIENCE

Time : Three Hours

Maximum : 100 Marks

Part A

Answer any eight questions.

1. Define and explain the following :
 - (i) Polymorphism.
 - (ii) Allotropy.
2. Describe with neat sketches the arrangement of atoms in the BCC and HCP lattices.
3. Explain any *one* mechanism of diffusion.
4. State and explain the Lever rule.
5. Explain Jomni test with a neat diagram.
6. Compare slip and twinning mode of plastic deformation.
7. Differentiate between ductile and brittle fracture.
8. List the merits and limitations of non-ferrous alloys compared with ferrous alloys.
9. Describe the properties and applications of ferritic and austenitic stainless steels.
10. Write a brief note on bio-materials.

(8 × 5 = 40 marks)

Part B

Answer all the questions.

11. (a) Explain with neat sketches the various steps involved in the preparation of specimen for microstructural examination.

Or

- (b) Discuss the following crystal imperfections :
- (i) Point defects.
 - (ii) Surface defects.

(8 + 7 = 15 marks)

Turn over

12. (a) Sketch and explain Pb-Sn phase diagram.

Or

(b) Give brief accounts of the following heat treatment methods :

(i) Annealing.

(ii) Austempering.

(8 + 7 = 15 marks)

13. (a) Discuss the elastic behaviour of materials in detail.

Or

(b) Explain the following :

(i) Work hardening.

(ii) Creep curve.

(7½ + 7½ = 15 marks)

14. (a) Describe composition, properties and applications of any *five* copper alloys.

Or

(b) Write short notes on the following :

(i) Polymer matrix composites.

(ii) Super alloys.

(10 + 5 = 15 marks)

[4 × 15 = 60 marks]