D 30899 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION OCTOBER 2012

Mechanical Engineering

AN/ME/AM 09.306/PTME 09.305—METALLURGY AND MATERIAL SCIENCE

(2009 Admissions)

Time : Three Hours Maximum : 70 Marks

Part A

Answer **all** *questions.*

1. What is the no. of atoms in SC system per unit cell ?
2. What is meant by surface defects ?
3. State Fick's I law.
4. What are the two types of solid solutions ?
5. List few properties of refractories.

(5 × 2 = 10 marks)

Part B

Answer any **four** *questions.*

6. Explain how materials are classified.
7. Define visco elasticity and an elastic behaviour.
8. Write peritectic and peritectoid reaction.
9. Mention few surface hardening methods. Explain any *one*.
10. What is Gun metal ? Enumerate its properties and applications.
11. What is meant by shape memory alloys ? How it achieves the effect ?

(4 × 5 = 20 marks)

Part C

Answer section (a) **or** *(b) in each question.*

12. (a) With a neat sketch explain the working of TEM.

Or

(b) Write short notes on Miller Indices and Miller Bran's indices.

13. (a) Explain annealing after work hardening.

Or

(b) Write short notes on fatigue and creep.

Turn over

14. (a) From the following data, predict whether Al, Ni (or) Cr as a solute metal form extensive solid solution in solvent Cu.

Metal	*Atomic radius* °A	*Crystal structure*	*Electro negativity*
Cu ...	1.28	FCC	1.9
Al ...	1.43	FCC	1.5
Ni ...	1.25	FCC	1.8
Cr ...	1.25	BCC	1.6

Or

(b) Draw TTT diagram for Hypo Eutectoid, Eutectoid and Hyper Eutectoid steel. Discuss their hardening procedure based on TTT diagram.

15. (a) Write in detail about properties and applications of any *two* copper alloys.

Or

(b) Write short notes on Nano materials and Optical fibers.

(4 × 10 = 40 marks)