Following Paper ID and Roll No. to be filled in your Answer Book)							
PAPER ID: 0428	Roll No.				19		

B. Tech.

(SEM. III) ODD SEMESTER THEORY EXAMINATION 2012-13

MATERIALS SCIENCE IN ENGINEERING

Time: 3 Hours

Total Marks: 100

Note: (1) Attempt all questions.

- (2) All questions carry equal marks.
- (3) Be precise in your answer.
- 1. Attempt any FOUR out of the following:
 - (a) Explain how is modern periodic table different from Mendeleev's periodic table.
 - (b) Distinguish clearly between primary and secondary type of bonding, giving suitable examples.
 - (c) Find the Miller indices of a set of parallel planes which make intercepts in the ratio 3a: 4b on the x and y axes and are parallel to z axis.
 - (d) Calculate the glancing angle on the cube (100) of a rock salt of lattice constant 2.814°A corresponding to second order diffraction for x-rays of wavelength 0.710°A.
 - (e) What do you mean by amorphous materials?
 Give examples. How do they differ from crystalline materials?

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- (f) Draw the figure showing the structure of a crystal containing a screw dislocation. Also indicate the Burgers circuit.
- 2. Attempt any TWO out of the following:
 - (a) What is meant by fracture? Explain the characteristics of brittle fracture and ductile fracture.
 - (b) Explain briefly the procedure for preparing the specimen for micro-examination.
 - (c) Define the following terms:
 - (i) pearlite
 - (ii) ferrite
 - (iii) cementite
 - (iv) bainite and
 - (v) martensite.
- 3. Attempt any TWO out of the following:
 - (a) Differentiate between grey cast iron and malleable cast iron.
 - (b) Explain the working of TTT diagram. What information do you get from this diagram?
 - (c) Name the composition and applications of following alloys:
 - (i) phosphor bronze,
 - (ii) gun metal,
 - (iii) duralumin and
 - (iv) babbit metal.

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- 4. Attempt any TWO out of the following:
 - (a) Describe the phenomenon of magnetic hysteresis. Why does it occur for ferromagnetic and ferrimagnetic materials?
 - (b) Classify intrinsic and extrinsic semi-conductors. Give two examples of each type.
 - (c) What is Meisner effect ? What do you mean by
 - (i) persistent current in a superconductor and
 - (ii) type II superconductor ?
- 5. Attempt any TWO out of the following:
 - (a) Classify ceramic materials with appropriate examples.
 - (b) Give the general difference in strengthening mechanism between large particle and dispersion strengthened particle reinforced composites.
 - (c) What are linear polymers? Explain the difference between addition and condensation polymerization.