DECEMBER 2008

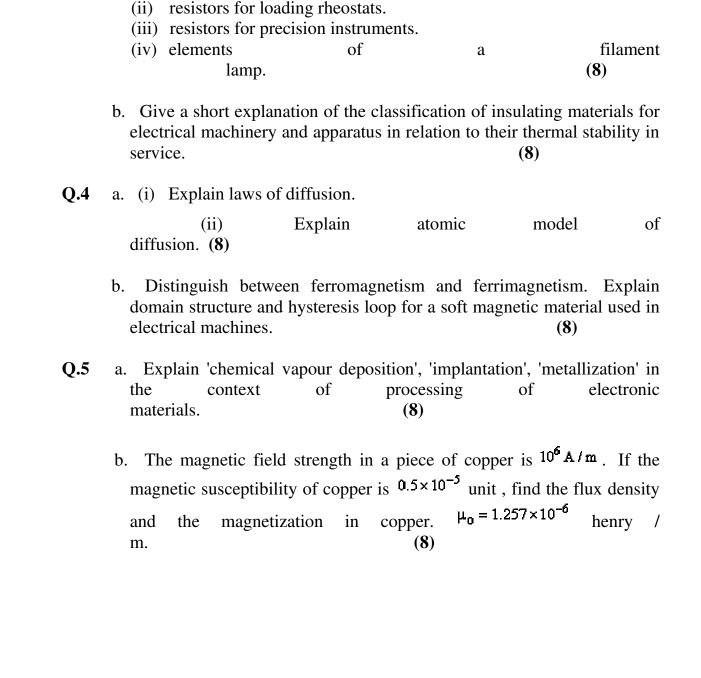
Code: AE04

Subject: MATERIALS AND PROCESSES

Time: 3 Hours Max. Marks: 100

 NOTE: There are 9 Questions in all. Question 1 is compulsory and carries 20 marks. Answer to Q. 1. must be written in the space provided for it in the answer book supplied and nowhere else. Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks. Any required data not explicitly given, may be suitably assumed and stated. 			
Q.1	Choose the correct or best alternation following:	ve in the (2x10)	
	a. The number of nearest neighb	ours for a body centred (BCC) lattice is	
	(A) 4. (C) 10.	(B) 8. (D) 16.	
	 b. The IC-chips used in compute (A) pure gold. (B) pure silicon. (C) silicon having desired important (D) germanium having silicon 	ourities.	
	c. Plastic pipes for domestic use are made of		
	(A) PVF.(C) Bakelite.	(B) Teflon.(D) PVC.	
	d. At 0°K, all valence electrons in an intrinsic semiconductor are		
	(A) free electrons.(C) in the forbidden gap.	(B) in the valence band.(D) in the conduction band.	
	e. Which of the following mater	rials has maximum magnetic permeability?	
	(A) 4% silicon steel.(C) grain-oriented Si – Fe.	(B) pure iron.(D) cast iron.	

	f. The minority carrier concentrat of	ion in semiconductors is largely a function
	(A) the breakdown voltage.(C) forward biasing voltage.	-
	g. Which of the following is transformer?	minimized by laminating the core of a
	(A) hysteresis loss(C) heat loss	(B) eddy current loss(D) all of them
	h. The degree of freedom when ice, water and water vapour co-exist in equilibrium is	
	(A) 1(C) 2i. Diamagnetic materials are	(B) 0 (D) −1
 (A) only slightly magnetized (B) magnetized in one direction (C) magnetized with eddy cut (D) magnetized in a direction 		ion only.
	j. Which of the following is an an	norphous material?
	(A) glass(C) silver	(B) zinc (D) mercury
	Answer any FIVE Questions Each question can	
Q.2	 a. Give examples for materials that (iii) metallic way of bonding materials depend bond. 	t bond in (i) ionic (ii) covalent Explain how the properties of these on the type of (8)
		erfections found in solid materials with 8)
Q.3	a. Name the materials which are u(i) elements for dielectric heate	



a. Describe direct **Q.6** and indirect extrusion with process sketches. **(8)** What is polarizability? What do you mean by local electric field? Examine the physical processes which give rise to different types of polarizations. **Q.7** treatment? hardening What is Explain heat and tempering. **(8)** b. Give an outline of the various steps taken during the process of photolithography. Discuss the fabrication of photo-masks employed for making micron-range devices. a. The intrinsic resistivity of germanium at 300°K is 47 ohm-cm. What is **Q.8** Given the intrinsic carrier concentration? the electron $\mu_n = 3900 \text{cm}^2$ mobility, per volt-sec: the hole $\mu_p = 1900 \text{cm}^2$ volt-sec. mobility, per and the electronic charge, $e = 1.6 \times 10^{-19}$ coulomb. **(8)** b. State and explain Hall effect. Describe an experimental set up to Hall coefficient determine and Hall mobility. **(8)** a. (i) What is phase rule? Explain phase, component and degree of **Q.9** freedom. refining. Give (ii) Explain its important zone applications. **(8)** b. Write notes on any **TWO** of the following: (i) Rolling. (ii) Annealing and Normalizing. (iii) Characteristics junction of p-n-p a **(8)** transistor.