

Reg. No. :

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Question Paper Code: 52003

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Second Semester

Civil Engineering

01UPH203- MATERIAL SCIENCE

(Common to Mechanical Engineering)

(Regulation 2013)

Duration: One hour

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

- In the case of _____, the valence band and the conduction band overlap each other
(a) conductors (b) dielectrics (c) insulators (d) semiconductors
- The valence electrons are _____ the nucleus and they are _____ bound.
(a) ionic (b) covalent (c) hydrogen (d) metallic
- The pure Si and Ge Semiconducting materials have _____ bonds.
(a) intrinsic semiconductor (b) compound semiconductor
(c) n-type semiconductor (d) p-type semiconductor
- Semiconductors have _____ temperature coefficient
(a) positive (b) negative (c) neutral (d) infinite
- In the case of paramagnetic materials the spin magnetic moments of the adjacent atoms are aligned
(a) parallel to each other (b) antiparallel to each other
(c) randomly (d) antiparallel but of unequal magnitude
- The superconducting state is perfectly _____ in nature.
(a) Diamagnetic (b) heat capacity (c) isotopic effect (d) entropy

7. _____ occurs when a dielectric contains occluded gas bubbles.
(a) thermal breakdown (b) defect breakdown
(c) intrinsic breakdown (d) discharge breakdown
8. _____ Polarization occur in Ferrites and semiconductors.
(a) Electronic (b) Ionic (c) Orientation (d) Space charge
9. Which of the following technique is used to form metallic glasses?
(a) Slow cooling (b) Quenching (c) Melt spinning (d) Hardening
10. Milling, Lithographic method and machining are examples of
(a) bottom-up approach (b) sputtering technique
(c) plasma assisted technique (d) top-down approach

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Derive an expression for electron concentration in conductor using Fermi distribution function. Use it to find the Fermi energy of electrons at absolute zero. (8)
12. Obtain an expression for the intrinsic charge density of an intrinsic semiconductor. (8)
13. Explain the domain theory of ferromagnetism. Using that theory, explain the formation of hysteresis in ferromagnetic materials. (8)
14. Define Local field in a dielectric. Obtain an expression for the internal field in dielectric and hence Deduce Clausius-Mosotti equations. (8)
15. What are nano materials? How nano materials are synthesised by sol gel and ball milling technique. (8)