

AMIETE – ET (Current & New Scheme)

Time: 3 Hours

JUNE 2017

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

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.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- 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 alternative in the following (2×10)

- a. Poorest conductor of electricity is?
 (A) Aluminum (B) Steel
 (C) Carbon (D) Silver
- b. Ferro-electric materials are characterized by
 (A) very high degree of polarization
 (B) a sharp dependence of polarization on temperature
 (C) non-linear dependence of the charge Q on the applied voltage
 (D) All of these
- c. Break down in dielectric may be
 (A) electrical breakdown
 (B) thermal breakdown
 (C) electrochemical breakdown
 (D) Any of these
- d. It is possible to destroy super-conductivity by
 (A) reducing temperature (B) adding impurities
 (C) application of magnetic field (D) Any of these
- e. Non-linear resistor
 (A) result in non-uniform heating
 (B) Follow ohm's law at low temperature only
 (C) produce harmonic distortions
 (D) None of these
- f. The atomic radius in case of body centered cubic lattice is
 (A) $a\sqrt{3}/4$ (B) $a\sqrt{2}/3$
 (C) $a\sqrt{2}/2$ (D) $a/2$
- g. Packing fraction in case of BCC crystal is
 (A) 0.50 (B) 0.68
 (C) 0.74 (D) 0.80

- h. Polymers
 (A) can be vaporized as well as recycled
 (B) can neither be vaporized nor recycled
 (C) can be vaporized but cannot be recycled
 (D) can be recycled but cannot be vaporized
- i. A carbon resistor contains
 (A) Solid carbon granules (B) Pulverized coal
 (C) Finely divided carbon black (D) Carbon crystals
- j. Free electron exist in
 (A) First Band (B) Second Band
 (C) Third Band (D) Conduction Band

**Answer any FIVE Questions out of Eight Questions.
 Each question carries 16 marks.**

- Q.2** a. Discuss different types of Bravais Lattices. (8)
 b. Explain the following : (4+4)
 (i) Production of ions of Opposite Sign
 (ii) Coulomb Attraction
- Q.3** a. Explain properties and application of polymers? (8)
 b. The surface of copper crystal is of the {111} Type. Calculate the surface energy (Enthalpy) of Copper. (8)
- Q.4** a. Explain the effect of temperature on electrical conductivity of metals. (8)
 b. What are the factors which affect the resistivity of electrical materials? (8)
- Q.5** a. Explain the effect of dielectric on the behavior of a capacitor. (8)
 b. What are the different types of polarization? Explain in brief. (8)
- Q.6** Differentiate between diamagnetic, paramagnetic and ferromagnetic materials? Also give one example of each. (16)
- Q.7** a. What are the different type of semiconductors? Explain n-type and p-type semiconductor with the help of energy band diagram. (12)
 b. What is diffusion? Explain (4)
- Q.8** a. What is voltage sensitive resistor? What are the different types of voltage sensitive resistors? (8)
 b. What is a PN junction? Draw and explain V-I Characteristic of PN Junction diode. (8)
- Q.9** a. Discuss epitaxial diffused junction diode and its application. (8)
 b. Give general properties of field effect transistor (FET). (8)