Total No. of Questions—**8**] [Total No. of Printed Pages—**3**

Seat No.	

[5252]-544

SE (Electrical) (First Semester) EXAMINATION, 2017

MATERIAL SCIENCE

(2015 PATTERN)

Time : Two Hours **Maximum Marks : 50**

Physical Constants :—

(*i*) Angstrom Unit (AU) = 1×10^{-10} metres.

(*ii*) Boltzmann's Constnat (k) = 1.380×10^{-23} joule.degree^{-1}

(*iii*) Charge on Electron (e) = 1.601×10^{-19} coulomb

(*iv*) Mass of Electron (m) = 9.107×10^{-31} kg

(*v*) Electron volt (eV) = 1.602×10^{-19} joules

(*vi*) Mass of Proton (m_p) = 1.627×10^{-27} kg.

(*vii*) Velocity of light (c) = 2.998×10^{8} m/sec

(*viii*) Dielectric Constant of free space (ε_0) = 8.854×10^{-12} F/m

(*ix*) Permeability of free space (μ_0) = $4 \pi \times 10^{-7}$ H/m

(*x*) Debye Unit = 3.33×10^{-30} coulomb.metre

1. (*a*) Explain : [6]

(*i*) Polarization

(*ii*) Pyroelectricity and

(*iii*) Ferroelectricity.

(*b*) State the properties and applications of : [6]

(*i*) Asbestos

(*ii*) Carbon.

P.T.O.

Or

2. (*a*) A parallel plate capacitor is used to store 16 μC at a potentil of 8 kV. The distance between the plates is 10×10^{-4} m. If the dielectric constant of the material is 20, kept between plates, what is the area of the plates ? [6]

(*b*) Discuss insulating materials used for transmission line. [6]

3. (*a*) Explain Ferromagnetic and Ferrimagnetic materials and their applications. [7]

(*b*) Describe the properties and applications of the following materials : [6]

(*i*) Platinum

(*ii*) Molybdenum.

Or

4. (*a*) Explain in detail BH curve (hysteresis loop) for ferromagnetic materials. [6]

(*b*) Write a short note on thermocouple. [7]

5. (*a*) Write down applications of carbon nano tubes and BN nano tubes. [6]

(*b*) Write a short note on : ZEBRA batteries. [6]

Or

6. (*a*) Write a short note on molecular machines. [6]

(*b*) Explain with neat diagram, chemical reaction, applications of : [6]

(*i*) Nickel-cadmium battery and

(*ii*) Sodium-sulphur battery.

7. (*a*) Describe measurement of dielectric strength of solid insulating material with reference to IS. [7]

(*b*) What is dielectric loss ? Explain with a suitable phasor diagram and derivation. [6]

Or

8. (*a*) With a neat sktech explain how flux density is measured with the help of gauss meter. [7]

(*b*) How will you test transformer oil ? Explain with neat diagram the test set up. [6]