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OIEE-002

DIPLOMA IN ELECTRICAL ENGINEERING (DELVI)

00729

Term-End Examination

December, 2017

OIEE-002 : ELECTRICAL ENGINEERING MATERIALS

Time : 2 hours *Maximum Marks : 70*

Note : *Question no. 1 is **compulsory**. Attempt any **four** from questions no. 2 to 7. Missing data may be suitably assumed. Use of scientific calculator is permitted.*

1. Fill in the blanks with appropriate statements. *7×2=14*

(a) The two types of forces acting between the atoms are _____ and _____ .

(b) When atoms are packed in a regular manner then they are known as _____ .

(c) Braggs' condition for X-ray reflection is _____ .

(d) The best known ferroelectric material is _____ .

(e) To characterize the losses of dielectric at a certain frequency and temperature the term _____ is used.

(f) According to Ohm's law, current density (J) is proportional to _____ .

(g) Electrical conductivity of semiconductors is similar to that of _____ .

2. Explain how engineering materials are classified. Give their properties and energy band description. *14*

3. Prove that the heat developed per unit volume per second in a conductor carrying current density (J) is $W = \sigma E^2 = JE$. *14*

4. Derive the expression as given, for a complex dielectric constant of non-dipolar solids. *14*

$$\varepsilon_r^* = \varepsilon_r' - j\,\varepsilon_r''$$

5. Explain the following : *2×7=14*

(a) Frohlich's Theory

(b) Von Hippel Theory

6. What are the factors that effect permeability ? Explain. *14*

7. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Relaxation Time

(b) Collision Time

(c) Cry Conductors

(d) Dielectric Losses

(e) Dielectric Gases

(f) Ferrimagnetism
