No. of Printed Pages : 4

OIEE-002

DIPLOMA IN ELECTRICAL ENGINEERING (DELVI)

00626 Term-End Examination

June, 2015

OIEE-002 : ELECTRICAL ENGINEERING MATERIALS

Time : 2 hours *Maximum Marks : 70*

Note : *Question no. 1 of Section A is* ***compulsory.*** *Attempt any* ***four*** *questions from Section B. All questions carry equal marks.*

SECTION A

1. Choose the correct answer from the following : *7×2=14*

(a) Brass is an alloy of

(i) Copper and Zinc

(ii) Copper and Tin

(iii) Copper and Aluminium

(iv) Lead and Iron

(b) Which of the following semiconducting materials is used for LED ?

(i) GaAs

(ii) CdS

(iii) Ge

(iv) ZnSe

(c) Resistivity of electrical conductors is most affected by

(i) Pressure

(ii) Temperature

(iii) Composition

(iv) Ageing

(d) Which of the following materials is used in making spark plugs ?

(i) Porcelain

(ii) Steatite

(iii) Alumina

(iv) Zirconia

(e) Heating in microwave oven is due to

(i) Magnetostriction

(ii) Electrostriction

(iii) Eddy current

(iv) Spontaneous polarisation

(f) Dielectric constant of vacuum is

(i) Infinity

(ii) 100

(iii) 1

(iv) Zero

(g) The relative permeability of a paramagnetic material is

(i) Unity

(ii) Slightly more than 1

(iii) Zero

(iv) Less than 1

SECTION B

*Attempt any **four** questions from the following.*

2. (a) Give reason for the statement that the temperature co-efficient of resistance should be low for the application of low and high resistivity materials.

(b) What are stranded conductors ? Why is ACSR used for long distance overhead power transmission lines ?

(c) State the factors on which the choice of conductor material depends.

(d) Why is copper used as compared to aluminium for windings of electrical machines ? $4 \times 3\frac{1}{2} = 14$

3. What is polarisation ? Discuss electronic polarisation, ionic polarisation and oriental polarisation. *14*

4. (a) State the difference between a dielectric material and an insulating material as regards their functions. *7*

(b) Explain how loss factor and dielectric constant vary with temperature and frequency of an alternating field. *7*

5. (a) What are the requirements of oil used as insulating material ? With the help of a neat diagram, explain how the dielectric strength of the transformer oil is tested. 7

(b) Mention at least five natural insulating materials. Give their most important properties and applications. 7

6. (a) Make a comparison between diamagnetism, paramagnetism and ferromagnetism. 7

(b) What are the factors affecting permeability and hysteresis loss of magnetic material ? 7

7. Write short notes on any ***two*** of the following : *2×7=14*

(a) Classification of materials based on energy band

(b) Breakdown mechanism in liquid dielectrics

(c) Complex dielectric constant

(d) Effect of moisture on insulating system