No. of Printed Pages : 5

OIEE-001

DECVI / DELVI / DCSVI / ACECVI / ACELVI / ACCSVI

Term-End Examination

00514

June, 2017

OIEE-001 : BASICS OF ELECTRICAL ENGINEERING

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. Question no. **1** is **compulsory**. Use of scientific calculator is allowed. Missing data, if any, may be suitably assumed.*

1. (a) Which of the following statements is correct regarding resistance ?

(i) The resistance of a conductor is the hindrance by which the conductor opposes the flow of current through it.

(ii) The resistance of a wire is independent of the temperature for most of the materials.

(iii) The resistance of a wire does not depend upon its material.

(iv) None of the above

(b) The condition for the validity of Ohm's law is that the

(i) temperature should remain constant.

(ii) current should be proportional to voltage.

(iii) resistance must be wire wound type.

(iv) All of the above

(c) The energy capacity of a storage battery is rated in

(i) kWh

(ii) kW

(iii) ampere hours

(iv) joules

(d) A standard cell

(i) will have precise and accurate constant voltage when the current drawn from it is few microamperes only.

(ii) will have precise and accurate constant voltage when few milliamperes are drawn from it.

(iii) will continue to have constant voltage irrespective of loading conditions.

(iv) can supply voltages up to 10 V.

(e) The relation between electric intensity E, voltage applied V and the distance d between the plates of a parallel plate condenser is

(i) $E = \frac{V}{d}$

(ii) $E = V \times d$

(iii) $E = \frac{V}{d^2}$

(iv) $E = V \times d^2$

(f) The magnitude of the magnetic flux density 'B' at a distance 'R' from an infinitely long straight current filament is

(i) $\frac{\mu_o I}{2R}$

(ii) $\frac{\mu_o I}{2\pi R}$

(iii) $\frac{\mu_o I}{4\pi R}$

(iv) $\frac{\mu_o I}{8\pi R}$

(g) The rms value of the voltage $u(t) = 3 + 4 \cos (3t)$ is

(i) $\sqrt{17}$ V

(ii) 5 V

(iii) 7 V

(iv) $(3 + 2\sqrt{2})$ V *7×2=14*

2. (a) Give reasons why all equipments are connected in parallel to the supply.

(b) An electric iron is rated as 1 kW, 250 V. Calculate the current taken by it if it is connected to a 220 V supply. *6+8*

3. (a) What is the difference between primary and secondary batteries ?

(b) A storage battery of 15 cells is to be charged from a 40 volt supply at a constant rate of 5 A. The emf of each cell is 1·2 V at the beginning of charge and the internal resistance of each cell is 0·03 Ω. Calculate the series resistance required in the circuit at the beginning of the charging. *6+8*

4. (a) What is Fleming's left-hand rule ?

(b) A wire of 25 m length is bent into a circle. If the current flowing through the wire is 100 A, find the magnetizing force at the centre of the circle. *6+8*

5. (a) Differentiate between form factor and peak factor.

(b) An AC sinusoidal current has rms value of 40 A at 50 Hz frequency. Write the expression of instantaneous current and obtain its value 0·002 sec after passing through maximum positive value. *6+8*

6. (a) What do you mean by three-phase balanced and three-phase unbalanced loads ?

(b) A 3-phase balanced load draws 10 kW power from a 400 V, 3-phase, 50 Hz, 4-wire supply at 0·8 lagging power factor.

(i) Determine the line current.

(ii) What would be the line current if the power factor were raised to unity, power remains the same ?

(iii) How can the power factor be improved to unity ? *6+8*

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

(a) Superposition Theorem

(b) Nickel Cadmium Cells

(c) Force on a Conductor placed in the Magnetic Field

(d) Faraday's Law of Electromagnetic Induction

(e) Phasor Diagrams of Series and Parallel RLC Circuits

(f) Star and Delta Connected Systems
