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OIEE-001

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DECVI / DELVI / DCSVI

Term-End Examination

June, 2011

OIEE-001 : BASICS OF ELECTRICAL ENGINEERING

Time : 2 hours *Maximum Marks : 70*

*Note:-There are **seven** Questions. Attempt **any five** question including question **No -1** is compulsory. All questions **carries equal** marks.*

1. (a) Condition for the validity of Ohm's law is that the : **2x7=14**

(i) temperature should remain constant.

(ii) current should be proportional to voltage.

(iii) resistance must be wire wound type.

(iv) all of the above.

(b) Hot resistance of the filament of a bulb is higher than cold resistance because the temperature coefficient of filament is :

(i) negative (ii) infinite

(iii) zero (iv) positive

(c) A magnetic circuit wound with N turns on coil carrying a current I and reluctance S then flux flow in magnetic circuit will be

(i) $\frac{NI}{S}$ (ii) $\frac{S}{NI}$

(iii) (NI).S (iv) None

(d) Time constant of R-L series circuit is given by :

(i) $\frac{L}{R}$ (ii) LR

(iii) $\frac{R}{L}$ (iv) None

(e) Average and rms value of half rectified waveform with peak value V_m are :

(i) $\frac{V_m}{2}, 0$ (ii) $\frac{V_m}{\pi}, \frac{V_m}{2}$

(iii) $\frac{2V_m}{\pi}, \frac{2V_m}{\sqrt{2}}$ (iv) None

(f) Power factor of circuit may be expressed as

(i) $\cos\phi = \frac{R}{Z}$

(ii) $\cos\phi$

(iii) $\cos\phi = \frac{\text{True power}}{\text{apparent power}}$

(iv) All

(g) Line voltage (V_L) and phase voltage (V_p) of star -connected system are related as

(i) $V_L = \sqrt{3}\, V_p$

(ii) $V_p = \sqrt{3}\, V_L$

(iii) $V_L = V_p$

(iv) None

2. (a) Resistance of a conductor $1mm^2$ in cross-section and 20m long is 0.346 Ω . Determine specific resistance of conductor material. **2x7=14**

(b) Two resistances of 20 Ω and 30 Ω are connected in parallel. These two parallel resistances are further connected in series with resistance of 15 Ω. If the current through 15 Ω resistance is 3A. find
(a) Current through 20 Ω and 30 Ω.
(b) Voltage across whole circuit.

3. (a) Explain construction, working and application of Nickel - Cadmium cells. **2x7=14**

(b) Draw and Explain B-H curve.

4. (a) Explain the concepts of self induced emf. Also derive relation for self inductance. **2x7=14**

(b) Prove that for pure inductive circuit voltage and current are in quadrature. Also prove that power consumed is zero.

5. (a) A series RLC circuit with R =250 Ω, L=0.6 H results in a leading phase angle of 60° at a frequency of 40 Hz. At what frequency will circuit resonate ? **2x7=14**

(b) Two impedances Z_1 = (6-j8)Ω and Z_2 = (8-j6)Ω are connected in parallel across 100V supply, find (i) current and powerfactor of each branch. (ii) overall current and power factor.

6. (a) Derive the relationship between line voltage and phase voltage of star-connected system.

(b) Three similar coils each having a resistance of 8 Ω and inductance of 0.0191 H in series in each phase is connected across a 400 V, 3ϕ 50 Hz supply. Calculate line current, power input, KVA and KVAR taken by load. **2x7=14**

7. Write short notes on *any two* of following. **2x7=14**

(a) Ohm's law.

(b) Kirchoff's law.

(c) Fleming's right hand rule.

(d) Superposition theorem.
