

**B.TECH.**  
**DECVI/DELVI/DCSVI/ACECVI/ACELVI/**  
**ACCSVI**

**Term-End Examination**

**December, 2013**

**OIEE-001 : BASICS OF ELECTRICAL**  
**ENGINEERING**

*Time : 2 hours*

*Maximum Marks : 70*

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**Note :** *Answer five questions.*

*Question No.1 is compulsory.*

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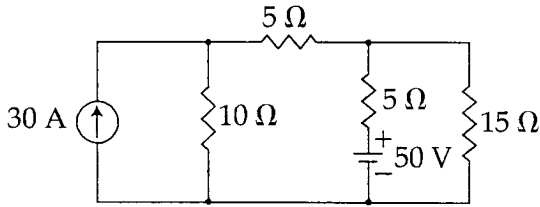
1. (a) State whether the statements are *true* or *false*. 1x5=5
- (i) The temperature coefficient of resistance is negative in case of conductors.
  - (ii) The reluctance of a material is defined as opposition offered to the magnetic field by it.
  - (iii) A 1 henry inductance carrying a current of 3A will store energy of a watt second.
  - (iv) In a LC series circuit, at resonance the impedance is maximum.
  - (v) Wattmetre is an instrument which measures average real power.

(b) Fill in the blanks in the following : 1x5=5

- (i) The resistivity of wire depends upon the \_\_\_\_\_ of the material.
- (ii) The resistance in the electric circuit is analogous to \_\_\_\_\_ in magnetic circuit.
- (iii) The magnitude of electromagnetically induced e.m.f is directly proportional to the rate of change of \_\_\_\_\_.
- (iv) Form factor is defined as the ratio of \_\_\_\_\_ and \_\_\_\_\_.
- (v) In a 3 phase system, the phase difference between the two adjacent e.m.fs is \_\_\_\_\_.

2. (a) Describe the construction and the action of lead acid cell giving the nature of the chemical changes that occur at the electrodes during charging and discharging. 7
- (b) Give at least five important applications of lead acid battery. 8

3. (a) What all the factors affecting the resistance of a conductor ? How they effect its value ? 7
- (b) For the network shown below, draw a Norton's equivalent circuit and determine the current flowing through  $15\ \Omega$  resistor 8



4. (a) Explain the terms 7
- (i) magnetic intensity
  - (ii) magnetic flux density
  - (iii) magnetic flux
  - (iv) permeability.
- (b) What is hysteresis loss ? Explain the importance of hysteresis loop. 8
5. (a) What do you understand by self induced emf and mutually induced emf ? 7
- (b) The combined inductance of two coils in series is 0.6 H and 0.1 H depending upon the relative direction of currents in the coils. If one of the coils when isolated has a self 8

inductance of 0.2 H. Calculate the mutual inductance of the coils and the self inductance of the other coil.

6. (a) Define admittance, conductance and susceptance. 7
- (b) A coil of p.f 0.8 is in series with a  $100\ \mu\text{F}$  capacitor. When connected to a 50 Hz supply the voltage across the capacitor is equal to the voltage across the coil. Find the resistance and inductance of the coil. 8
7. (a) Derive an expression for the total power in a balanced 3-phase load. 7
- (b) Three  $100\ \Omega$  resistors are connected in star first and then in delta across 415 V, 3-phase supply. Calculate the line and phase currents in each and also the power taken from the source. 8
8. Write short notes on **any two** of the following :
- (a) Power factor and its improvement.  $7\frac{1}{2}\times 2=15$
- (b) Thevenin's Theorem.
- (c) Faraday's laws of electromagnetic induction.
- (d) Series and parallel resonance and its condition.