

**BTCSEVI / BTECVI / BTELVI**

**Term-End Examination**

**June, 2016**

00136

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

*Time : 3 hours*

*Maximum Marks : 70*

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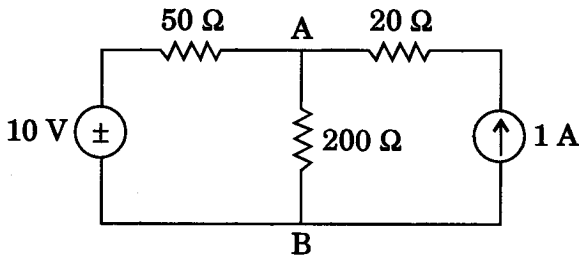
**Note :** Answer *five* questions in all. All questions carry equal marks. Use of scientific calculator is allowed.

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1. (a) What is meant by E.M.F. of a source ? Distinguish between ideal and practical voltage sources. 7
- (b) Discuss critically the active, reactive and apparent power in a single phase A.C. circuit and their relations. 7
2. (a) Explain the construction and working of a lead acid storage battery. 7
- (b) Explain the charging method used for a lead acid battery. 7
3. (a) What are the important features of network theorems ? State Thevenin's theorem. 7

- (b) State Norton's theorem. Determine the voltage across  $200\ \Omega$  resistance in the following network by using Norton's theorem :

7



4. (a) Derive an expression for the field strength at the centre of a long solenoid of 'N' turns having a length of 'l' metres and carrying a current 'I' amperes. 7
- (b) A cast steel electromagnet has an air gap length of 3 mm and an iron path at length 40 cm. Find the number of ampere turns necessary to produce a flux density of  $0.7\ \text{Wb/m}^2$  in the gap. Neglect leakage and fringing. Assume flux density in gap = flux density in iron portion =  $0.7\ \text{Wb/m}^2$ . 7
5. (a) Derive the relationship between the voltage and current for a purely inductive circuit. Also show that the average power consumed by the above circuit is zero. 7
- (b) Draw the phasor diagrams for the following : 7
- (i) Purely resistive circuit
  - (ii) R-L circuit
  - (iii) R-C circuit
  - (iv) R-L-C circuit

6. (a) Explain why the series resonant circuit is often regarded as the acceptor circuit and the parallel circuit as the rejector circuit. 7
- (b) A coil of resistance  $20 \Omega$  and inductance  $0.2 \text{ H}$  is connected in series with a condenser of capacitance  $200 \mu\text{F}$  across a  $250 \text{ V}$ ,  $50 \text{ Hz}$  supply. Determine the (i) impedance, (ii) current, and (iii) power factor. 7
7. Write short notes on any *two* of the following :  $2 \times 7 = 14$
- (a) Superposition Theorem
- (b) r.m.s. value and average value of A.C. sinusoidal current
- (c) Energy stored in a magnetic field
- (d) Force between two parallel current carrying conductors
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