

(Following Paper ID and Roll No. to be filled in your Answer Book)

Paper ID : 121101

Roll No. 1503210003

B.Tech.

(SEM. I) THEORY EXAMINATION, 2015-16

BASIC ELECTRICAL ENGINEERING

[Time:3 hours]

[Total Marks:100]

## SECTION-A

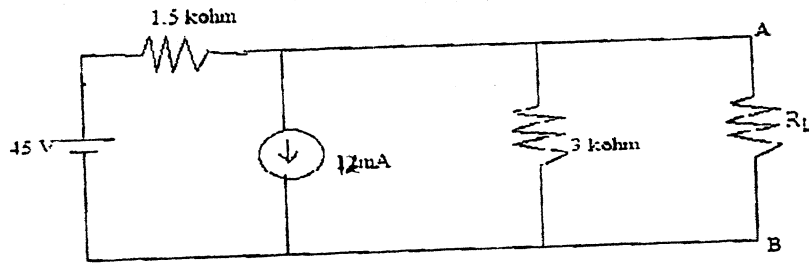
1. Attempt **all** questions. All questions carry equal marks.  
(10×2=20)
- (a) Define Bilateral & Unilateral Elements with example.
- (b) What will happen if the primary of a transformer is connected to D.C. supply?
- (c) What are the advantages of wound rotor motors over squirrel cage motors?
- (d) State Superposition Theorem & Norton's Theorem.

- (e) What happens when one phase of a delta connected alternator is reversed?
- (f) What do you mean by the term Resonance?
- (g) What is meant by Current magnification?
- (h) Define RMS value & Average value.
- (i) Define the terms: Permeability, Relative permeability & Reluctance applied to magnetic circuits.
- (j) How does magnetic circuit differ from Electric circuit?

### SECTION-B

Attempt **any five** questions. All questions carry equal marks.  
(10×5=50)

2. (a) How Norton's Theorem is equivalent to Thevenin's Theorem? Also write the Limitations of Thevenin's Theorem and find the voltage across load resistance  $R_L$  using Thevenin's theorem when load resistance is  $2\text{ k}\Omega$ .



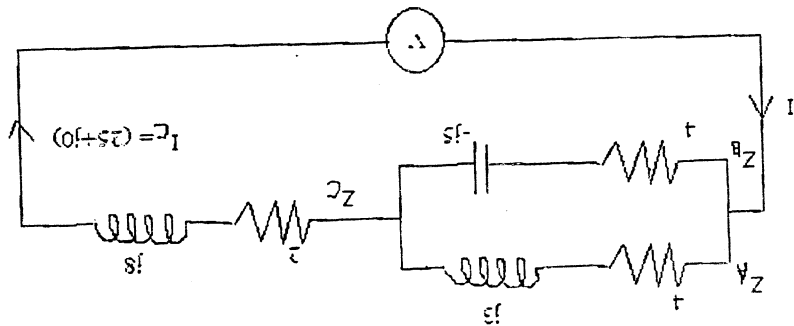
- (b) Explain with a neat diagram, the constructional features and working of Dynamometer type Wattmeter. Also write its merits & demerits.
- (c) Explain the principle of operation of a transformer. Derive E.M.F. equation of Single phase transformer.
- (d) What are the causes of low power factor in supply system? Discuss its effect & how power factor is improved?
- (e) List the various Losses occurring in transformer & the condition for maximum efficiency. In a 25 KVA, 2000/200 V transformer the iron & copper losses are 200 W & 400 W respectively. Calculate the efficiency at half load & 0.8 power factor lagging. determine also the maximum efficiency & the corresponding load.

- (f) What are the methods of power measurement in 3-phase Ac circuits? explain Two-Wattmeter method for delta connected load.
- (g) Derive the expression for Generated E.M.F. in Dc Machine. Explain the term Back E.M.F. when applied to Dc motor. Briefly explain what role Back E.M.F plays in starting & running of motor.
- (h) Why is the Synchronous motor not self starting? Explain the advantages & disadvantages along with applications of Synchronous motor.

### SECTION-C

Attempt **any two** parts of the following. (15×2=30)

3. (a) Derive the expression of resonant frequency of parallel R-L-C circuit. In series-parallel circuit A & B are in series with C. The Impedances are:  $Z_A=4+j3 \Omega$ ,  $Z_B=4-j5 \Omega$ ,  $Z_C=2+j8 \Omega$ . If the current  $I_C=(25+j0)$ , calculate:
- Branch Voltage
  - Branch Currents
  - Total Power
  - Phasor Diagram



- (b) Explain the working of 3-phase Induction motor. what is meant by slip? Explain Slip-Torque characteristics of 3-phase Induction motor.
- (c) Obtain the relation between line & phase voltages in balanced Star connected load system. Also draw its Phasor diagram. A 3-phase, star connected balanced load is supplied by 400 V, 50 Hz. The load takes a ~~leading~~ <sup>lagging</sup> current of  $100\sqrt{3}$  A & power 20 kW. Calculate power factor of load and Resistance & Inductance per phase.

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