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**B.TECH.** 

# THEORY EXAMINATION (SEM-II) 2016-17

## BASIC ELECTRICAL ENGINEERING

#### Time : 3 Hours

Max. Marks : 100

*Note* : Be precise in your answer. In case of numerical problem assume data wherever not provided.

#### SECTION – A

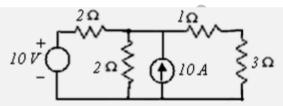
#### **1.** Explain the following:

- (a) Define unilateral and bi-lateral elements.
- (b) What are the advantages of three phase system over the single phase system?
- (c) Why the series resonance is called the voltage resonance?
- (d) What do you understand by an accepter and rejector circuit?
- (e) Why damping torque in necessary for an analog type instruments?
- (f) What do you know about phase sequence in a three phase supply system?
- (g) How hysteresis loss can be minimised in a transformer?
- (h) Write the function of commutator in a DC generator.
- (i) Name any two motors, which can be used for purpose of constant speed.
- (j) Why condensor is necessary to be connected in ceiling fan?

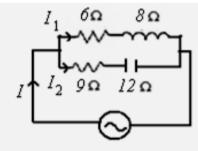
## SECTION – B

#### 2. Attempt any five parts of the following questions:

(a) Find the current in 3 ohm resistance by loop current method and verify the answer by node voltage method.



- (b) For the parallel circuit shown in figure, calculate the following;
  - (i) Current through each branch
  - (ii) Total current drawn and power factor of complete circuit.
  - (iii) Equivalent impedance of the circuit.
  - (iv) Draw phasor diagram



230 V 50 Hz

- (c) Define power factor? What are causes and effects of low power factor? What are the methods to improve the power factor of an ac circuit?
- (d) A Series R-L-C circuit consists of a resistance of  $10\Omega$  an inductance of 0.1H and a capacitance of 8µf. Determine;
  - (i) the resonance frequency,
    (ii) the Q factor of the circuit at resonance,
    (iii) Band width
    (iv) the half power frequencies

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 $10 \ge 2 = 20$ 

 $5 \ge 10 = 50$ 



Fire rank what are the power losses in *FirstRanker*? Coffine efficiency and obtriant the condition for a transformer, when it operates at its maximum efficiency.

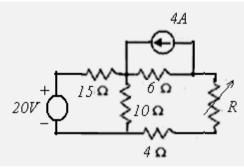
- (f) Explain construction and working of attraction type moving iron instrument. List the advantages and disadvantages of these instruments.
- (g) A 20 KW, 250V dc shunt machine has armature and field resistances 0.1 ohm and 125 ohm respectively. Calculate the emf developed in armature when running (i) as a generator delivering 20 KW output (ii) as a motor taking 20 KW input.
- (h) Write the working principle of a three phase induction motor. Draw its torque-slip characteristics and show operating, breaking and generating regions of motor.

## **SECTION – C**

## Attempt any two of the following questions:

 $2 \ge 15 = 30$ 

- **3.** (a) State and prove maximum power transfer theorem.
  - (b) Find the value of resistance R for maximum power transfer in the circuit shown. Also obtain the value of maximum power.



- 4. (a) Discuss the Quality factor and Bandwidth in detail. The power of a 400 volts, 3-phase, star connected 3-phase circuit is measured by two-wattmeter method. If the readings of both wattmeter's are found to be 50 kW and 30 kW, then calculate the followings;
  - (i) Circuit power factor
  - (ii) Total active and reactive power.
  - (iii) Line current drawn by the circuit.
  - (iv) Impedance per phase
- (a) A moving coil instrument gives a full scale deflection of 20 mA when a potential difference of 50 mV is applied. Calculate the series resistance to measure 500 V on full scale.
  - (b) Explain double field revolving theory.
  - (c) Write applications of three phase synchronous motor.