

**B TECH**  
**(SEM I) THEORY EXAMINATION 2018-19**  
**BASIC ELECTRICAL ENGINEERING**

Time: 3 Hours

Total Marks: 70

**Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.

**SECTION A**

1. Attempt all questions in brief.

2 x 7 = 14

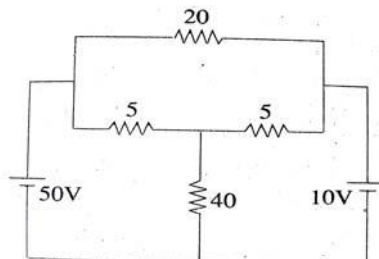
- a. Explain linear and non linear circuit.
- b. Explain ideal voltage and current source with example.
- c. Give the advantages and disadvantages of 3-phase system.
- d. Explain Quality factor of series resonance circuit.
- e. A current wave is represented by the equation  $i = 20 \sin (251t)$ . Calculate the maximum and RMS value of the current and its frequency.
- f. Draw and explain torque slip characteristic of three phase induction motor.
- g. What do you mean by magnetic hysteresis?

**SECTION B**

2. Attempt any three of the following:

7 x 3 = 21

- a. Derive the relation for Star to delta conversion.
- b. Using superposition theorem find current in 40 ohm resistance.



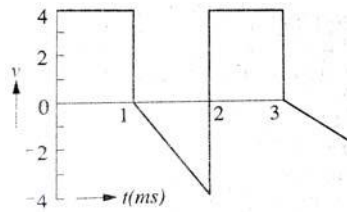
- c. A star connected balanced load is supplied from a three phase balanced supply with a line voltage of 416 V at a frequency of 50 Hz. Each phase of load consists of a resistance and a capacitor joined in series and the reading on two wattmeters connected to measure the total power supplied are 782 watt and 1980 watt, both positive. Calculate (a) the power factor of the circuit (b) the line current and (c) the capacitance of each capacitor.
- d. Give the analogy between magnetic circuit and electric circuit.
- e. Explain construction and working principle of three phase synchronous motor.

## SECTION C

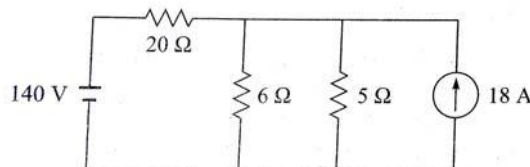
3. Attempt any one part of the following:

7 x 1 = 7

- (a) Find the form factor and Peak factor of the given waveform.



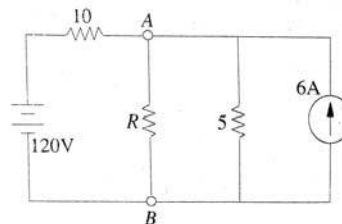
- (b) Find current delivered by the voltage source mesh analysis.



4. Attempt any one part of the following:

7 x 1 = 7

- (a) Derive the relation for cut off frequencies and bandwidth of a series resonance circuit.
- (b) Explain maximum power transfer theorem and find the value of load resistance and amount of power transferred.



5. Attempt any one part of the following:

7 x 1 = 7

- (a) Explain construction and working of dynamometer type wattmeter with its merits and demerits.
- (b) What is the necessity of a three phase system? Derive the relation between line values and phase values of a three phase star and delta connected system.

6. Attempt any one part of the following:

7 x 1 = 7

- (a) Explain working of a single phase transformer and derive the e.m.f. equation. Why the rating of transformer is in KVA.
- (b) In a 50 KVA, 1100/220 V transformer, the iron and copper losses at full load are 350 W and 425 W respectively. Calculate the efficiency at (i) full load and half load unity power factor (ii) full load 0.8 Power factor (iii) maximum efficiency and load at which maximum efficiency occurs assuming the load to be resistive.

7. Attempt any one part of the following:

7 x 1 = 7

- (a) Explain different types of dc motor and give their characteristic.
- (b) Explain efficiency of a three phase induction motor and derive the condition for maximum efficiency.