

B. TECH.
(SEM-IV) THEORY EXAMINATION 2017-18
ELECTRICAL CIRCUIT & MACHINE

*Time: 3 Hours**Total Marks: 100***Note:** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

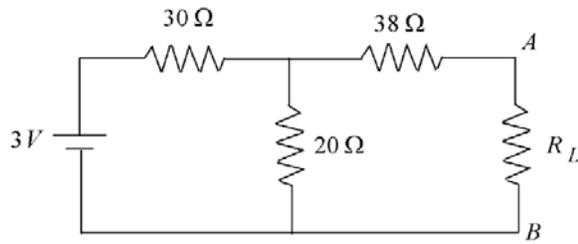
- 1. Attempt all questions in brief. 2 x 10 = 20**
- a. Explain the Kirchhoff's law.
 - b. Explain low band pass filter.
 - c. Dependent and independent sources.
 - d. State and explain the maximum power transfer theorem.
 - e. What do you mean by composite filters?
 - f. Why carbon brushes are being used in d.c. machine?
 - g. Under which situation during the measurement of 3 phase power by two wattmeter method, one wattmeter start giving reading in negative direction.
 - h. RMS value of alternating current.
 - i. Give the statement of Thevenin's theorem.
 - j. What is meant by resonant frequency?

SECTION B

- 2. Attempt any three of the following: 10 x 3 = 30**
- (a) What is armature reaction? Describe the effects of armature reaction on the operation of dc machines.
 - (b) Why starter is required? Explain the construction and working of a three point starter.
 - (c) The efficiency of a 1000 kVA, 110/220 V, 50 Hz, single phase transformer is 98.5% at half load and full load at 0.8 p.f. leading and 98.8% at full load unity p.f. Determine (i) Iron loss (ii) full load copper loss (iii) maximum efficiency at upf (iv) load kVA at maximum efficiency.
 - (d) Discuss why single phase induction motors do not have starting torque. Explain its principle of operation and list various methods of starting. Also discuss the speed-torque characteristic of any one of the 1phase induction motor.
 - (e) Explain Thevenin's Norton superposition power transfer in detail.

SECTION C

- 3. Attempt any one part of the following: 10 x 1 = 10**
- (a) Explain maximum power transfer theorem. Also find the value of load resistance R_L in the given diagram and determine the maximum power transferred.



- (b) Write short notes on
- (i) EMF and torque equation.
 - (ii) Leakage resistance
 - (iii) Voltage regulation
 - (iv) Hysteresis loss

- 4. Attempt any one part of the following: 10 x 1 = 10**
- (a) Explain the construction and working of poly phase induction motor with circuit and phasor diagram.
 - (b) Why starter are necessary for starting of 3 phase induction motor? Explain the working of rotor resistance starter for 3 phase slip ring induction motor.
- 5. Attempt any one part of the following: 10 x 1 = 10**
- (a) Explain the terms average power, power factor, Instantaneous power and reactive power.
 - (b) Explain the procedure to convert star connected network into delta connected network and delta connected network into star connected network.
- 6. Attempt any one part of the following: 10 x 1 = 10**
- (a) Explain the speed control methods of DC Motor.
 - (b) Why improvement of power factor is needed? Explain.
- 7. Attempt any one part of the following: 10 x 1 = 10**
- (a) Explain two wattmeter method of measurement of 3 phase power with the help of circuit and phasor diagram.
 - (b) A voltage waveform is given by expression $v=150 \sin (520t+50)$. Determine :
 - (i) Maximum Value
 - (ii) RMS Value
 - (iii) Frequency
 - (iv) Time Period
 - (v) Phase angle of voltage