



Printed Pages : 4 TEE – 201 / TEE - 101 / EE - 201

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

PAPER ID : 2018+19+20 Roll No.

### B. Tech.

(SEM. II) EXAMINATION, 2006-07

### ELECTRICAL ENGINEERING

Time : 3 Hours]

[Total Marks : 100

- Note :
- (1) Attempt *all* questions.
  - (2) All questions carry *equal* marks.
  - (3) In case of numerical problems, assume data wherever not provided.
  - (4) Be precise in your answer.

1 Attempt any **four** parts of the following : **5×4=20**

- (a) Find Average Value, RMS value and form factor of half wave rectified alternating current.
- (b) The voltage and current through a circuit element are  
 $v = 50 \sin (314 t + 55^\circ)$  volts  
 $i = 10 \sin (314t + 325^\circ)$  ampees  
Find the value of power drawn by the element.
- (c) Explain series resonance in R-L-C circuit. What are band width and quality factor of the circuit ?
- (d) A coil of resistance  $40 \Omega$  and inductance  $0.75$  H are in a series circuit. The resonant frequency is  $55$  Hz. If supply is  $250$  V,  $50$  Hz find  
(i) line current (ii) power factor (iii) power consumed.

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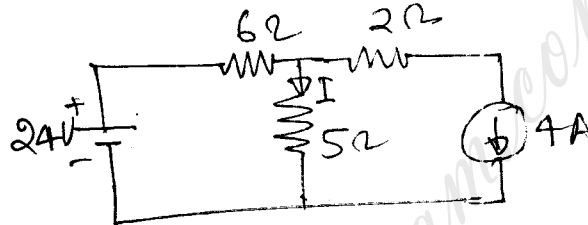
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- (e) Explain magnetic and electric circuits. Give analogy between them.
- (f) An electromagnet has an air gap of 4 mm and flux density in the gap is  $1.3 \text{ Wb/m}^2$ . Determine the ampere turns for the gap.

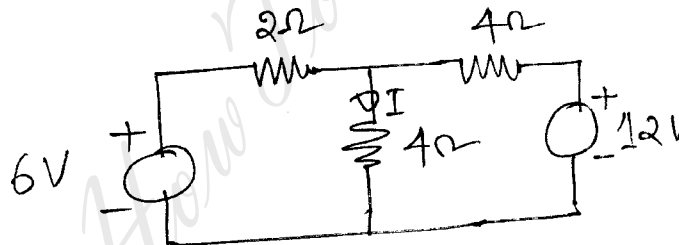
2 Attempt any **four** parts of the following : **5×4=20**

- (a) Find the current in the circuit given in fig 1.



**Fig. 1**

- (b) Give the limitations of Thevinin's theorem. Find current I using this theorem in circuit in fig.2.



**Fig. 2**

- (c) How a star network is converted into a delta network? Explain with example.
- (d) Explain maximum power transfer theorem. Using this theorem find the value of load resistance  $R_L$  for maximum power flow through it in fig 3.

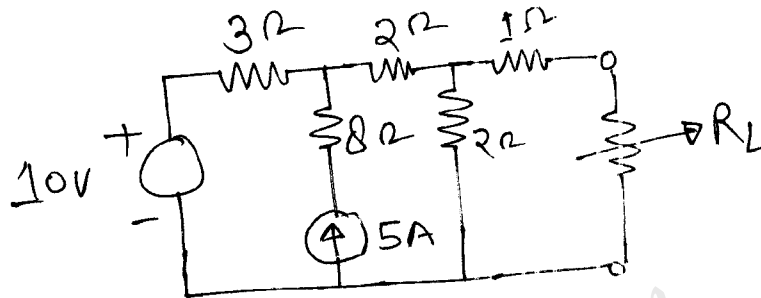


Fig. 3

- (e) Explain principle of operation and applications of moving coil instrument.
  - (f) Explain working of single phase induction type of energy meter with neat diagram.
- 3 Attempt any **two** parts of the following : **10×2=20**
- (a) For star connected system in a 3 phase circuit prove that  $V_L = \sqrt{3} V_{ph}$  and  $I_L = I_{ph}$ .  
A 3phase, 400V supply is connected to a 3-phase star connected balanced load. The line current is 20A and the power consumed by the load is 12kW. Calculate the impedance of the load, phase current and power factor.
  - (b) Explain the methods to measure power in 3 phase circuits. In a 3 wattmeter method power measured was 30kW at 0.7 pf lagging. Find the reading of each wattmeter.
  - (c) Explain following for single phase transformer :
    - (i) Phasor diagram for inductive load
    - (ii) Equivalent circuit
    - (iii) Voltage regulation.

- 4 Attempt any **two** parts of the following : **10×2=20**
- (a) Draw the external load characteristics of D.C. shunt generator. Why voltage drop occurs when it is loaded? Write the conditions of voltage failure in it.
  - (b) A 20 kW, 200 V shunt generator has an armature resistance of  $0.05 \Omega$  and a shunt field resistance of  $200 \Omega$ . Calculate the power developed in the armature when it delivers rated output.
  - (c) Explain the working principle of synchronous motor. Draw V-curve and give its applications.
- 5 Attempt any **two** parts of the following : **10×2=20**
- (a) Rotor of 3 phase induction motor cannot run at synchronous speed. Explain A three phase slip ring, 4 pole induction motor has rotor frequency 2.0 Hz while connected to 400 V, 3 phase, 50 Hz supply determine slip and rotor speed.
  - (b) Draw torque-speed characteristics of 3 phase induction motor. Show the different operating regions. What will happen if rotor resistance of motor changes?
  - (c) Why single phase induction motor is not self starting? Explain method to start it.
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