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

$v = 50 \sin (314\, t + 55^{o})$ volts

$i = 10 \sin (314t + 325^{o})$ 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 Ω 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.

(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 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.

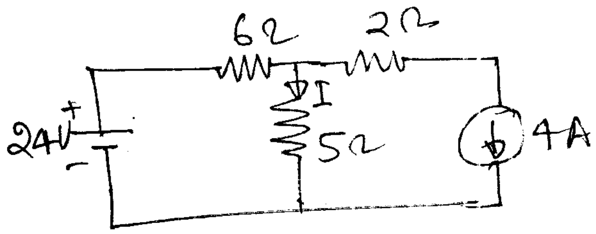

Fig. 1

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

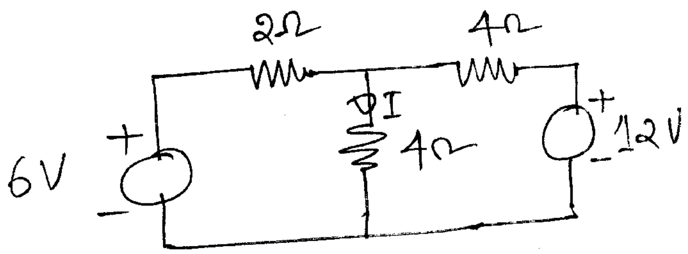

Fig. 2

(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.

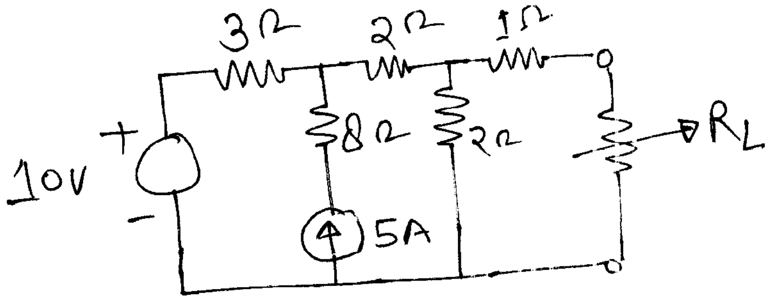

Fig. 3

(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 $V_L = \sqrt{3}$ Vph and I_L=Iph.

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 fialure in it.

(b) A 20 kW, 200 V shunt generator has an armature resistance of 0.05 Ω and a shunt field resistance of 200 Ω . 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.