

- (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.

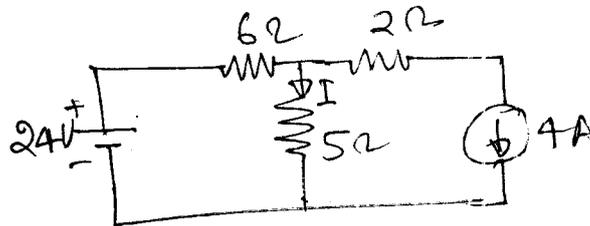


Fig. 1

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

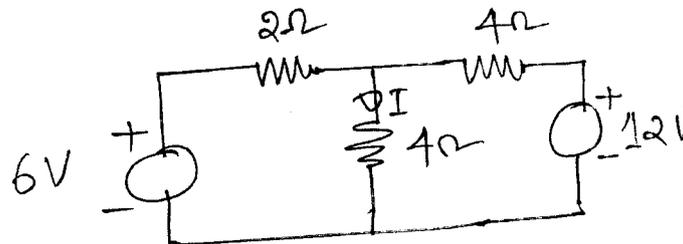


Fig. 2

- (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.

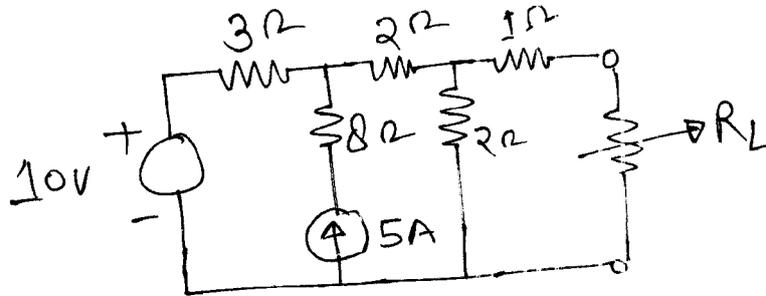


Fig. 3

- (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 0.05Ω and a shunt field resistance of 200Ω . 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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