ESC101 - Basic Electrical Engineering
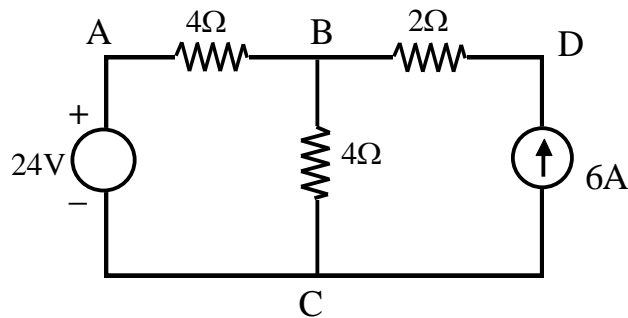
P. Pages : 2

GUG/W/23/13167

Time : Three Hours

6460

Max. Marks : 80

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Notes :
1. All questions carry equal marks.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Diagrams and Chemical equation should be given wherever necessary.
5. Illustrate your answers wherever necessary with the help of neat sketches.
6. Discuss the reaction, mechanism wherever necessary.
7. Use of slide rule, Logarithmic tables is permitted.
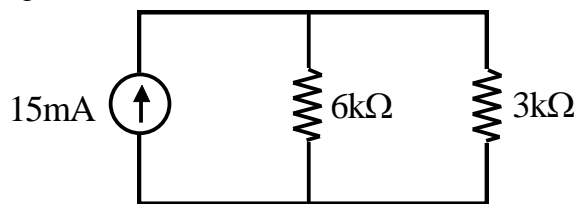8. Non programmable calculator is permitted.

1. a) Find the current in branch BC in the given circuit by following methods. **8**
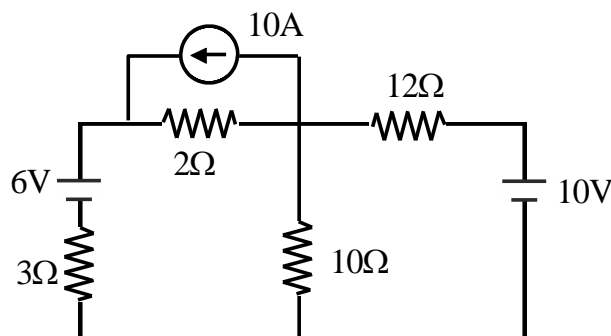   i) By Thevenin's Theorem.   ii) By Norton's Theorem.

b) Illustrate the types of sources used in electrical network. Write down the difference between ideal and practical sources used in the electrical network? Explain with a suitable diagram how we can convert current source into voltage source. **8**

OR

2. a) Find the current in the 5kΩ and 10kΩ resistor in the given figure by converting the current source to a voltage source. **8**

b) Refer the circuit shown below. Apply KVL/KCL and find out the value of current in through 10 Ω resistor, by converting the current source into voltage source. **8**

3.	a)	Explain RLC series circuit and resonance in detail.	**10**
	b)	Explain lagging and leading concept of a. c. quantities.	**4**

OR

4.	a)	Why do we choose sinusoidal wave rather than a simple curve such as a square or triangle wave? Write down the difference between AC and DC quantities?	**8**
	b)	A three-phase power system with a line voltage of 400V is supplying a delta connected load of 1500W at 0.8 pf lagging. Determine the phase and line current and also the phase impedance.	**8**
5.	a)	Explain in detail different losses taking place in DC motor.	**8**
	b)	A 500kVA transformer has 95% efficiency at full load and also at 60% of full load both at unity power factor, find i) Separate out the transformer losses ii) Determine the transformer efficiency at 75% full load, unity power factor.	**8**

OR

6.	a)	State different losses in transformer and explain why transformer cannot be operated using DC supply.	**8**
	b)	The emf per turn of a single phase 2200/220 V, 50 Hz transformer is 12V. Calculate: i) The number of primary and secondary winding turns, ii) The net cross-sectional area of core for a maximum flux density of 1.5 T.	**8**
7.	a)	Explain briefly how reversal of DC motor can be achieved?	**5**
	b)	Compare squirrel cage I.M. and slip ring I.M?	**3**
	c)	A 3-phase, 20kw, 400 V, 1470 rpm, 50 Hz squirrel cage Induction motor develops a torque of 100 N-m, connected to a 30 Hz supply, for keeping the same air-gap flux, and for the same load torque, then calculate the supply voltage should be and new speed?	**8**

OR

8.	a)	A 4 pole 220V shunt motor has 540 lap wound conductors. It takes 32 Amps from the supply mains and develops output power of 5.595 kw. The field winding takes 1 Amp. The armature resistance is 0.09 ohm. and the flux per pole is 30m Wb.	**8**
	b)	Discuss construction and working of synchronous generator.	**8**
9.	a)	Explain half wave and full wave rectifier with neat and clean diagram and waveform.	**8**
	b)	State different types of energy storing devices and give important characteristics of it.	**8**

OR

10.	a)	Explain Electrical Earthing and Type of Electrical Earthing?	**8**
	b)	Explain with neat sketch diagram of any two? i) SFU ii) MCB iii) ELCB	**8**

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