

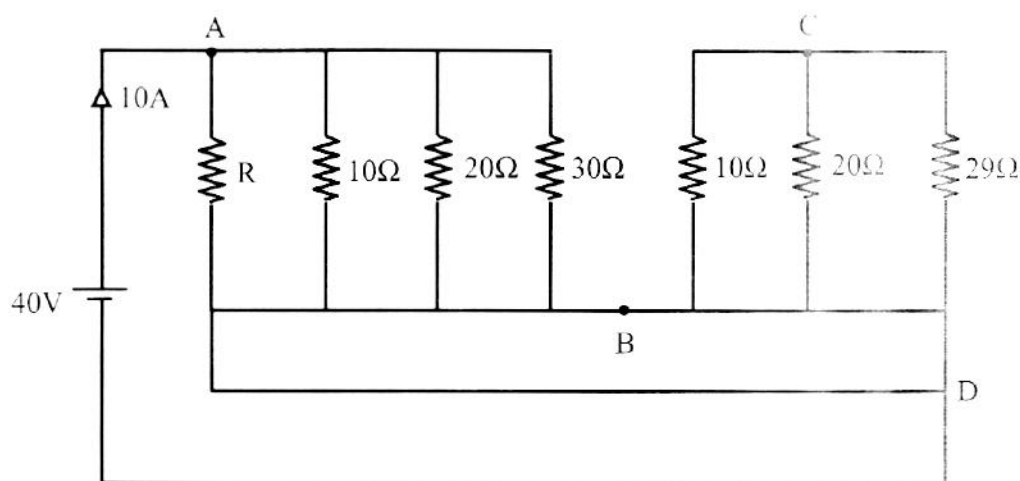


- Notes :
1. All question carry equal marks.
  2. Answer **Three** question from Section A and **Three** question from Section B.
  3. Due credit will be given to neatness and adequate dimensions.
  4. Assume suitable data wherever necessary.
  5. Illustrate your answer necessary with the help of neat sketches.
  6. Use of pen Blue/Black ink/refill only for writing the answer book.

**SECTION – A**

1. a) Calculate the Resistance R.

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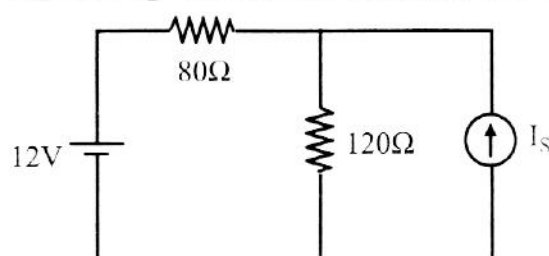
- b) Define Temperature coefficient? Prove that  $\alpha_2 = \frac{\alpha_1}{1 + \alpha_1(t_2 - t_1)}$ .

7

**OR**

2. a) For the circuit shown in fig. Find  $I_s$  such that the current in  $120\Omega$  Resistance is zero.

7



- b) State and explain maximum power transfer theorem. Where this theorem particularly used?
3. a) Explain similarities and dissimilarities of Electric and Magnetic circuit.

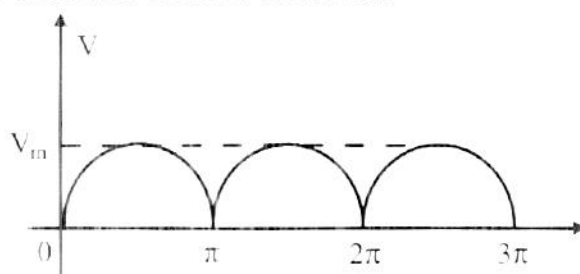
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- b) Two Identical coils A and B of 1000 turns each lie in parallel plane such that 80% of flux produced by one coil link with the other. A current of 5A flowing in one coil produces a flux of 0.05 mWb in it. If the current in coil A changes from +10A to -10A in 0.01 seconds. Calculate
- mutual inductance.
  - emf induce in coil B.

OR

4. a) Explain statically induce Emf. 6
- b) An iron ring of mean circumference 80 cm is made from round iron of area  $8 \text{ cm}^2$ . It has saw cut of 2mm wide and is will with 500 turns. Find the current required to produce a flux of 0.8 mWb across the airgap. Assume a relative permeability for iron as 625 and leakage factor of 1.25. 7
5. a) Derive an expression for current when pure capacitor is connected across an alternating voltage. Show its waveform and phasor diagram. 6
- b) Find the average value and RMS value of waveform. 7



OR

6. a) Define and explain following terms as applied to A.C. circuit. 6
- Power factor.
  - Frequency.
  - Impedance.
- b) A series circuit has a following component of Resistance  $15\Omega$  inductance  $0.05\text{H}$  & capacitor  $100\mu\text{F}$ . Across a 230V, 50Hz supply find 7
- Reactance.
  - Impedance.
  - Power factor.
  - Voltage across each element.

### SECTION – B

7. a) Prove that algebraic sum of three phase voltage is zero also draw their waveform and phasor diagram. 7
- b) Three choke coil having resistance of  $20\Omega$  and inductance of  $0.2\text{H}$  are connected in star across 400V, 3 $\phi$ , 50Hz supply. Calculate 7
- line current
  - Active power and Reactive power.

OR

8. a) Derive the relationship among phase and line voltage, phase and line current for balance Delta connected load. 7
- b) A balance star connected load is supplied from a symmetrical 3 $\phi$ , 415V system the current in each phase is  $20\angle -30^\circ$ , determine 7
- i) phase voltage
  - ii) line current
  - iii) total power
  - iv) power factor of load.
- If one of the branch impedance of star connected load becomes open circuited calculate
- i) line current
  - ii) power taken from the line.
9. a) Explain construction and working principle of a single phase transformer. Why it can not work on D.C supply system? 7
- b) Derive the torque equation of the D.C. motor. 6

**OR**

10. a) Explain various losses in a transformer. 6
- b) What do you mean by D.C. motor? Explain briefly the different types of D.C. motor with suitable diagram. 7
11. a) Explain construction and working of permanent magnet moving coil type instrument. 7
- b) A measuring instrument of a resistance  $5\Omega$  required potential difference of 75mV to give a full scale deflection calculate 6
- i) Value of shunt resistance needed to enable the instrument to give full scale deflection at 30 Amp.
  - ii) Value of series resistance to allow instrument to work as a voltmeter with full scale reading of 250 Volt.

**OR**

12. a) Explain the need of earthing an electrical equipment and explain how earthing is done. 7
- b) State safety precautions in Handling Electrical Appliances. 6

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