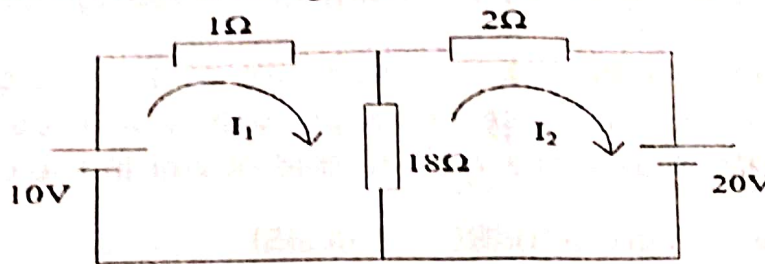


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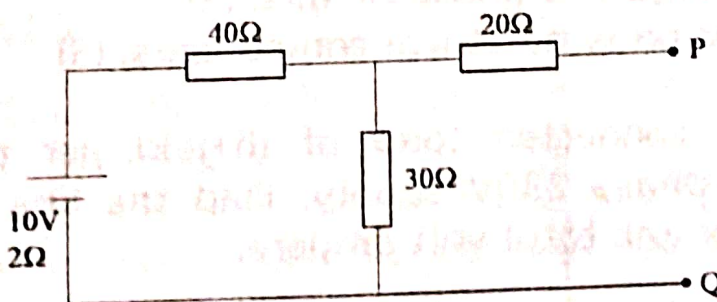
Time – Three hours
(Maximum Marks: 100)

[N.B. Answer all the questions, choosing any two subdivision from each question. Each subdivision carries 10 marks.]

1. (a) Find the current flowing through 18Ω resistor in the circuit shown below using mesh analysis.

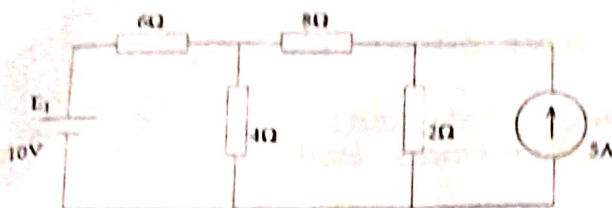


- (b) Three resistors of resistance 10Ω , 5Ω and 10Ω are connected once in series and then parallel. Find the equivalent resistance for each case.
- (c) (i) State and explain Kirchhoff's laws. (7)
(ii) State Ohm's law. (3)
- (d) Derive an expression for star to delta transformation.
2. (a) State Maximum power transfer theorem. Also derive the conditions for maximum power transfer in a single source circuit.
- (b) Obtain the Thevenin's equivalent circuit at terminals PQ of the following circuit.



- (c) State and explain the superposition theorem with an example.

- (d) Find the current flowing through 4Ω resistance in the circuit shown below using Norton's theorem.



3. (a) Define the following terms: Form Factor, Peak factor, Impedance, Phase angle and Power factor.
- (b) (i) Draw and explain the power triangle. (7)
(ii) Define effective (RMS) value of sinusoidal voltage. (3)
- (c) A coil of resistance 8Ω and an inductance of 0.1 H is connected in series with a capacitance of $75\text{ }\mu\text{F}$ with a voltage of 240V , 50Hz . Calculate impedance, current and power in the circuit.
- (d) (i) Draw phasor diagram for RC circuit. (5)
(ii) Define apparent power and active power. (5)
4. (a) Discuss the concept of parallel resonance.
- (b) Explain the steps involved in the conversion of following form of complex numbers: (i) polar to rectangular form
(ii) rectangular to polar form.
- (c) Determine the resonant frequency and Q factor of the series resonance RLC circuit with $R = 10\Omega$; $L = 0.1\text{ H}$ and $C = 10\mu\text{F}$.
- (d) Define the following terms: Resonance, Conductance and Admittance.
5. (a) Explain the two wattmeter method of 3-phase power measurement in a 3 phase star connected load.
- (b) (i) Write the significance of 3 phase circuits. (5)
(ii) Write short notes on symmetrical components. (5)
- (c) A balanced delta connected load of $(8+j6)\Omega$ per phase is connected to a 3 phase 230V supply. Find the line current, power factor, power and total volt ampere.
- (d) Derive the relationship between voltages, currents of line and phase values in star and delta connection.
