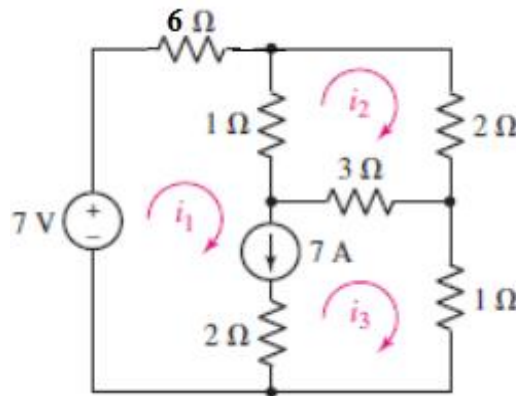
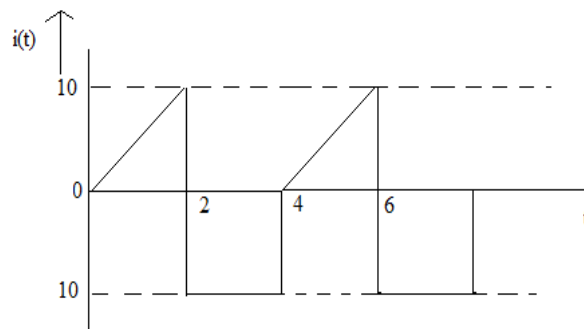




resistor in the circuit below.



- 13 An iron ring has a diameter of 21 cm and a cross sectional area of  $10 \text{ cm}^2$ . The ring is made up of semicircular sections of cast iron and cast steel with an air gap of 0.2 mm. Find the ampere turns required to produce a flux of 8 mWb. The relative permeability of cast steel and cast iron are 800 and 166, respectively. (10)
- 14 a) Compare (by writing both similarities and differences) electric and magnetic circuits. (6)
- b) Derive the equivalent reluctance of two magnetic circuits in parallel. (4)
- 15 Determine the RMS and average values of the current waveform shown below. (10)



- 16 A non inductive resistor of  $10\Omega$  is connected in series with a choke coil having an internal resistance of  $1.2 \Omega$  and is fed from a 200 V, 50 Hz supply. The current flowing through the circuit is 8 A. Calculate (i) Inductance of the choke coil (ii) Voltage across the choke coil (iii) Power absorbed by the choke coil (iv) Power absorbed by the non-inductive resistor (v) Phasor diagram of voltage. (10)

### PART C

*Answer any one full question from each module, each carries 10 marks.*

#### Module V

- 17 A 50Hz sinusoidal voltage of  $(40+j30) \text{ V}$  is applied to a series RL circuit resulting in a current of  $(4+j1) \text{ A}$ . Calculate (i) Impedance of the circuit (ii) (10)

Power consumed in the circuit (ii) Power factor of the circuit.

- 18 a) an R-L-C series circuit with  $R=10\ \Omega$ ,  $L=0.1\ \text{H}$  and  $C=10\ \mu\text{F}$  is excited with an alternating voltage source. Determine the impedance (i) at resonant frequency, (ii) 10 Hz above resonant frequency and (iii) 10 Hz below resonant frequency. (8)
- b) Draw the variation of impedance with respect to frequency of an R-L-C series circuit. (2)

#### Module VI

- 19 a) Compare star and delta connected three phase power supply systems. (4)
- b) A three-phase delta connected load consists of three similar impedances of  $(10+12j)\ \Omega$ . Find the line current and total power absorbed if it is connected to a 415V, 50Hz supply. (6)
- 20 a) Calculate the phase and line currents and the load impedance parameters in a balanced delta connected load which consumes a power of 25 kW at 0.866 power factor lag fed from a three phase 400V, 50 Hz supply. (6)
- b) A balanced three phase load consumes a power of 10 kW at 0.9 pf lag. If the power is measured by two wattmeter method, calculate the readings of the two watt-meters. (4)

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