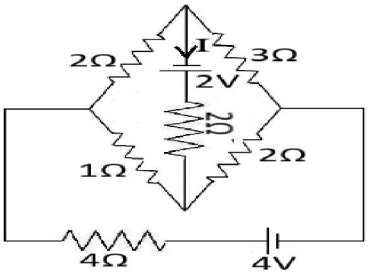
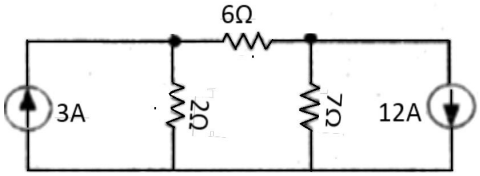
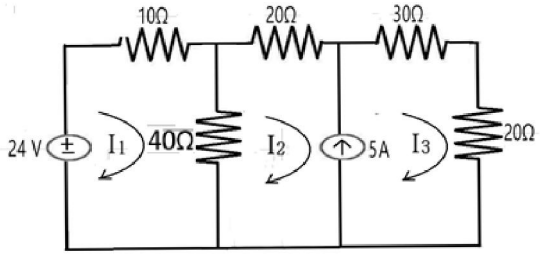


13 a) Find the current through the 6Ω resistor using Nodal Analysis. (4)



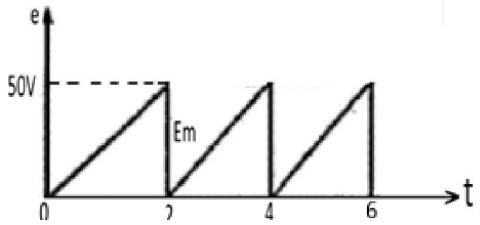
b) Using Mesh Analysis determine the currents I_1, I_2 and I_3 in the circuit shown in figure. (6)



14 a) A circular iron ring has a cross-sectional area of $0.01m^2$ and a mean circumference of 1.5m. A saw cut of 4mm wide is made in the ring. Calculate the magnetising current required to produce a flux of 0.8mWb in the air gap if the ring is wound with a coil of 175 turns. Assume relativepermeabilityof iron as 400 and leakage factor as 1.25. (5)

b) Define the terms flux, permeability and m.m.f with respect to magnetic circuits. (5)

15 a) Find the form factor of the waveform shown in figure. (5)



b) A coil of resistance 8Ω and inductance 0.03H is connected to an a.c supply of 240V, 50Hz. Calculate: (5)

i) The current, power and power factor of the circuit.

ii) The value of capacitance which when connected in series with the above coil causes no change in the value of current and power taken from the supply.

16 A non-inductive resistor of 10Ω is connected in series with a choke coil having internalresistance of 1.2Ω and is fed from a 200V, 50 Hz supply. Current flowing through the circuit is 8A. Calculate: (10)

i) Inductance of the choke coil ii) Voltage across the choke coil

iii) Power absorbed by the choke coil iv) Power absorbed by non-inductive resistor v) Total power absorbed. vi) Phasor diagram of the voltages in the

circuit.

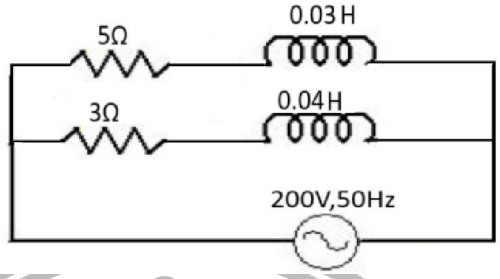
PART C

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

Module V

17 a) What is active power and reactive power in an ac circuit? Explain. (4)

b) For the circuit shown in figure determine: (6)
i) The admittance in each branch ii) Total admittanceiii) Total current drawniv) Circuit power factor v) Power absorbed.



18 a) Draw the resonance curve of series RLC circuit (3)

b) A series RLC circuit has R= 5Ω, L=0.2H and C=50μF. The applied voltage is 200V. Find the: (7)
i) Resonant frequency ii) Q-factor iii) Band width
iv) Half power frequencies v) Current at resonance vi) Current at half power points vii) Voltage across inductance at resonance.

Module VI

19 a) What are the advantages of three-phase system over single-phase system? (4)

b) A balanced delta connected load consists of (5+j3) Ω in each branch. The line voltage is $300\sqrt{2}$ volts. Find: (6)
i) Line and phase currents ii) Real and apparent power.

20 a) Show that power consumed by three identical single-phase loads connected in delta is equal to three times the power consumed when the loads are connected in star. (6)

b) In the two-wattmeter method of 3 phase power measurement, the power input to load is 30kW at 0.397 lagging. Find the reading of each wattmeter. (4)

****