



(3 Hours)

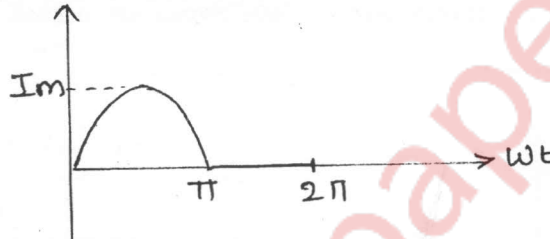
[Total Marks: 80]

**NB.** Q.1 is Compulsory.  
 Solve any three questions from the remaining  
 Assume suitable data if required and justify it.

- Q.1** a) State and explain superposition theorem 3  
 b) Find the equivalent resistance between A & B 3

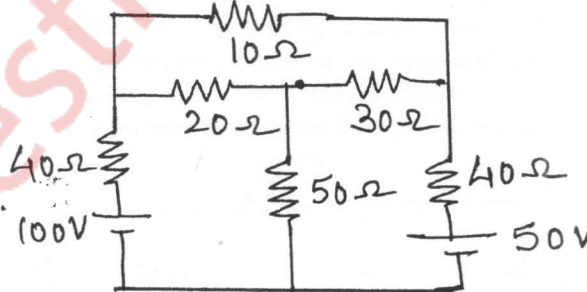


- c) Find average value of the shown waveform 3



- d) Explain the working of 1-phase transformer & derive its emf equation 4  
 e) Derive the condition for resonance in series R-L-C circuit 4  
 f) Write the relation between line and phase quantities in case of star connected load and delta connected load 3

- Q.2** a) Find the current through 10Ω resistor by mesh analysis. 6



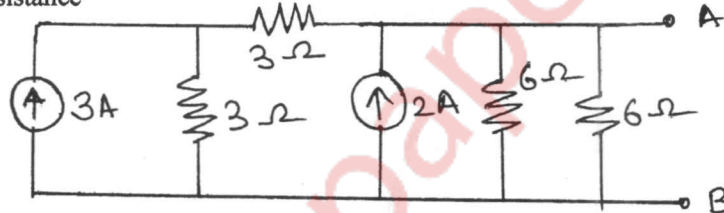
- b) A resistance is connected in series with a coil across 230V, 50 Hz supply. The current is 1.8 A and voltage across the resistance and coil are 80V, & 170V respectively. Calculate the resistance and inductance of the coil & phase difference between the current and supply voltage. Draw phasor diagram. 8

- c) Explain open circuit test of a single phase transformer 6

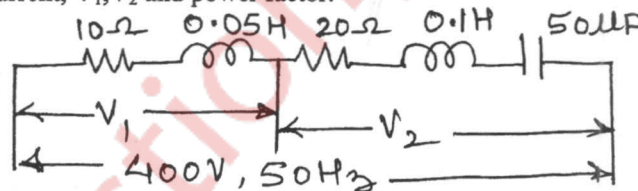
TURN OVER

- Q.3 a) Three identical choke coils are connected as a delta load to a three-phase supply. The line current drawn from the supply is 15A and total power consumed is 7.5 KW. The KVA input is 10KVA. Find 8
- Line and phase voltage
  - Impedance /phase
  - Reactance/phase
  - Resistance/phase
  - Inductance if frequency is 50 Hz
  - P.f.
  - Phase current
- b) A single phase transformer has primary voltage of 230 V, No-load primary current is 5A. No-load p.f. is 0.25 ,number of primary turns is 200 and frequency is 50Hz.. calculate 6
- Maximum flux induced in the core
  - Core loss
  - Magnetizing current
- c) Explain the use of filter in a rectifier circuit 2
- d) Explain input characteristics of CE configuration 4

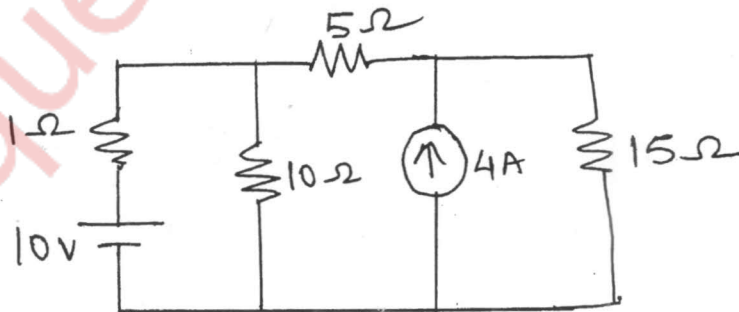
- Q.4 a) Reduce the circuit into a single current source in parallel with single resistance 5



- b) Draw the phasor diagram for the circuit shown. Also find the values of current,  $V_1, V_2$  and power factor. 7

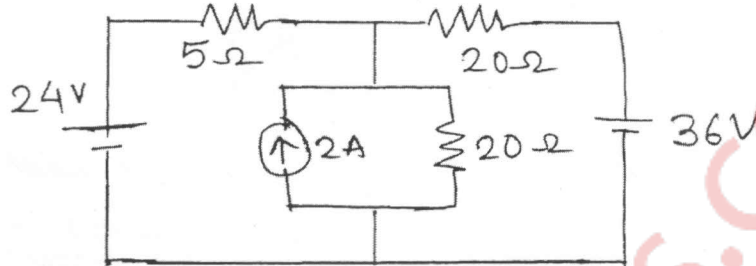


- c) Explain the effect of power factor on wattmeter reading. 4
- d) Explain the working of full wave bridge rectifier 4
- Q.5 a) Using Norton's theorem find current through 10 Ω branch 8



- b) Two impedances of  $Z_1 = (10 + j15) \Omega$  and  $Z_2 = (6 - j8) \Omega$  are connected in parallel across an ac supply. If load current supplied is 15A what is the power taken by each branch. 4
- c) A 25 KVA, 2200/220 V, 50 Hz, 1-phase transformer has a primary resistance of  $1.8 \Omega$ . calculate the efficiency of the transformer at 8
- Full load unity power factor
  - Half load, 0.8 lagging power factor  
Iron loss is 1000 W

Q.6 a) find current through  $5\Omega$  branch using superposition theorem 7



- b) R-L circuit of  $2\Omega$  and  $0.01H$  is connected in series with a capacitor across 200V mains. Maximum current flows through the circuit at 50Hz frequency. What should be the value of capacitor. Also find value of current and voltage across capacitor 7
- c) Show that  $W_1 + W_2 = P$  in a 3-phase star connected load. 6