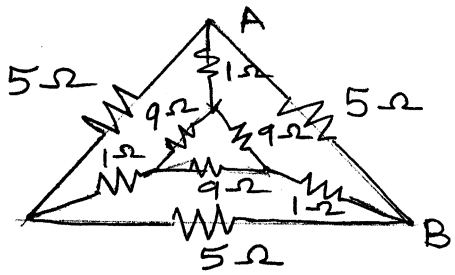
(3 Hours) [Total Marks: 80]

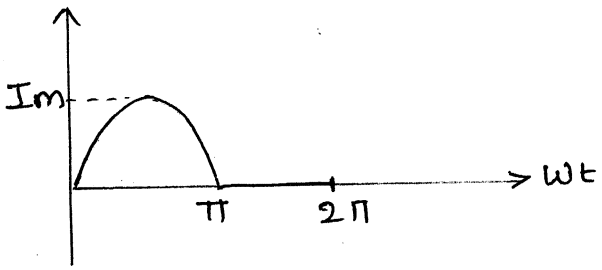
NB. Q.1 is Compulsory.
Solve any three questions from the remaining
Assume suitable data if required and justify it.

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

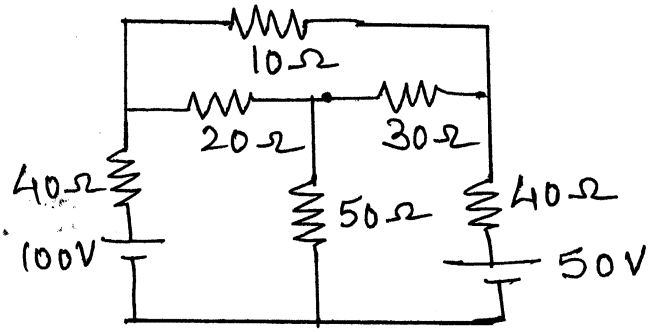


d) Explain the working of 1-phase transformer & derive its emf equation 4

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

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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**

i) Line and phase voltage
ii) Impedance /phase
iii) Reactance/phase
iv) Resistance/phase
v) Inductance if frequency is 50 Hz
vi) P.f.
vii) Phase current

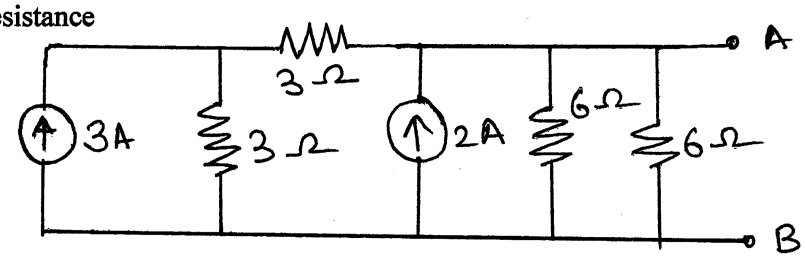
b) A single phase transformer has primary voltage of 230 V, No-load primary current is 5A. No-load p.f. is 0.25 ,number of primary turns is 200 and frequency is 50Hz.. calculate **6**

i) Maximum flux induced in the core
ii) Core loss
iii) Magnetizing current

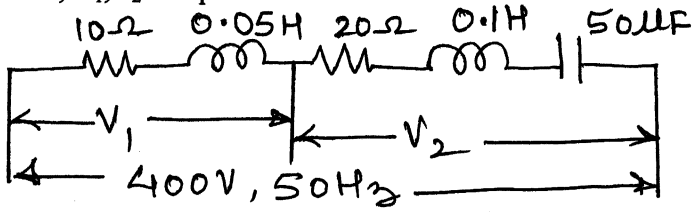
c) Explain the use of filter in a rectifier circuit **2**

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**



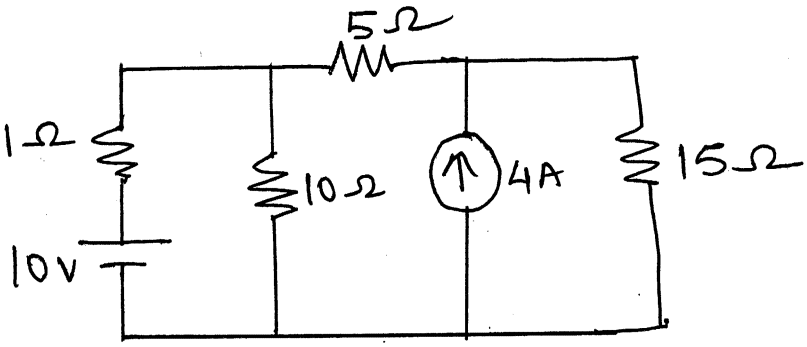
b) Draw the phasor diagram for the circuit shown. Also find the values of current, V_1,V_2 and power factor. **7**



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 through10 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

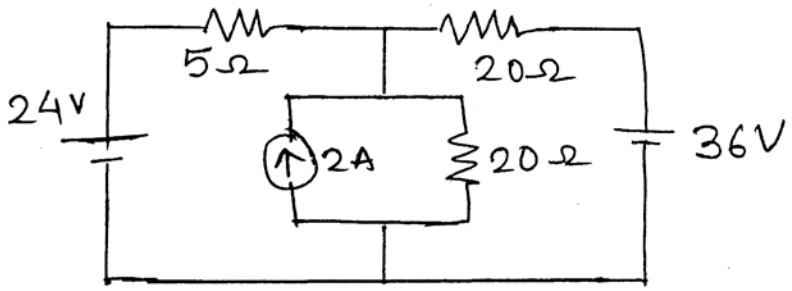
c) A 25 KVA ,2200/220 V ,50 Hz, 1-phase transformer has a primary resistance of 1.8 Ω . calculate the efficiency of the transformer at 8

i) Full load unity power factor

ii) Half load , 0.8 lagging power factor

Iron loss is 1000 W

Q.6 a) find current through 5Ω branch using superposition theorem 7



b) R-L circuit of 2Ω 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
