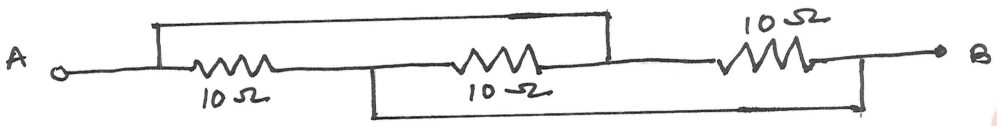
[3 Hours]

[Total Marks: 80]

Note: 1. Question No. 1 is compulsory.
2. Attempt any three questions from remaining five.

Q. 1 a) Find R_{AB} for the following [3]



b) State Superposition theorem [3]

c) An alternating voltage is given by v = 10sin(942t) V. Determine the time taken from time t = 0 for the voltage to reach +6V for the first time. [3]

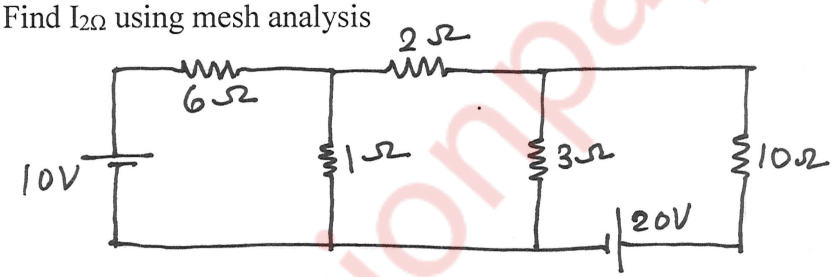
d) Given an RLC series circuit with values of R=10Ω, L=0.01H and C=100μF. Find the bandwidth of the circuit. [3]

e) Draw phasor diagram of a transformer on no-load. [2]

f) A 3000/200 V, 50 Hz single phase transformer has cross sectional area of the core is 150 cm^2. If the number of turns on the low voltage winding is 80, determine the number of turns on the high voltage winding and maximum value of flux density in the core [4]

g) Draw the input and output waveforms for a halfwave Rectifier [2]

Q. 2 a) Find $I_{2\Omega}$ using mesh analysis [6]



b) The two impedances, $Z_1=(6+j8)\ \Omega$ and $Z_2=(8-j6)\ \Omega$ are connected in parallel. If the applied voltage to the combination is 100 V, calculate (i) current and pf of each branch, (ii) overall current and pf of the combination, (iii) power consumed by each branch [8]

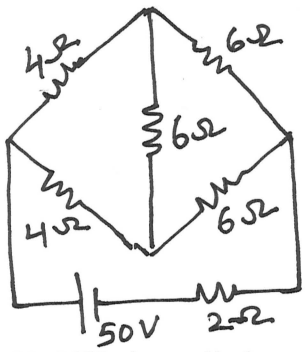
c) A single phase transformer has a primary voltage of 230 V. No load primary current is 5A. No load pf is 0.25. Number of primary turns are 200 and the frequency is 50Hz. Calculate (i) active component of the current, (ii) core loss, and (iii)magnetising current [6]

Q. 3 a) Three equal impedances, each of (8+j10) Ω are connected in star across a three phase 440V, 50 Hz supply. Calculate phase voltage, phase angle, phase current, line current, active power and reactive power [8]

b) A 50 KVA 4400/220 V transformer has $R_1=3.45\ \Omega$, $R_2=0.009\ \Omega$. The reactances are $X_1=5.2\ \Omega$, $X_2=0.015\ \Omega$. Calculate [6]
i) Full load primary and secondary currents
ii) Equivalent resistances, reactances and the impedances referred to primary and secondary

c) Explain the output characteristics of a transistor in the CE configuration. [6]

Q. 4 a) Determine the current supplied by the source (use star delta transformation). [7]

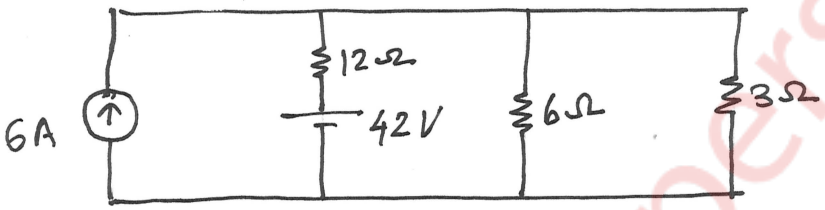


b) A voltage of 150 V, 50Hz is applied to a pure inductor of 0.2 H. Write the equations for voltage and current [5]

c) Prove that the power in delta connection is three times the power in star [4]

d) Explain the working of Full wave bridge rectifier [4]

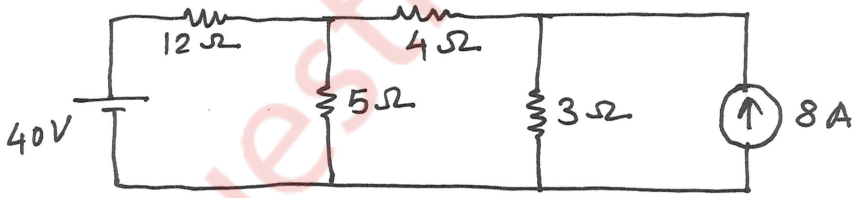
Q. 5 a) Calculate the current through 3 Ω resistor, using Thevenin's theorem [8]



b) An alternating voltage of 80+j60 V is applied to a circuit. The resultant current is 4-j2A. Calculate Z, ϕ, pf and average power dissipated in the circuit. [4]

c) A 5 KVA, 1000/200V, 50 Hz single phase transformer gave the following test results: [8]
OC Test (L V side): 200V, 1.2A, 90W
SC Test (H V side): 50V, 5A, 110W
Calculate the efficiency on (i) full load at unity power factor and
(ii) half load 0.8pf lag.

Q. 6 a) Determine the current through 4 Ω using Superposition theorem. [7]



b) Explain with neat diagrams how R, X, Z, I vary with frequency in an RLC series resonant circuit. [7]

c) Two wattmeters connected to measure the power in a three phase balanced circuit indicate 2000W and 500W respectively. Determine the power factor of the circuit when (i) both readings are positive, and (ii) the latter reding is obtained after reversing the connection to the current coil [6]