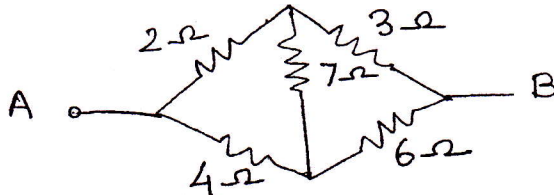[3 Hours]   [Total Marks: 80]
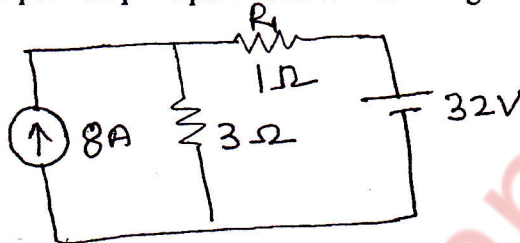
N.B. : 1. **Question 1** is **compulsory.**
      2. Solve **any three** from remaining.
      3. Assume suitable data if required and justify it.

Q.1)   Solve   **[20]**
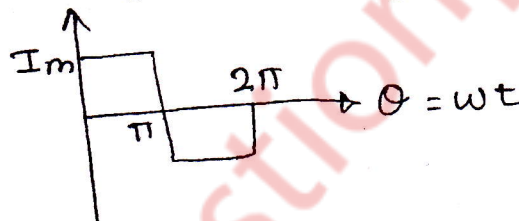
a. Find Rab using star –delta transformation   [3]

b. Use superposition principle to find current through R1   [3]

c. An alternating current of frequency 50Hz has a maximum value of 100 A.   [3]
    Calculate its value 1/600 seconds after the instant the current is zero & its
    value decreasing afterwards

d. Find the average & rms value of the given waveform   [3]

e. Two wattmeters are connected to measure power consumed by 3-phase   [2]
    star connected load. What is the power factor of load if
       1. Both wattmeters show equal reading
       2. Only one wattmeter shows reading

f. Compare Ideal & Practical transformer   [4]

g. Draw input & output voltage waveforms of a centre tapped rectifier.   [2]

Q.2)

a. Using nodal analysis ,find current through 0.05 Ω   [6]
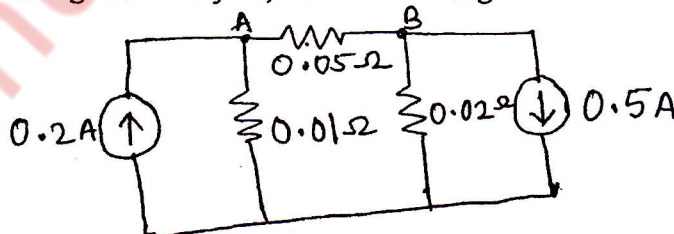
Turn Over

b. A resistor R in series with capacitor C is connected to 50Hz, 240V source. **[8]** Find the value of C so that R absorbs 300W. Voltage across R is 100V

c. A single phase transformer has 350 primary & 1050secondary turns. The **[6]** primary is connected to a 400V, 50 Hz supply. If net cross sectional area of core is 50 cm^2 find i) the max. Value of flux density in the core ii) the voltage induced in secondary winding

Q.3)

a. Find I, I_1, I_2 in the given circuit. **[8]**
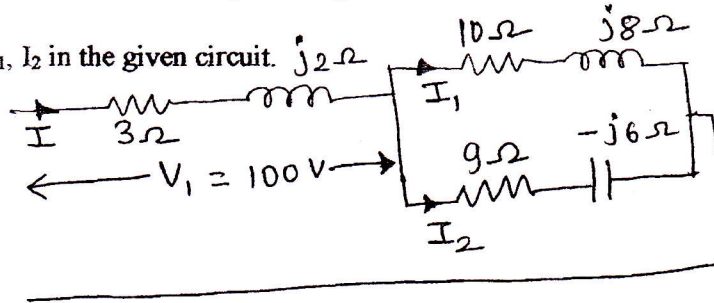
b. Obtain equivalent circuit of a 200/400V, 50Hz single phase transformer **[6]** from the following test data
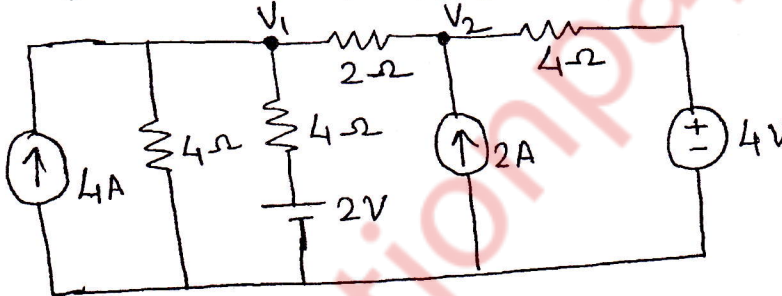
OC test: 200V   0.7A   70W   (on lv side)
SC test: 15V   10A   85W   (on hv side)

c. Draw and explain the output characteristic of CE transistor configuration **[4]**
d. Explain capacitor filter. **[2]**

Q.4)

a. Using source transformation, find V_1, V_2 in the circuit shown **[7]**

b. A balanced star connected load of (8+j6)Ω per phase is connected to a three **[4]** phase 400V supply. Find the line current & power factor.

c. An iron choke coil takes 4A current when connected to a 20V dc supply & **[5]** takes 5A from 65V, 50Hz ac supply. Determine R & L of the coil.

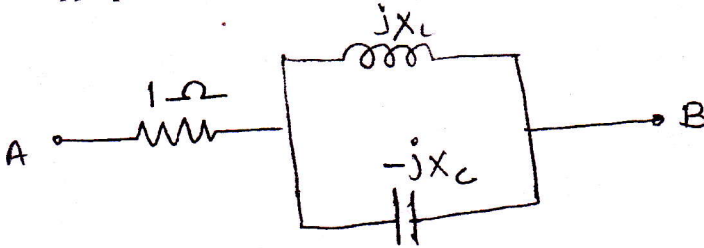d. Draw and explain the working of full wave rectifier in detail **[4]**

Q.5)

a. Det. The value of R_L for max. Power at the load. Calculate Pmax. **[8]**
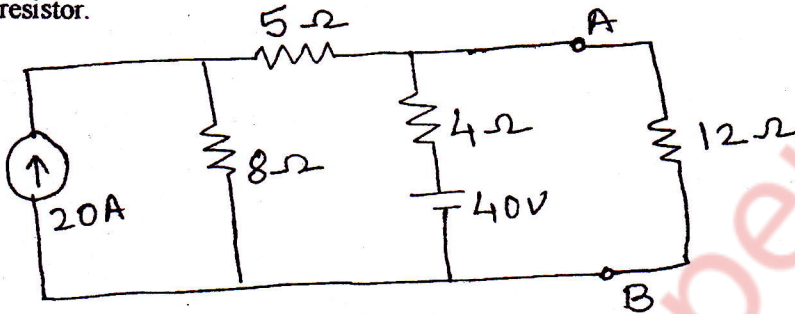

Turn Over

2751D78227C359606D4F3673871D7E29
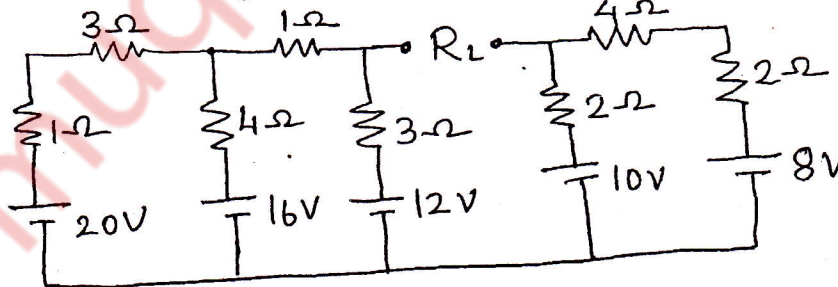
b. Draw admittance triangle between terminals A & B labelling with its sides [5]
    with appropriate values & units if $X_L = 4\Omega$ $X_C = 8\Omega$

c. The wattmeter reads iron losses in OC test & copper losses in SC test of a [7]
    transformer. Justify.

Q.6)

a. Draw Norton's equivalent source across AB & find current through 12Ω [7]
    resistor.

b. A circuit consist of a resistance of 4Ω & inductance of 0.5H & a variable [7]
    capacitance in series across a 100V, 50Hz supply. Calculate
    i)   Value of capacitance to produce resonance
    ii)   Voltage across capacitor
    iii) Q factor of the circuit

c. In a 3-phase star connected load, show that $V_L = \sqrt{3} V_{PH}$ & $I_L = I_{PH}$ [6]