(3 Hours) [Total Marks : 80]

NOTE

1.Question number 1 is compulsory

2.Attempt any three from the remaining

3.Figures to right indicates full marks

4.Assume suitable data if necessary and mention the same

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|---|---|---|---|
| 1. | | Attempt any four of the following :- | 20 |
| | a) | In a particular R-L circuit voltage of 10 V at 25 Hz produces 100 mA, while the same voltage at 75 Hz produces 60 mA. Draw the circuit diagram and insert values of the constants | 05 |
| | b) | A circuit consisting of resistance, inductive reactance and capacitive reactance in series is connected across an ac single phase, 100 V, 50 hz supply. If the voltage across the resistance and inductive reactance are 80 V and 120 V respectively and if the power consumed by resistance is 800 W. Find the value of capacitance. Take overall p.f of the circuit as lagging | 05 |
| | c) | Derive the expression to convert delta network to its equivalent star network. | 05 |
| | d) | If two resistances are connected in series equivalent resistance is 8 ohms and when same resistances are connected in parallel equivalent resistance is 2 ohms. Find the values of resistances | 05 |
| | e) | A 50 KVA, single phase transformer has an efficiency of 98 % at full load, 0.8 pf and 97 % at half full load, 0.8 pf. Determine the full load copper loss and iron loss. | 05 |
| 2. | | | 20 |
| | a) | Find current through 4 Ω by Thevenin's theorem | 10 |

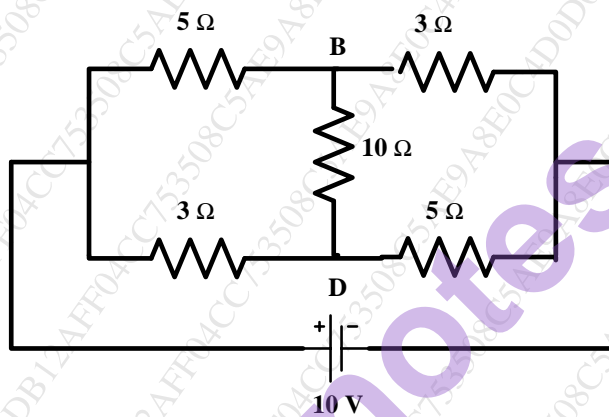3 Ω    4 Ω

7 V        5 Ω        9 V
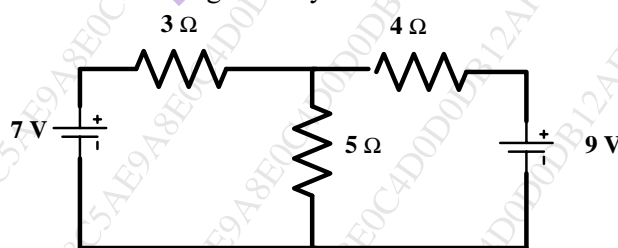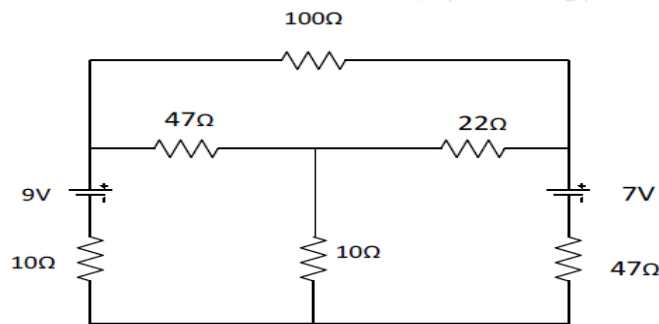
b) 10



Find current through 22Ω by Mesh analysis

3. 20
a) A 600 KVA, single phase transformer has an efficiency of 92 % at both 10
full load and half load at unity pf. Determine the efficiency at 75% of full
load, 0.9 pf lagging

b) Determine the current in branch BD in the circuit by using Thevenin's 10
theorem



4. 20

a) An equipment consumes 2 KW when connected across a 110 V, 100 Hz 10
supply and takes a lagging current of 25 A. If a capacitor is connected in
parallel with equipment to make the pf unity, Determine the value of
capacitance

b) A source of 1MHz is connected across series R L C circuit. The capacitor 10
`c' is variable. When capacitor is 500 pf. maximum current is passed
through circuit. For 600 pf. The current is half of the previous case.
Calculate parameters R , L , Bandwidth & Quality factor at resonance.

5. 20

a) Coil A takes 2 Amps at a power factor of 0.8 lagging with an applied 10
voltage of 10 Volts. A second coil B takes 2 Amps with a power factor of
0.7 lagging with an applied voltage of 5 Volts. What voltage will be
required to produce a total current of 2 Amps With A and B in parallel

b)        Determine the value of Z                              10
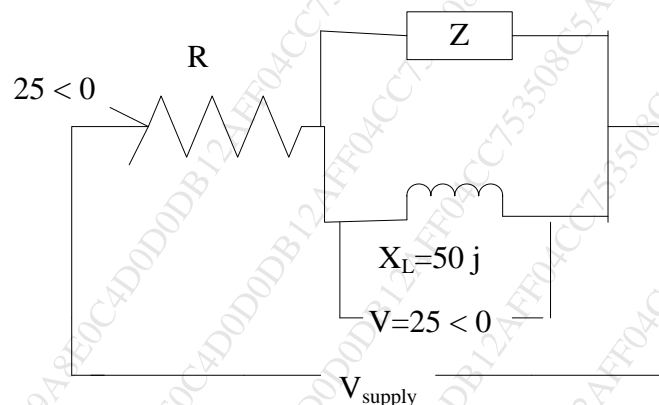


6.                                                                    20

    a)      Explain how two watt-meters can be used to measure power and     10
power factor in a three phase balanced delta connected load lagging pf.

    b)      The power input to a 2000 V, 50 $H_z$ three phase induction motor     10
running on a full load at an efficiency of 90 % is measured by two
wattmeters, which indicate 300 KW and 100 KW respectively
calculate i) Input power ii) Power factor iii) Line current iv)Output
power

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