

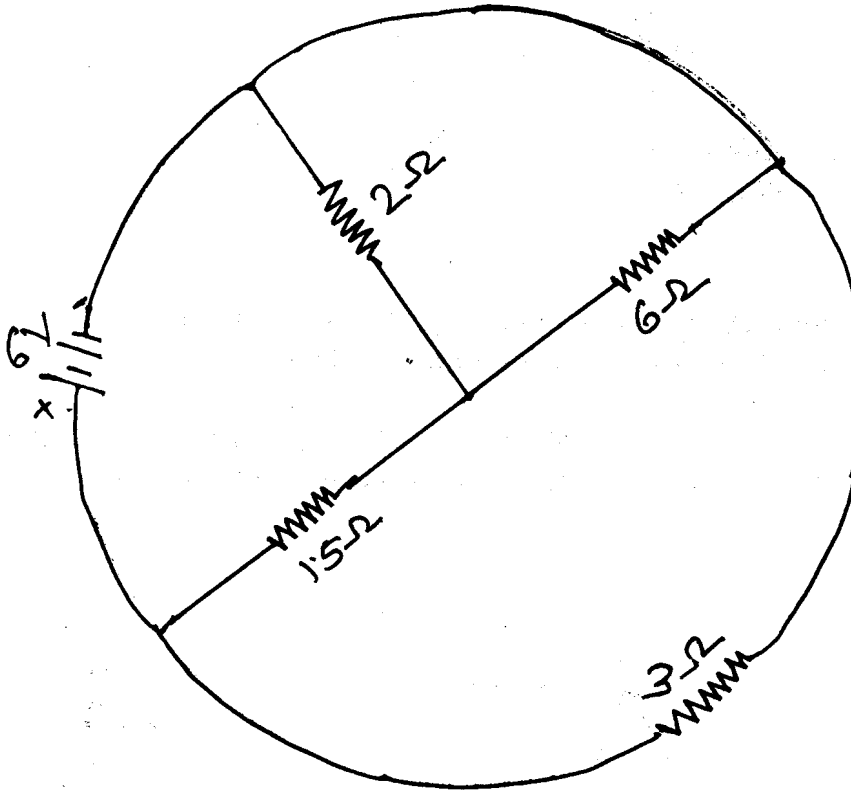
(3 Hours)

[Total Marks : 100

N.B. (1) Question No. 1 is **compulsory**.

(2) Attempt any **four** questions out of remaining **six** questions.

1. (a) What is the total current supplied by the battery to the circuit shown ? 5



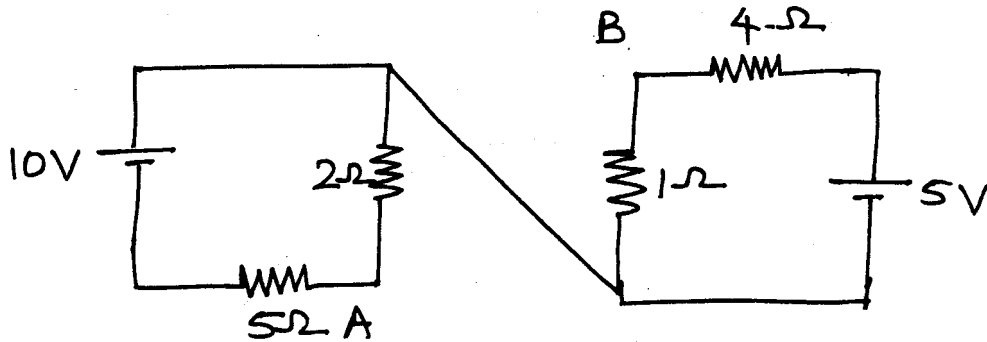
(b) What is back emf and state its significance wrt DC motor. 5

(c) What are the losses in transformer ? Explain why rating of transformer in KVA and not in kW ? 5

(d) What is power factor ? What is its significance ? State one method to improve it ? 5

2. (a) Obtain Thevenin's equivalent circuit across A and B.

8



(b) Draw experimental set-up to plot Input-Output characteristics of CE configuration of BJT and draw and explain output characteristics.

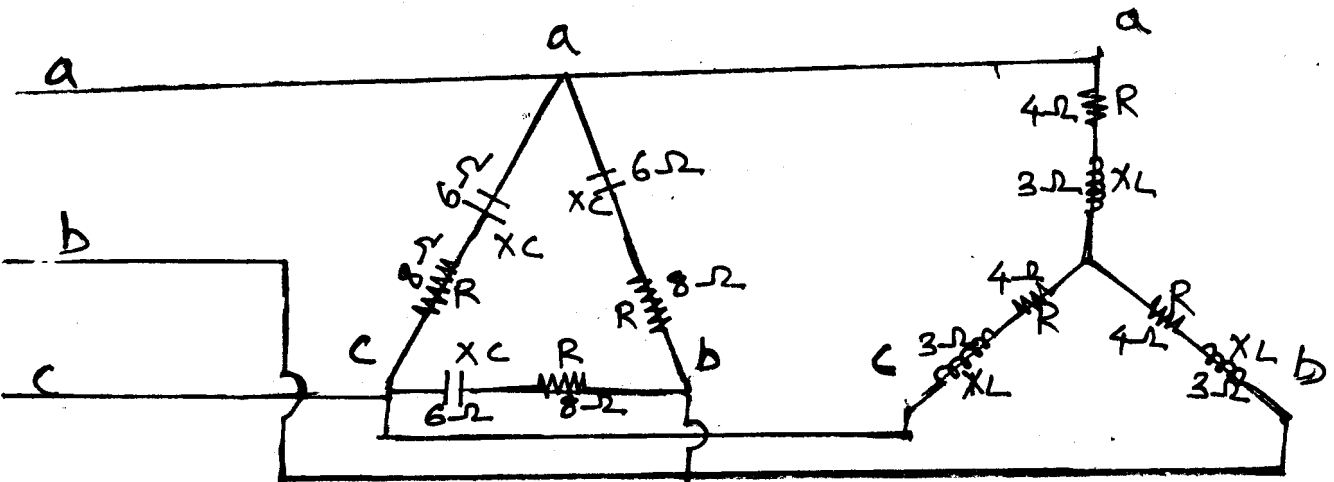
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(c) In RLC series circuit the voltage across resistor, inductor and capacitor are 10 V, 15 V and 10 V respectively. What is power factor of the circuit ?

4

3. (a)

12

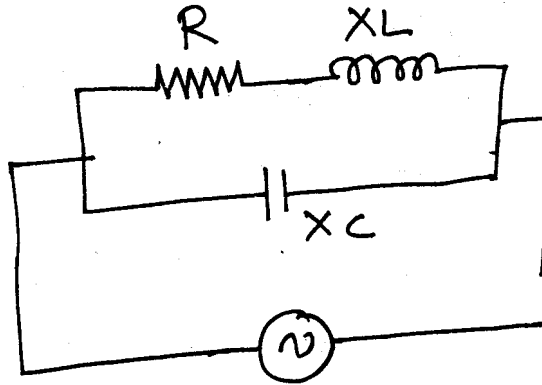


If 3- ϕ 400 V, 50 Hz is supplied to the circuit. Calculate line currents, phase currents, power factor, active power and reactive power.

(b) Explain full wave rectifier circuit using centre tap transformer. Find the expression for rms and average load current, TUF and rectifier efficiency.

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4. (a) Develop the approximate equivalent circuit of a transformer. How it helps in deciding the Regulation of transformer. 12
- (b) Derive the condition for resonance in the circuit given below. Find equation for impedance. (Find Resonance frequency equation) 8

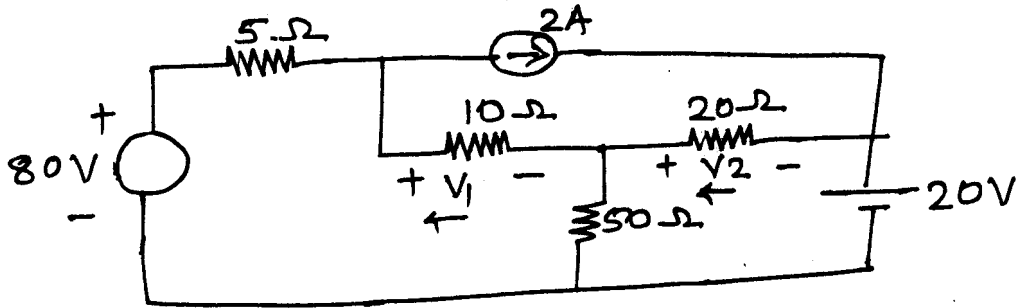


5. (a) A voltage of $200 \angle 25^\circ$ Volt is applied to a circuit composed of 2 parallel branches, if the branch currents are $10 \angle 45^\circ$ and $20 \angle -30^\circ$ determine the kVA, kVAR, kW in each branch. Also calculate the P. F. of the combined load. 10
- (b) Draw schematic diagram of DC shunt motor and explain its characteristics and applications. 10
6. (a) A 5 kVA 200/400 V, 50Hz, single phase transformer gave the following test results. 12

O.C. test (L.V. side)	200 V	0.7 A	60W
S.C. test (H.V. side)	22 V	16 A	120 W

- (i) Draw the equivalent circuit of the transformer referred to L.V. side and insert all parameter values.
- (ii) Efficiency and regulation at 0.9 P.F. (lead) if operating at rated load.
- (iii) Currents at which efficiency is maximum, also find load kVA at max η (efficiency).
- (b) A 3-phase 10 kVA load has P.F. of 0.342. The power is measured by two watt-meter method. Find the reading of each wattmeter when (i) P.F. is leading (ii) P.F. is lagging. 6
- (c) Define R.M.S. value. 2

7. (a) By using Nodal analysis find V_1 and V_2 .



- (b) Explain the production of rotating magnetic field by graphical approach.
- (c) Define phase sequence and explain it's significance.