Max. Marks: 70
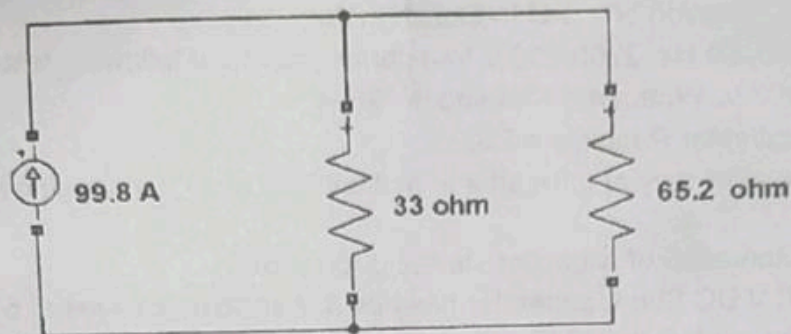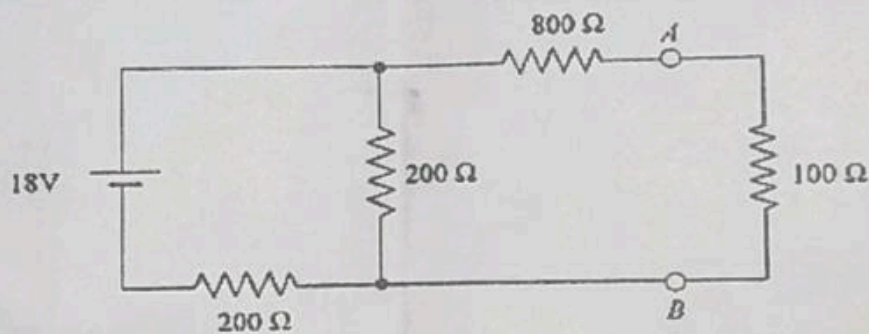
Time: 3 Hours

Note: (i) First question is compulsory and answer any four questions from the
remaining six questions. Each questions carries 14 Marks.

(ii) Answer to each question must be written at one place only and in the
same order as they occur in the question paper.

(iii) Missing data, if any, may be suitably assumed.

1. (a) State Superposition Theorem

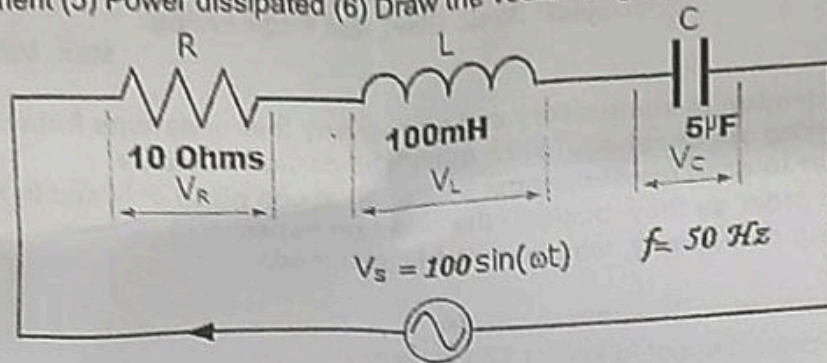(b) Find the Power dissipated in 65.2 Ohms resistor

(c) Define Instantaneous and Average value of an Alternating Quantity

(d) Write about Auto Transformer advantages, disadvantages & applications

(e) What are the parts of DC Machines?

(f) What are the types of earthing?

(g) Which losses are present in a Transformer?

2. (a) State Kirchhoff's Voltage Law & Kirchhoff's Current Law

(b) Using Norton's theorem, find the voltage across 100 Ohm resistor in the circuit shown below:

...2

3. (a) Derive the relation between Line and Phase Voltage in a 3-Ø Star connection.
   (b) For the given RLC Circuit find (1) Current (2) Impedance (3) Power Factor (4) Voltages across each element (5) Power dissipated (6) Draw the vector diagram

$$V_s = 100\sin(\omega t) \qquad f = 50\ Hz$$

4. (a) Explain the Operation of a 3-Ø Induction motor.
   (b) A 20 kVA, 1-Ø, 50 Hz, 2200/200 V transformer gave the following test results:
   OC test: 2200 V, Wattmeter Reading is 220 W
   SC test: Wattmeter Reading is 240 W.
   Calculate the efficiency at full load and half full load at p.f. 0.8 lagging?
   $h \cdot 7 \, 5 \qquad\qquad 2 \cdot 3 9 \qquad\qquad 5 \cdot 9 7$

5. (a) Explain the operation of capacitor start and run motor.
   (b) A 4 Pole,250 V DC Shunt generator has Iron & mechanical losses of 500 w. If a load of 20 A is connected then find the EMF and efficiency of the generator if R_a & R_{sh} are 0.1Ohm & 250 Ohm respectively. (Sketch relevant Figures)

6. (a) Explain the working of MCB with neat sketch.
   (b) What is the necessity of Earthing? Explain any one with neat sketch.
   $49 \qquad 120 \qquad 270$

7. (a) In a house, 5 No of Tube light of 40 W each and 3 No of fans of 150 W each are used for 20 Hours/day. Find the Power consumption per (1) day (2) Month and (3) Calculate the power bill for a Month if unit rate is Rs.5/-   600
   (b) Draw and discuss the Power triangle   1350

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