

BT-1/D11

7529

Electrical Technology

Paper : EE-101 E

Time : Three Hours]

[Maximum Marks : 100

Note :- Attempt any **FIVE** questions. Attempt at least **ONE** question from each Unit. All questions carry equal marks.

UNIT-I

1. (a) Use Kirchoff's law and Ohm law in a step by step procedure to evaluate the currents and voltages in each circuit of Fig. 1. 10
- (b) Calculate the power absorbed by each of seven circuit elements and show that sum is zero. 10

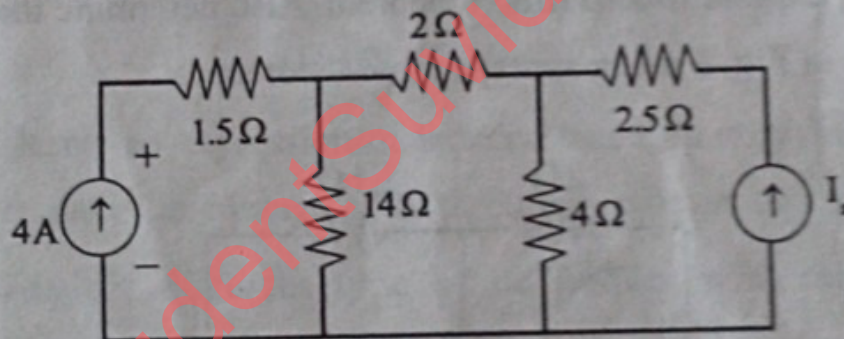


Fig.1

2. (a) Define (i) Real power (ii) Apparent power (iii) complex power (iv) power triangle. 10
- (b) A $200\ \Omega$ resistor and $10\ \mu\text{F}$ capacitor are connected in series across a 12V 50 MHz source. Calculate (i) impedance (ii) current (iii) power factor (iv) active power. 10

UNIT-II

3. (a) Find the value of I_x by the method of nodal analysis for the circuit shown below : 10

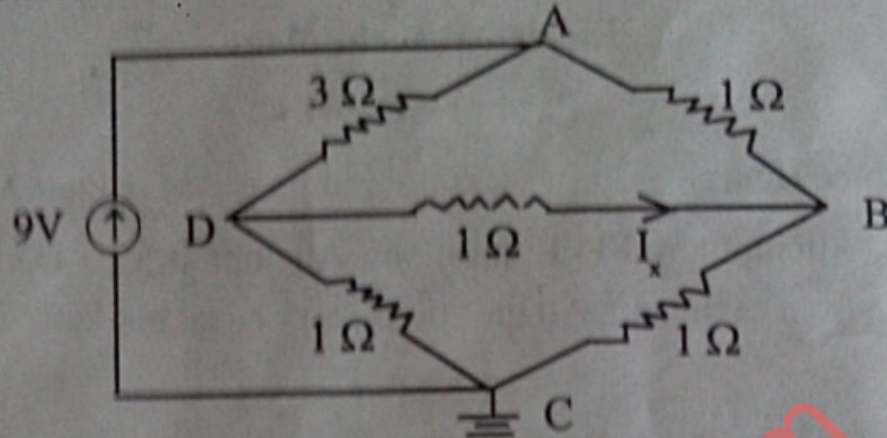


Fig. 2

- (b) Explain the concept of time constant for series R-L and R-C circuits. 10
4. (a) Explain superposition theorem. Also determine the value of i_x in Fig. 3 using superposition theorem. 4+6

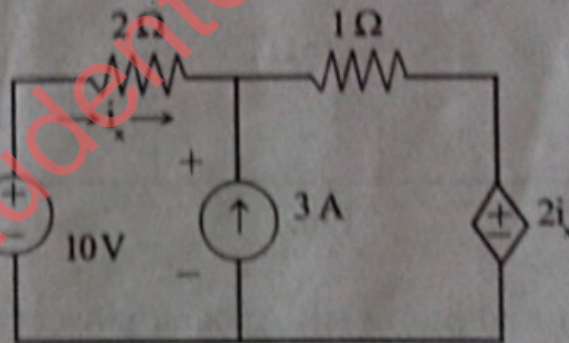


Fig.3

- (b) Define series Resonance. Draw reactance curve for individual reactances for series R-L-C circuit. Also derive the expression of bandwidth in terms of circuit parameters. 3+3+4

UNIT-III

5. (a) Explain the two wattmeter method to measure the power of 3 ϕ circuit. Also derive the expression of power factor in terms of wattmeter readings. 6+4
- (b) Write the advantages of three-phase system over single-phase system. Also prove that :

$$V_{\text{line}} = \sqrt{3} Y_{\text{phase}} \text{ for star connection.} \quad 4+6$$

6. (a) Explain the constructional details of a single phase transformer. Also explain the different materials used for transformer. 5+5
- (b) Explain different losses occurs in a transformer. Also derive an expression of η of a transformer. How these losses can be minimised? 3+3+4

UNIT-IV

7. (a) Derive an expression of induced emf of a dc generator. Also explain the concept of back emf in a dc motor. 6+4
- (b) Explain different type of dc motors with their typical characteristics and applications. 10
8. Write short notes on any four of the following :
- (i) Speed control of DC motor
 - (ii) Importance of earthing
 - (iii) Parallel resonance
 - (iv) Star to Delta transformation
 - (v) Exponential and Trigonometric representation
 - (vi) Regulation in 1- ϕ transformer. 5 \times 4=20