

Roll No.

BT-1/D08

ELECTRICAL TECHNOLOGY

Paper : EE-101E

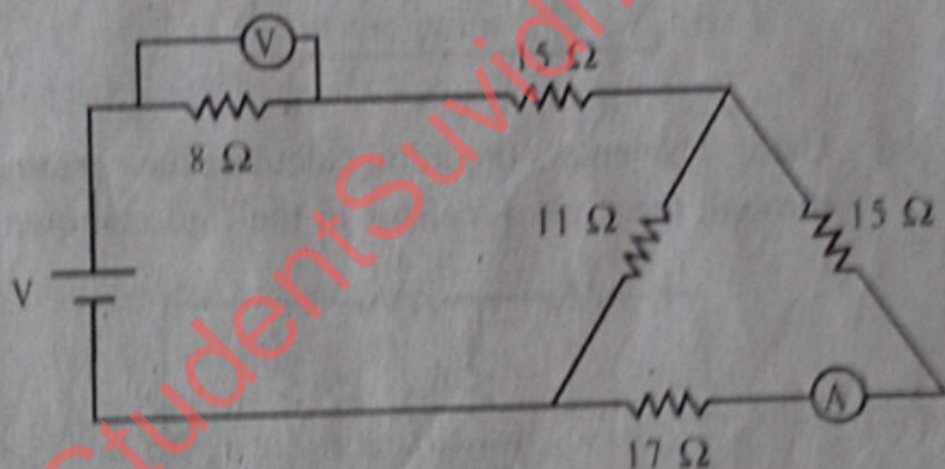
Time : Three Hours]

[Maximum Marks : 100

Note : Attempt *five* questions in all, selecting at least *one* question from each part.

PART-I

1. (a) Explain the behaviour of pure L and C components in A.C. circuits. Draw appropriate diagrams. 10
- (b) A battery of unknown emf is connected across resistances as shown in the figure 1.



The voltage drop across the 8Ω resistor is 20 V.
What will be the current reading in the ammeter ?
What is the emf of the battery ? 5+5

2. (a) Describe the following terms :
- (i) Power factor.
 - (ii) Polar and Exponential representation.
 - (iii) Phase angle.
 - (iv) RMS value.

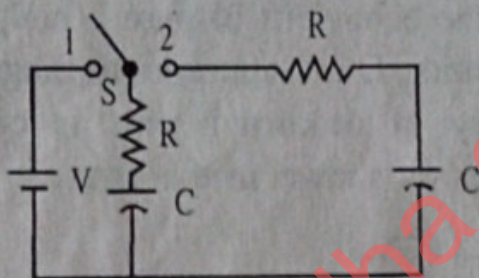
2+2+2+2

[P.T.O.]

- (b) Explain Nodal and Loop method of analysis. 4+4
 (c) What is the concept of complex power ? 4

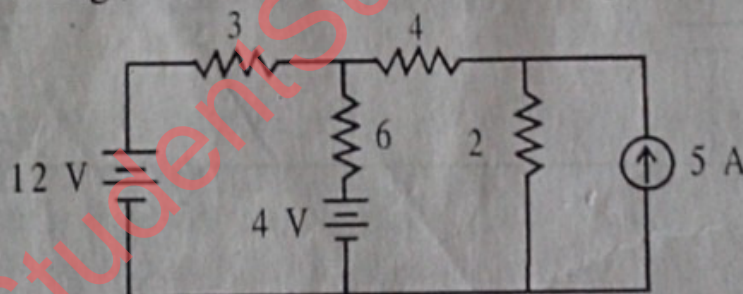
PART-II

3. (a) Write down the statement for Maximum power transfer theorem. Explain it with suitable examples. 10
 (b) Explain the transient response of the circuit shown below :
 (i) when switch 'S' is connected to 1.
 (ii) when switch 'S' is connected to 2.



5+5

4. (a) Using Thevenin's theorem, calculate the current flowing through the 4 ohm resistor in the figure shown below :



All resistances are in ohms.

- (b) Explain parallel resonance with proper circuit diagram. 4
 (c) Describe the following terms :
 (i) Cut-off frequencies.
 (ii) Bandwidth.
 (iii) Q factor.
 (iv) Dynamic impedance. 2+2+2+2

PART-III

5. (a) Write down the working principle of single phase autotransformer. Compare it with the single phase transformer (two winding).
(b) What is the importance of earthing ?
(c) Draw the phasor diagram of transformer under unit power factor loading condition.
6. (a) A 220 V, 3- ϕ voltage is applied to a balanced delta connected, 3- ϕ load of phase impedance $(15 + j20)$ ohm.
(i) Find the phasor current in each line.
(ii) What is the power consumed per phase ?
(iii) What is the phasor sum of the three line currents ?
Why does it have this value ?
(b) Explain the following :
(i) Two wattmeter method for 3- ϕ power measurement.
(ii) Relationship between phase and line quantities for balanced star circuit with appropriate phasor diagram.
(iii) Maximum efficiency condition for single phase transformer.
(iv) Voltage regulation of single phase transformer.

PART-IV

7. (a) Explain the concept of slip. Write various types of induction motors. Explain the working principle of three phase induction motor.
(b) Draw a neat sketch of synchronous motor. Explain each part in detail.

8. (a) Draw internal and external characteristics of DC machines. 6
- (b) Derive emf and torque equation of DC machine. 8
- (c) Why speed control is required for DC machine ? Explain any one method in detail. 6
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