



DBW-1

Seat No. _____

M. Sc. (ECI) (Sem. II) (CBCS) (W.E.F. 2016) Examination

July - 2022

Basic Circuit Analysis : Paper-5
(New Course)

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

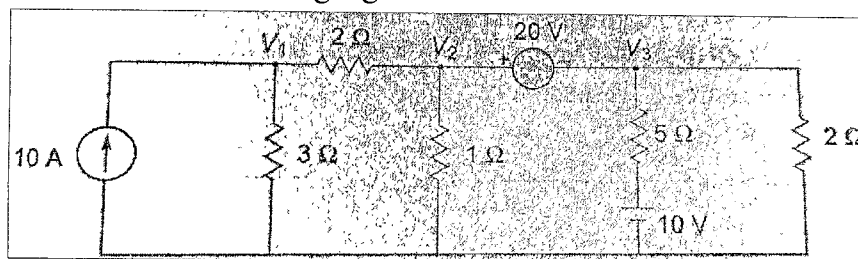
- Instructions :** (1) All questions carry equal marks.
(2) The figures on right hand side indicate marks.

1 Answer the following : (Any seven) **14**

- (1) Define TREE and CO-TREE.
- (2) What are the TWIGS and LINKS?
- (3) What is the mesh analysis technique for network solution?
- (4) In which case the supermesh analysis of the network is required?
- (5) State the superposition theorem for network analysis.
- (6) What is the reciprocity theorem?
- (7) What are the phase angles between the two sine waves?
- (8) Write the expression for phase relation in a pure resistor.
- (9) What is the complex impedance?
- (10) What is the phaser diagram?

2 Answer the following : (Any two) **14**

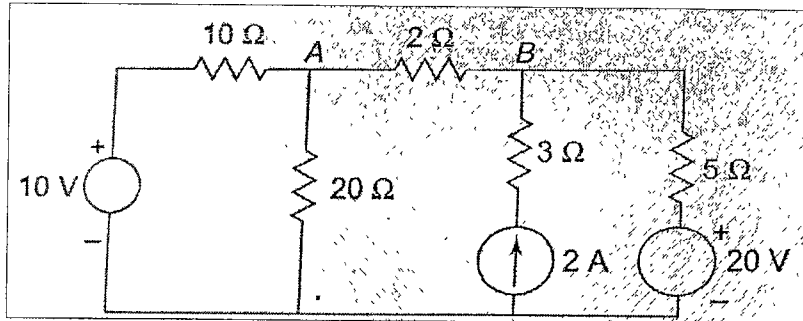
- (1) Write the properties of incidence matrix. **7**
- (2) Determine the current in the 5Ω resistor for the circuit shown in the following figure. **7**



- (3) Explain the star-delta transformation technique for solving complex networks. **7**

3 Answer the following : 14

- (1) Find the voltage across the $2\ \Omega$ resistor in the following figure by using the super-position theorem. 7



- (2) Explain duals and duality for a network in which R-L-C elements connected in series, and excited by a voltage source. 7

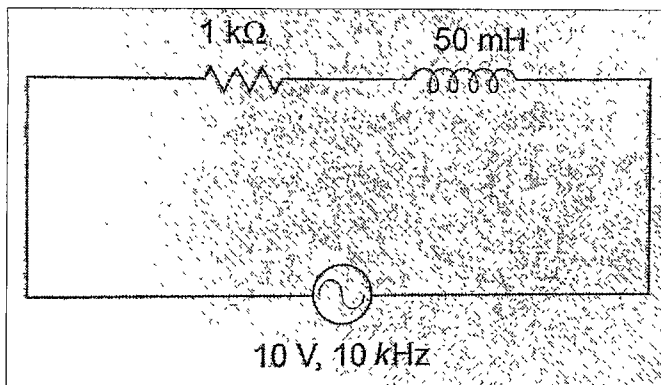
OR

3 Answer the following 14

- (1) Explain the terms: instantaneous value, peak value, peak to peak value, average value and RMS value for sine wave. 7
- (2) Explain the phase relation in a pure inductor. 7

4 Answer the following : 14

- (1) To the circuit shown in the following figure and find impedance Z , current I , phase angle θ , voltage across resistance V_R , and the voltage across inductance V_L . 7



- (2) Write a note on instantaneous power. 7

5 Answer the following : (Any two) 14

- (1) Explain apparent power and power factor. 7
- (2) Write a note on maximum power transfer theorem. 7
- (3) Explain the series resonance for RLC series circuit. 7
- (4) Define the quality factor (Q) and discuss its effect on bandwidth. 7