22330

11819

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions : (1) All Questions are *compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following : **10**

(a) Define :

(i) Admittance

(ii) Conductance

(b) Write the equation of open circuit Z parameter.

(c) Draw phasor diagram for R-L series circuit.

(d) Draw resonance curve for series resonance.

(e) Define :

(i) Node

(ii) Branch

(f) State Thevenins theorem.

(g) Write the formula for Delta to Star conversion giving examples.

2. Attempt any THREE of the following : **12**

(a) For RLC series circuit draw voltage triangle, power triangle and impedance triangle along with proper labellings and equations for condition $V_L > V_C$.

(b) Define and state equations for (i) Active Power (ii) Reactive Power (iii) Apparent Power

(c) Explain the steps for converting practical voltage source into practical current source.

(d) Three resistances 32 Ω, 40 Ω, 48 Ω are connected in star circuit. Determine its equivalent delta circuit.

3. Attempt any THREE of the following : **12**

(a) If $Z_1 = 3 + j7$ and $Z_2 = 12 - j16$ are connected in parallel. Find the equivalent impedance of combination.

(b) Determine Bandwidth and Quality factor (Q) for the series circuit.

(c) Using Mesh Analysis find current through 4 Ω resistance. (Refer fig. 1)

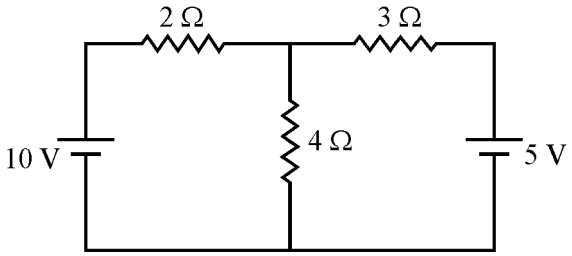

Fig. 1

(d) Explain the procedure for solving Thevenins theorem using suitable example.

4. Attempt any THREE of the following : **12**

(a) A coil has resistance of 4 Ω and an inductance of 9.55 mH. Calculate (i) Reactance (ii) The impedance (iii) The current taken from 240 V, 50 Hz supply.

(b) Draw the phasor diagrams for a series RL and series RC with AC supply.

(c) Compare series and parallel circuits.

(d) Using source transformation technique find the resultant current (I) through circuit. (Refer fig. 2)

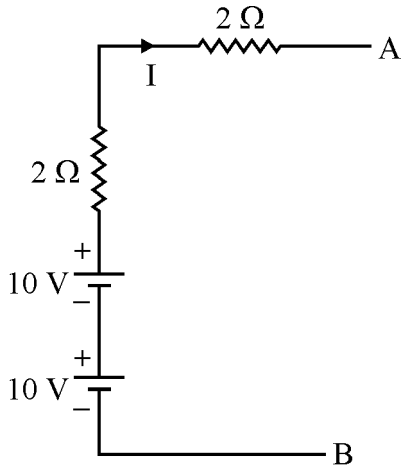

Fig. 2

(e) Using super-position theorem find current through 4 Ω resistance. (Refer fig. 3)

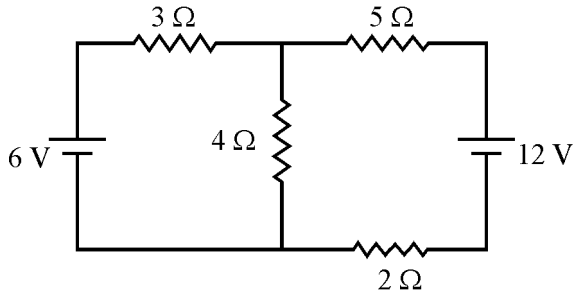

Fig. 3

P.T.O.

5. Attempt any TWO of the following : **12**

(a) Derive the expression for resonance frequency for parallel circuit.

(b) Calculate current through 8 Ω resistance using Norton's theorem. (Refer fig. 4)

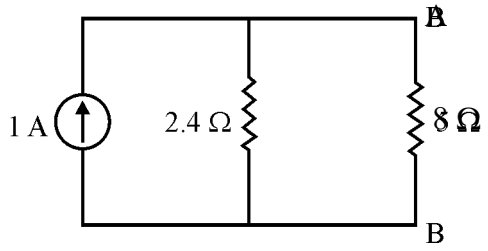

Fig. 4

(c) Explain 'Π' and 'T' circuit with proper phasor diagram.

6. Attempt any TWO of the following : **12**

(a) Calculate the nodal voltage V_B using nodal analysis. (Refer fig. 5)

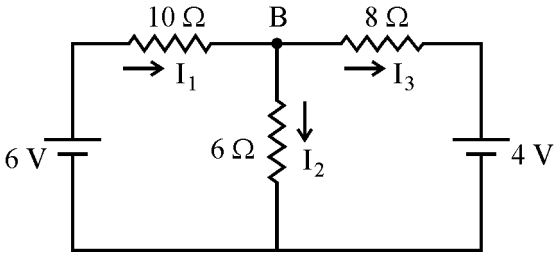

Fig. 5

(b) State and explain :

(i) Maximum power transfer

(ii) Reciprocity theorem

(c) Explain significance of two-port network. Also draw two port network for (i) Cascade configuration ABCD parameter (ii) Series configuration.