C14–AEI–**402**

# 4414

## BOARD DIPLOMA EXAMINATION, (C–14)
## SEPTEMBER/OCTOBER - 2020
## DAEIE—FOURTH SEMESTER EXAMINATION

NETWORK THEORY

*Time* : 3 hours ]  [ *Total Marks* : 80

**PART—A**  3×10=30

*Instructions* : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

**1.** List any three differences between active and passive circuits.

**2.** State Kirchhoff's voltage law.

**3.** Define the term junctioning circuits.

**4.** Define co-tree and links in a circuit.

**5.** Define node and principal node in the circuit.

**6.** State Thevenin's theorem.

**7.** List any three advantages of maximum power transfer theorem.

**8.** Define the term resistance.

**9.** Define resonance.

**10.** State the importance of $Q$-factor.

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**PART—B**  $10 \times 5 = 50$

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*Instructions* : (1) Answer *any* **five** questions.

                    (2) Each question carries **ten** marks.

                    (3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

**11.** Find the star equivalent circuit for the delta connected circuit shown in Fig. 1 :
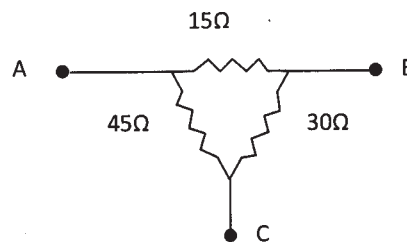


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Fig. 1

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**12.** Explain star and delta circuits with diagrams.

**13.** Write the mesh current equations in the circuit shown in Fig. 2 and determine the currents $I_1$ and $I_2$ :
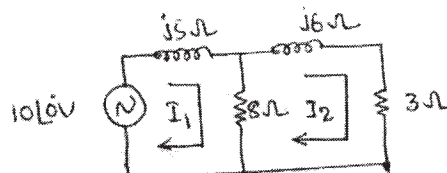


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Fig. 2

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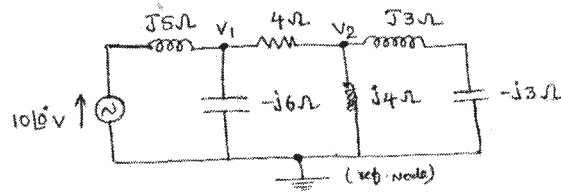**14.** In the network shown in Fig. 3, determine $V_1$ and $V_2$ :



Fig. 3

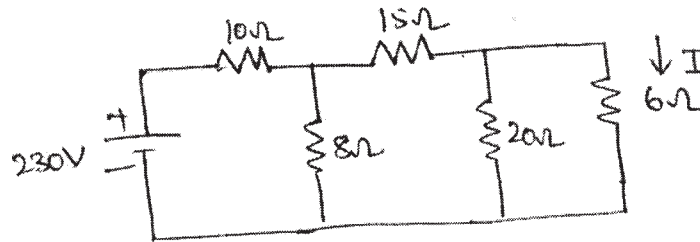**15.** Verify the reciprocity theorem for the network shown in Fig. 4 :



Fig. 4

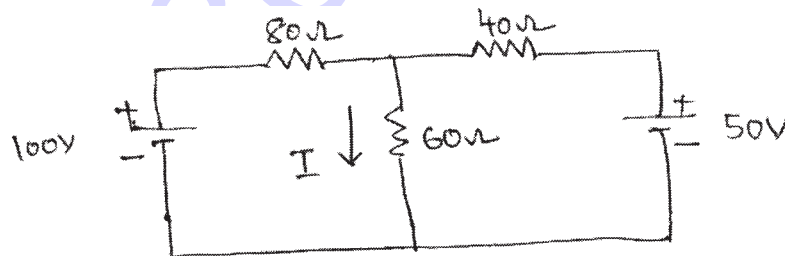**16.** Find the current $I$ in the network shown in Fig. 5 using superposition theorem :



Fig. 5

**17.** Derive the expression for impedance, current, phase angle, power and power factor in series *R-C* circuits.

**18.** Derive the relationship between voltage and current in pure capacitive circuit.

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