* 4414 *

C14–AEI–402

4414

BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—2016

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. Define junction and branch in circuits.

2. List any three limitations of Ohm's law.

3. Define active circuits.

4. Define tree and node in circuits.

5. Define co-tree and principal node in circuits.

6. Define ideal current source.

7. List the limitations of Thevenin's theorem.

8. Define resonance in series circuits.

9. A series circuit with R 10 , L 30 mH and a variable capacitor C has an applied voltage with a frequency f 1500 Hz. Find the capacitance C for series resonance.

10. In a series RLC, circuit R 100 , L 10 mH, C 25 F. Determine resonant frequency $_0$.

PART—B

10×5=50

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. Derive the star to delta transformation formulae.

12. *(a)* State Kirchhoff's voltage law.

(b) What is the current in the circuit shown in Fig. 1, and determine the voltage across each resistor.

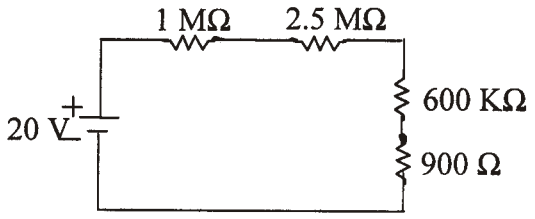

Fig. 1

13. Write the mesh current equations in the circuit shown in Fig. 2, and determine the currents.

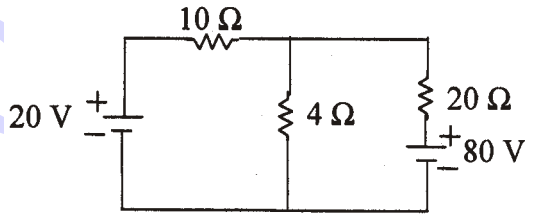

Fig. 2

14. Write the node voltage equations and determine the currents in each branch for the network shown in Fig. 3.

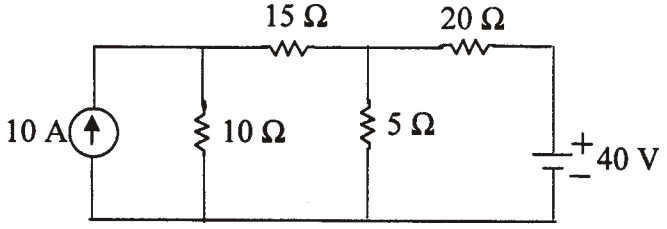

Fig. 3

15. Obtain the Norton's equivalent circuit for the active network given in Fig. 4.

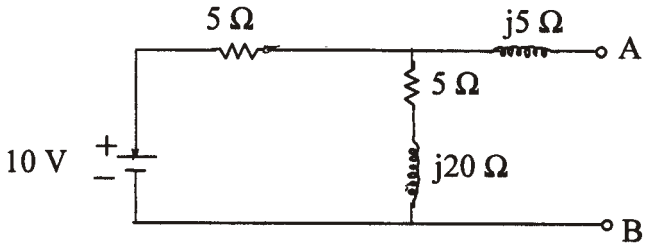

Fig. 4

16. Verify the reciprocity theorem for the network shown in Fig. 5.

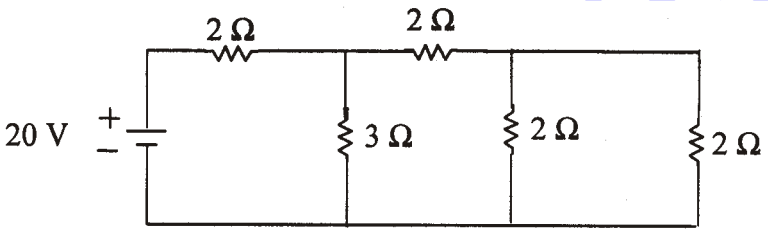

Fig. 5

17. Derive the relationship between voltage and current in pure inductive circuits.

18. Derive the impedance, current and phase angle in series *RLC* circuit.

★ ★ ★