



COLLEGE OF ENGINEERING, SCIENCE AND TECHNOLOGY
SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING

BACHELOR OF ENGINEERING PROGRAMME, YEAR 2 (BENG 2)

EEE681 ELECTROTECHNOLOGY

FINAL EXAMINATION (SEMESTER 1, 2017)

DATE/TIME/ROOM – Refer to Timetable

Maximum Marks – 100

Time – 3 hours and 10 minutes

INSTRUCTIONS TO CANDIDATES

1. You are allowed 10 minutes extra time during which you are not to write.
2. Begin each answer on a fresh new page and use both sides of the sheets.
3. Write your identification number on the top of each attached sheet.
4. Insert all written foolscaps, graph paper, drawing paper etc. in their correct sequence and secure with string provided.
5. For all sheets of paper in which rough work has been done, cross it through and you must attach to your answer script.
6. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
7. *ANSWER ONLY TEN QUESTIONS.*

Total number of pages – 4 (including cover page)

1. Determine the resistance between nodes A & E and current supplied by the 30 Volt supply shown in Fig. 1.

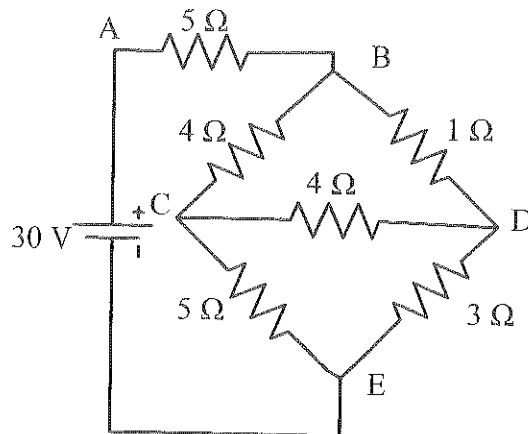


Fig. 1

[10 Marks]

2. Determine the current through all branches and power supplied by the voltage source shown in Figure. Also calculate the maximum power absorbed by the 10 Ω resistance.

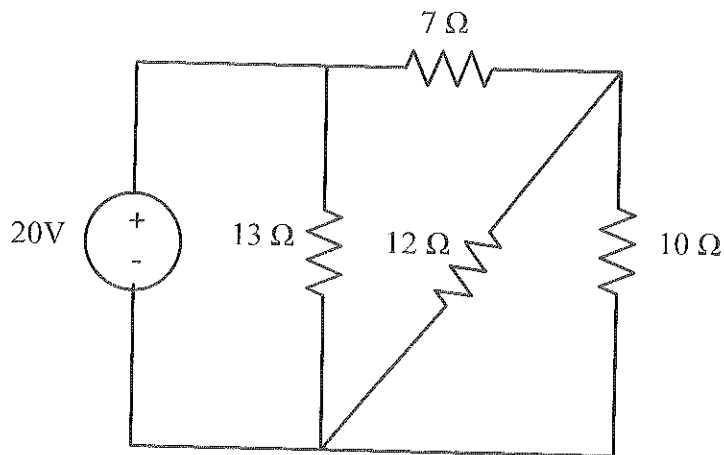


Fig. 2

[10 Marks]

3. Determine the current through branch AB by Norton's theorem or Thevenin's theorem.

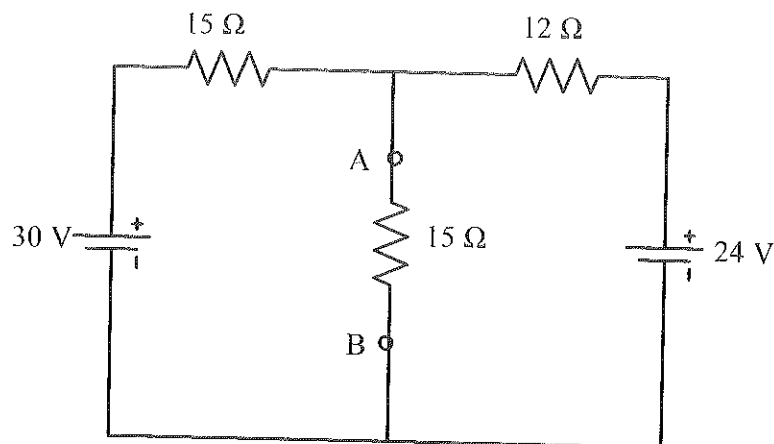


Fig. 3

[10 Marks]

4. Determine the current in the 10Ω resistor in the circuit by mesh current analysis.

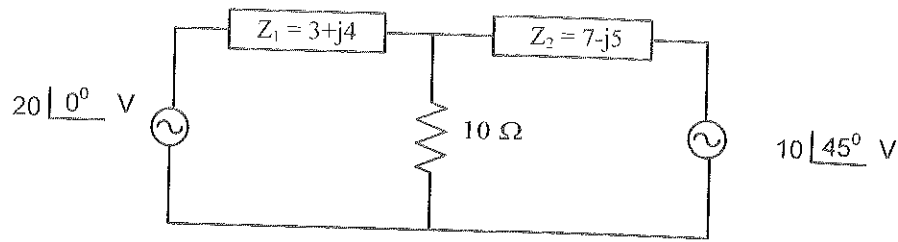


Fig. 4

5. Determine the resistance between nodes A & B by using star delta transformation method given in Fig. 5 (a) & Fig. 5 (b). [10 Marks]

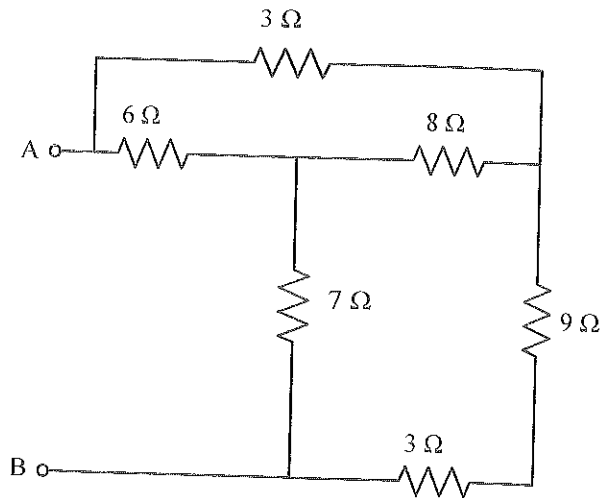


Fig. 5(a)

[5 Marks]

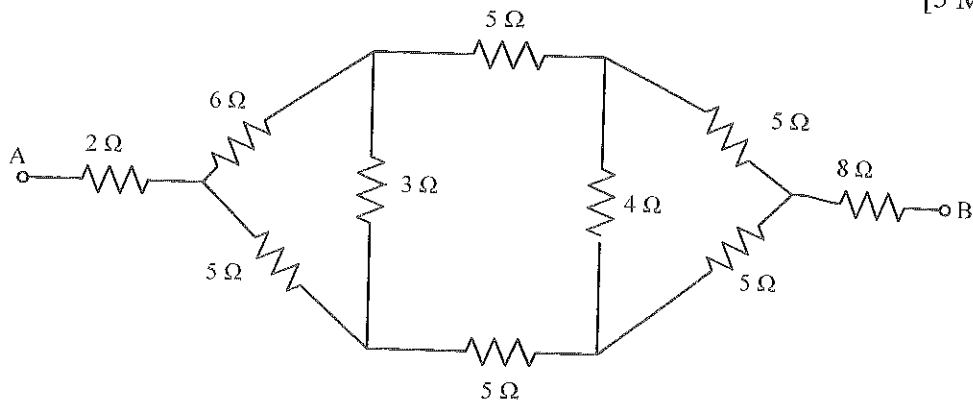


Fig. 5(b)

[5 Marks]

6. The power input to a 200V, 50 Hz, three-phase induction motor running on full load at an efficiency of 90% is measured by two wattmeter which indicate 300W and 100W respectively. Calculate (a) power factor (b) the input power (c) the line current (d) output power.

[10 Marks]

7. Discuss any three terms associated with circuit analysis [10 Marks]
- Norton's Theorem
 - Thevenin's Theorem
 - Superposition Theorem
 - Maximum Power Transfer Theorem

8. An AC series circuit has a resistance of 10Ω , an inductor of 0.2H and a capacitance of 60 microfarad . Calculate (a) resonant frequency (b) the resonant current (c) the power at resonance (d) the quality factor. Given that the applied voltage is 200V , 50Hz . [10 Marks]

9. Consider the circuit, determine
- Impedance parameter
 - Admittance parameter
 - Hybrid parameter
 - Transmission parameter

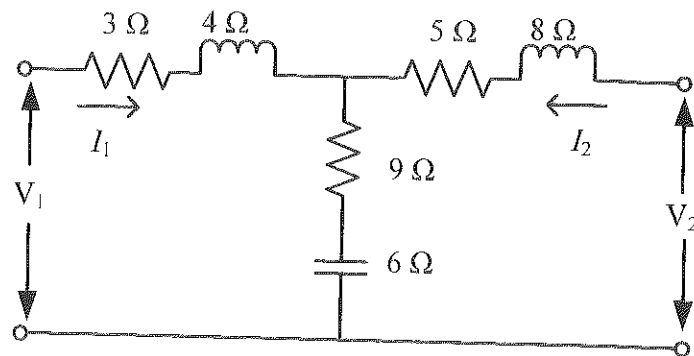


Fig. 6

10. The unbalanced three-phase load voltages of a star connected circuit are $V_{an} = 312.53 \angle 8.69^\circ \text{ V}$, $V_{bn} = 157.4 \angle -103.81^\circ \text{ V}$ and $V_{cn} = 250.1 \angle 98.64^\circ \text{ V}$. Obtain the zero sequence and positive sequence components. [10 Marks]

11. A balanced three phase 440 V (line to line) source is applied to (a) star connected (b) delta connected impedances of $20 \angle 45^\circ \Omega$ per phase. Find the line current and three-phase power in both cases. [10 Marks]

[THE END]