



COLLEGE: COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY (CEST)

SCHOOL: SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

TRADE DIPLOMA IN ELECTRICAL ENGINEERING

UNIT CODE: EEE571

UNIT TITLE: ELECTRICAL POWER NETWORKS & THEOREMS

FINAL EXAMINATION – TRIMESTER 2, 2019

ROOM: AS PER TIMETABLE

DURATION: 2 HOURS & 10 MINUTES

TOTAL MARKS: 100

INSTRUCTIONS TO STUDENTS

1. You are allowed **10 minutes** extra **reading time** during which you are **NOT** to write.
2. Begin each SECTION on a fresh page and use both sides of the sheet.
3. Write your candidate number at the top of each attached sheet.
4. Insert all written foolscaps, graph paper, drawing paper, etc. in their correct sequence and secure with a string.
5. For all sheets of paper on which rough/draft work has been done, cross it through and **ATTACH** these to your answer scripts.
6. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
7. Use of programmable calculator(s) is prohibited.
8. **ANSWER ALL QUESTIONS**
9. Show all working where necessary.

ALWAYS CHECK YOUR WORK BEFORE YOU LEAVE

Section A**(25 Marks)**

Questions 1-4 are multiple choice questions choose the best answer and write the alphabet in the answer sheet.

1. The "Superposition theorem" is essentially based on the concept of
 - (A) duality
 - (B) linearity
 - (C) reciprocity
 - (D) non-linearity.

2. Thevenin's equivalent circuit consists of _____.
 - (A) series combination of R_{Th} , E_{Th} and R_L .
 - (B) series combination of R_{Th} , E_{Th} .
 - (C) parallel combination of R_{Th} , E_{Th} .
 - (D) parallel combination of R_{Th} , E_{Th} and R_L .

3. A network that does not have either voltage or current sources is called
 - (A) Active network
 - (B) Dummy network
 - (C) Resistive network
 - (D) Passive network

4. Maximum power transfer in an ac circuit will take place when
 - (A) load resistance is equal to internal resistance of power source
 - (B) power is same throughout the circuit
 - (C) Frequency is same in the circuit
 - (D) Voltage is same in circuit

Questions 5 - 7 requires the student to explain and show using diagrams, draw neat and labelled diagrams and use pencils for all diagrams.

5. Explain frequency response with aid of diagram(s). (5 marks)

6. Draw a standard configuration of a two port and explain its function. (5 marks)

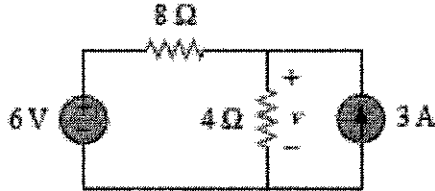
7. Draw circuits to show how wattmeters are connected in a three phase star system.
 - a) One wattmeter method (2 marks)
 - b) Two wattmeter method (4 marks)
 - c) Three wattmeter method (5 marks)

Section B

(75 Marks)

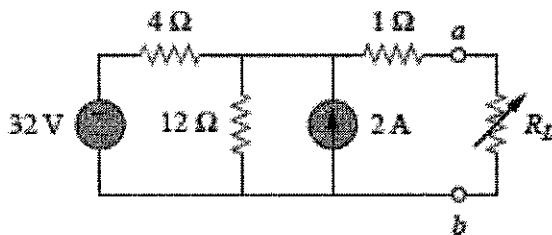
Question 1 – 6 are calculations question, show all working.

1. Use the superposition theorem to find v in the circuit.



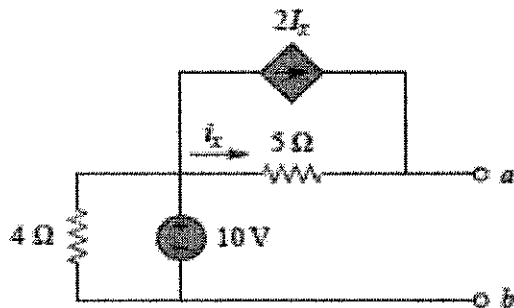
(10 marks)

2. Find the Thevenin's equivalent circuit of the circuit shown in Figure below to the left of the terminals a-b. Then find the current through $R_L = 6, 16,$ and 36Ω .



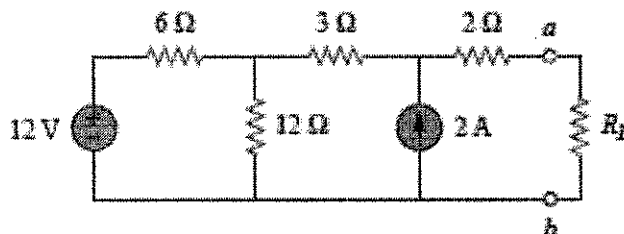
(15 marks)

3. Using Norton's theorem, find R_N and I_N of the circuit at terminals a-b.



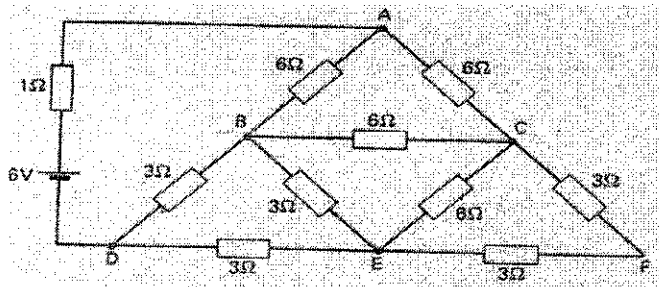
(15 marks)

4. Find the value of R_L for maximum power transfer in the circuit of figure below. Find the maximum power.



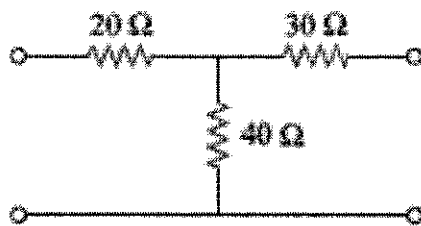
(10 marks)

5. Reduce the circuit given in Fig. 2.10 to a single equivalent resistance in series with a voltage source. (10marks)



$$Y_A = \frac{Y_1 Y_2 Y_3}{Y_1 + Y_2 + Y_3}$$

6. Determine the Z-parameter for the circuit shown below.



(10 marks)

7. Determine the Laplace Transform of each of the following functions.

- a) t^n (1marks)
- b) $\cos wt$ (2 marks)
- c) $e^{at} \cos wt$ (2 marks)

The End