



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

SCHOOL: SCHOOL OF ELECTRICAL & ELECTRONICS ENGINEERING

PROGRAMME: DIPLOMA IN ELECTRICAL ENGINEERING - STAGE 3

UNIT CODE: EED512

TITLE: ELECTRICAL POWER NETWORKS AND THEOREMS

FINAL EXAMINATION – SEMESTER 1, 2019

ROOM: AS PER TIMETABLE **TIME:** 3 HOURS & 10 MINUTES

INSTRUCTIONS TO STUDENTS

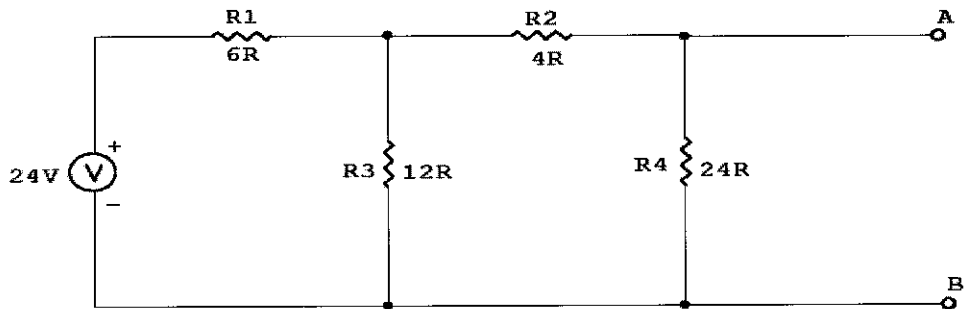
1. You are allowed 10 minutes extra reading time during which you are NOT to write.
2. Begin each SECTION on a fresh page and use both sides of the sheet.
3. Write your candidate number at the top of each attached sheet.
4. Insert all written foolscaps, graph paper, drawing paper, etc. in their correct 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.
10. ALWAYS CHECK YOUR WORK BEFORE YOU LEAVE THE EXAM ROOM.

ALL QUESTIONS ARE COMPULSORY

[100 MARKS]

QUESTION 1

Reduce the circuit shown to its Thevenin and Norton equivalent circuits using source transformation.



(15 marks)

QUESTION 2

For the circuit shown in Fig. 1, find the value of R_L for maximum power transfer. What will be the value of maximum power?

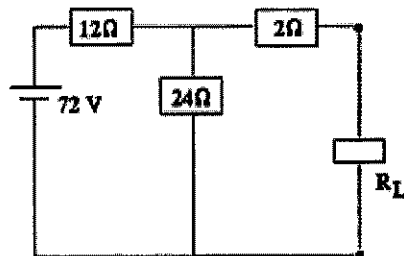
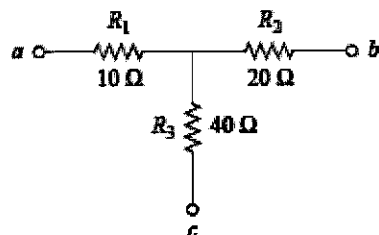


Fig.1

(5 marks)

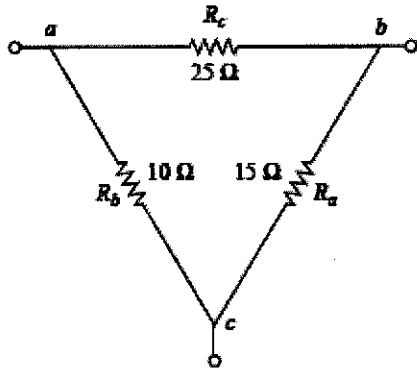
QUESTION 3

A) Transform the Y network to Delta network.



(7.5 marks)

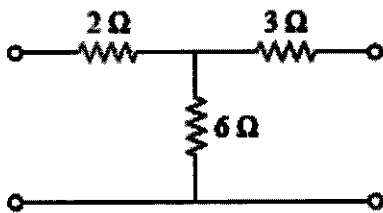
B) Transform the Delta network to Y network



(7.5 marks)

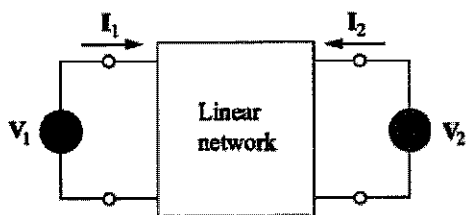
QUESTION 4

Find the hybrid parameters for the two-port network.



(10 marks)

QUESTION 5



The diagram above shows linear two port network driven by voltage source.

a) State the formula of Z_{11} , Z_{12} , Z_{21} and Z_{22} (5 marks)

b) With the aid of diagram show

Z_{11} = Open circuit input impedance

Z_{12} = Open circuit transfer impedance from port 1 to port 2

Z_{21} = Open circuit transfer impedance from port 2 to port 1

Z_{22} = Open circuit output impedance

(10 marks)

QUESTION 6

Express the following voltages in phasor domain and determine the phase sequence.

$$V_{an} = 120 \cos(\omega t + 30^\circ)$$

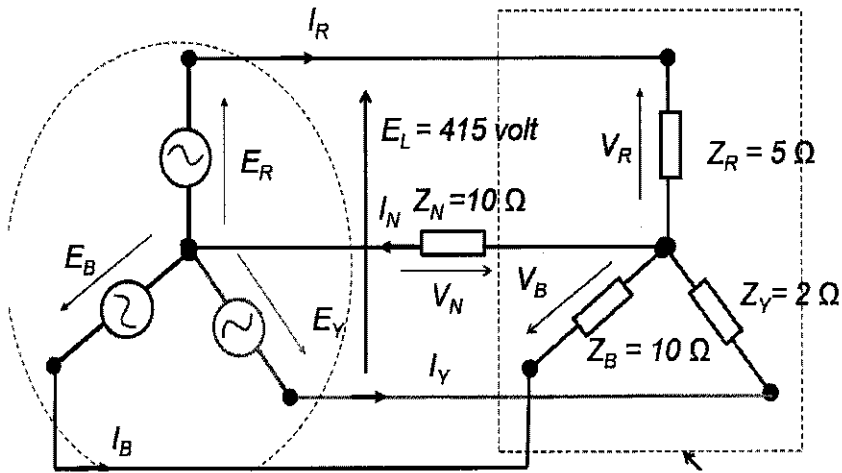
$$V_{bn} = 120 \cos(\omega t + 270^\circ)$$

$$V_{cn} = 120 \cos(\omega t - 210^\circ)$$

(5marks)

QUESTION 7

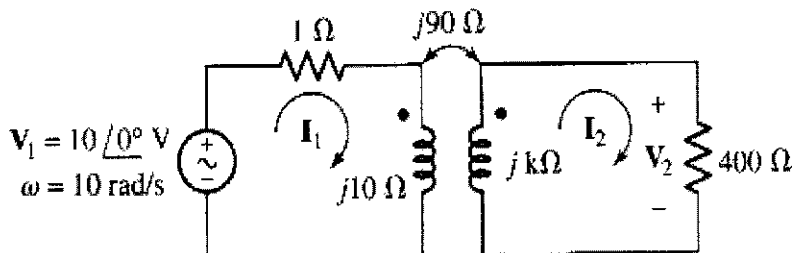
Find line currents I_R, I_Y, I_B and I_N for the circuit given below



(10 marks)

QUESTION 8

Find the ratio of the output voltage across the 400Ω resistor to the source voltage, expressed using phasor notation.



(10 marks)

QUESTION 9

Determine the Laplace Transform of each of the following functions.

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

QUESTION 10

Find the inverse Laplace transform of $F(s) = \frac{1}{s^2 + s - 2}$

(10 marks)

*****THE END*****