FIJI NATIONAL UNIVERSITY

COLLEGE OF ENGINEERING, SCIENCE & TECHNOLOGY
SCHOOL OF ELECTRICAL & ELECTRONIC

ENGINEERING

TRADE DIPLOMA IN ELECTRICAL ENGINEERING
STAGE 4

EEE535–ELECTRO- TECHNOLOGY

SEMESTER 1 - 2019.

Total marks-100%--------Duration: 3Hrs 10 Minutes

DAY/DATE: **TIME:** **ROOM: As per timetable.**

INSTRUCTIONS TO STUDENTS

1. You are allowed 10 minutes Extra reading time during which you are NOT to write.

2. Begin each answer 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 sheets in their correct sequence and secure with string.

5. For all sheets of paper on which rough/draft work has been done, cross it though and you MUST ATTACH to your answer scripts.

6. Write clearly the number(s) of the question(s) attempted on the top of each sheet.

7. Answer all Questions

8. Show all workings where necessary.

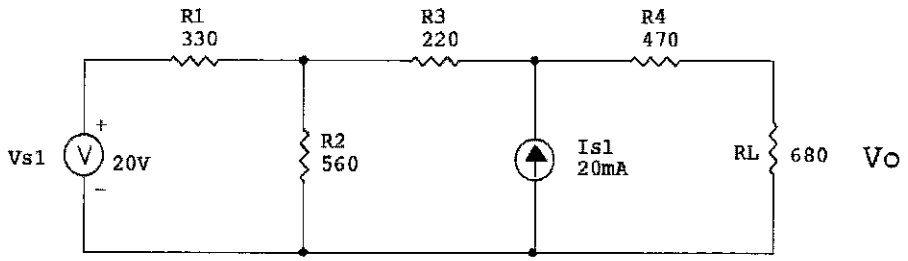
9. Do not use programmable calculators, especially the ones that does the conversions of number systems.

10. ***CHECK YOUR WORK BEFORE YOU LEAVE THE ROOM****!*

Attempt all the questions

Question 1

a) Reduce the circuit shown to its Thevenin and Norton equivalent circuits. (15 marks)



b) Find the value of *RL* for maximum power transfer in the circuit (5 marks)

c) Find the maximum power. (5 marks)

Question 2

For the circuit shown in Fig. 1, find the value of RL for maximum power transfer.

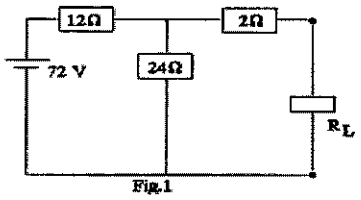


Fig.1

(5 marks)

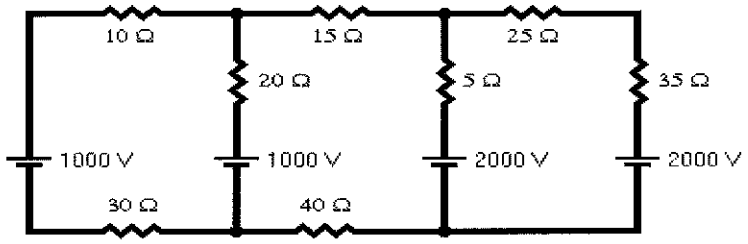
Question 3

A coil of inductance 318.3mH and negligible resistance is connected in series with a 200Ω resistor to a 240V, 50 Hz supply. Calculate the p.d. across each component.

(5 marks)

Question 4

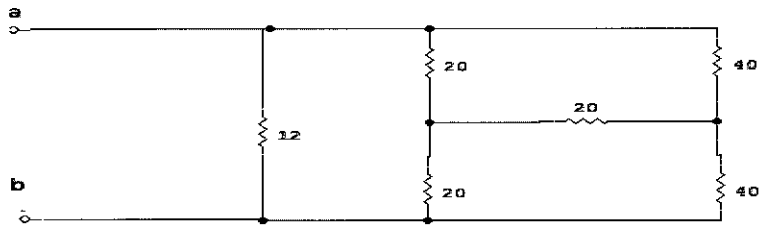
Use nodal analysis to find the voltage at each node of this circuit.



(10 marks)

Question 5

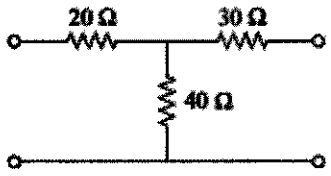
Execute $Y \rightarrow \Delta$ (R_{ab})



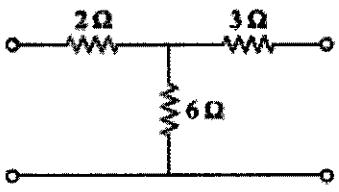
(10 marks)

Question 6

a) Given the following circuit. Determine the Z parameters (10 marks)

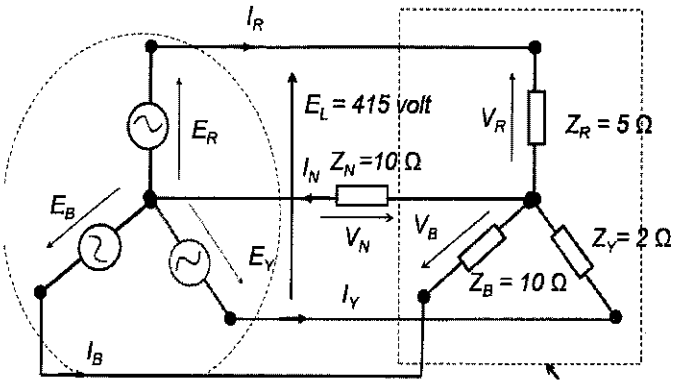


b) Obtain hybrid parameters for the network shown (10 marks)



Question 7

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



(10 marks)

Question 8

Determine the Laplace Transform of each of the following functions.

a) $t^2 - 2t$ (1marks)

b) $\cos wt$ (2 marks)

c) $e^{at} \cos wt$ (2 marks)

Question 9

a) Find the inverse Laplace transform of $F(s) = \dfrac{1}{s+2}$ (5 marks)

b) Find the Laplace transform of $\int_0^t \sin(at)\cos(at)dt$

(5marks)

----------THE END----------

TABLE

	$f(t)$	$\mathcal{L}[f(t)]=\mathcal{L}(f)$
1.	1	$1/s$
2.	t	$1/s^2$
3.	t^2	$2!/s^3$
4.	t^n	$\frac{n!}{s^{n+1}}$
5.	e^{at}	$\frac{1}{s-a}$
6.	$\cos wt$	$\frac{s}{s^2+w^2}$
7.	$\sin wt$	$\frac{w}{s^2+w^2}$
8.	$\cosh at$	$\frac{s}{s^2-a^2}$
9.	$\sinh at$	$\frac{a}{s^2-a^2}$
10.	$e^{at}\cos wt$	$\frac{s-a}{(s-a)^2+w^2}$
11.	$e^{at}\sin wt$	$\frac{w}{(s-a)^2+w^2}$
12.	$t^a (a>0)$	$\frac{\Gamma(a+1)}{s^{a+1}}$