



FIJI NATIONAL UNIVERSITY

SCHOOL OF ELECTRICAL & ELECTRONIC ENGINEERING

TRADE DIPLOMA IN ELECTRICAL ENGINEERING  
(ELECTRICAL & ELECTRONIC MAJORS)

EEE466 – CIRCUIT ANALYSIS

RESIT/SUPPLEMENT ASSESSMENT EXAMINATION – PENSTER-1,  
2016

DAY/DATE: Friday 11/03/2016 TIME : 9 – 12.10pm  
DURATION: 3HRS+10min

VENUE: SAMABULA CAMPUS ROOM: A-Block Hall

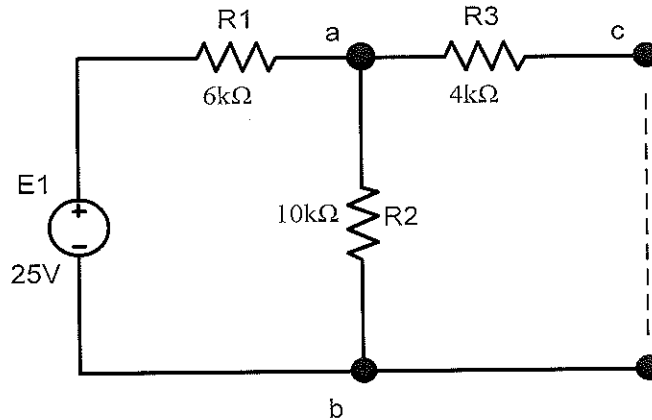
INSTRUCTION TO STUDENT

1. You are allowed 10 minutes extra reading time during which you are NOT to write.
2. **Begin** each answer (each Question) on a fresh page and use both sides of the sheet.
3. Write your candidate number at the top of each answer & attached sheet.
4. Insert all written foolscaps, graph 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 you must attach all of them to your answer scripts.
6. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
7. Tables & formula on the Appendix.
8. **SECTION A. – Attempt ALL ;**  
**SECTION B – Choose any two(2) question.**

**Section – A: - Compulsory Section - Answer all question in this section**

**Question 1**

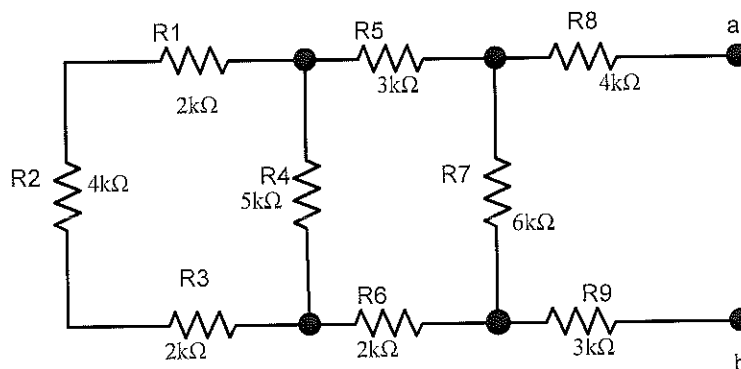
(A). For the series/parallel Resistive circuit below, find out:-



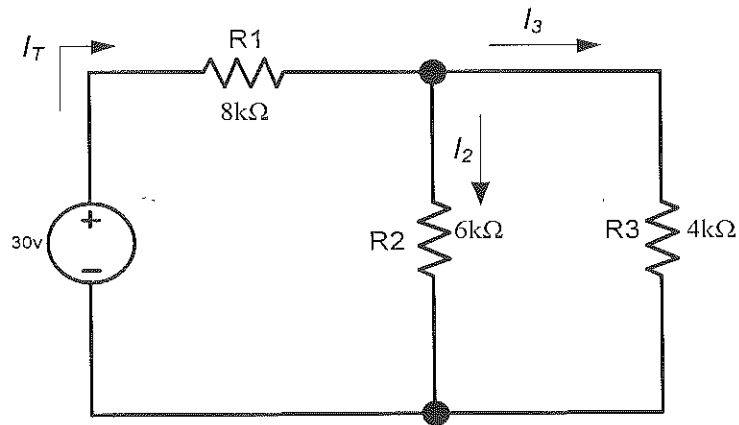
- i) The voltage across each resistor. (4marks)
- ii) The current through the circuit. (1mark)
- iii) If there is a short between points **c-b**, work out the current through  $R_2$  and  $R_3$  resistor using current divider method. (3marks)
- iv) The current through the circuit if points **a-b** is shorted. (2marks)

(B). A resistive circuit is given below. Workout the:

- i) the  $R_{eq}$  between terminal a and b . (4 marks)



- (C). Find the current flowing through each branch of the circuit in figure below....  
(6 marks)



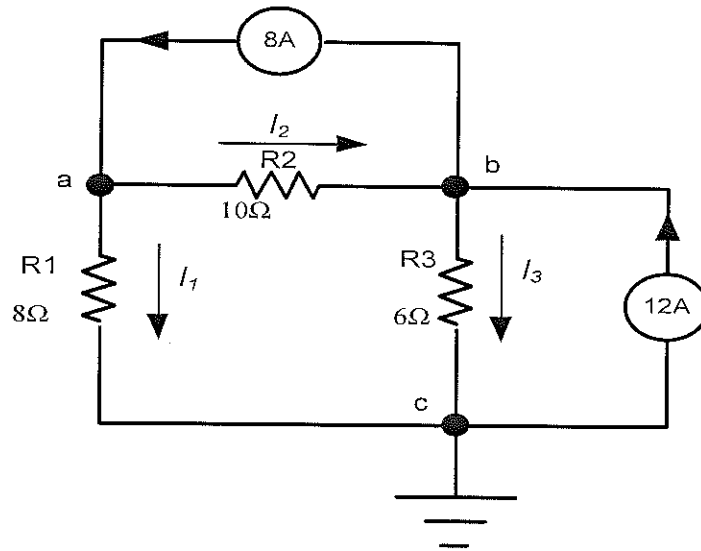
[Total 20 marks]

## Question 2

Using Nodal Analysis method:

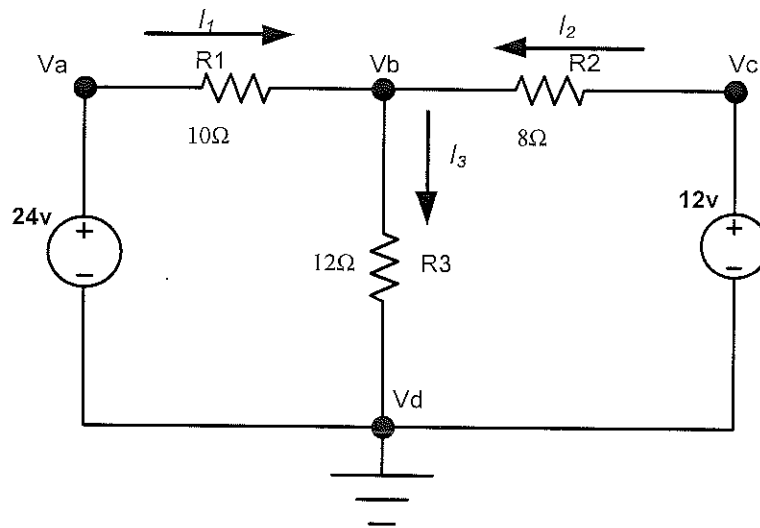
(A). Find the voltage at node "a" & node "b" in a circuit given below.

(10 marks)



(B). Find the current in a 12Ω resistor in a circuit below.

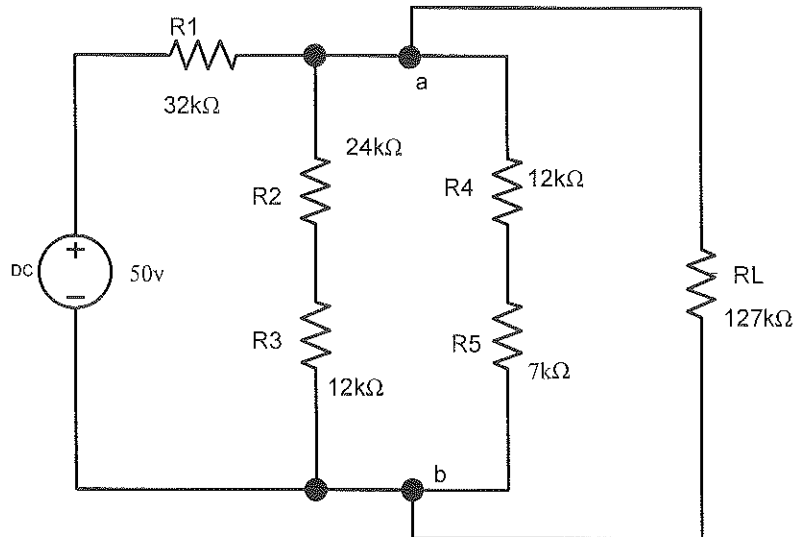
(10 marks)



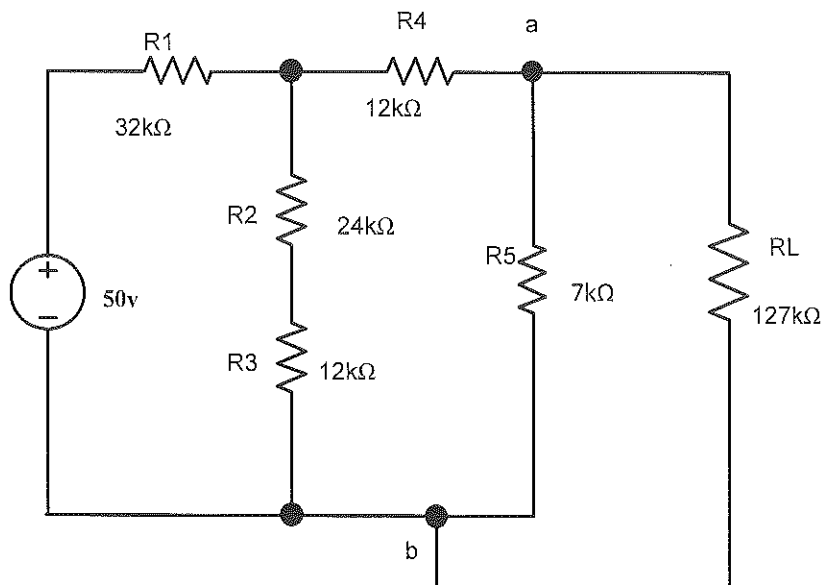
[Total: 20marks]

### Question 3

(A). From the circuit given below, determine Thévenin's equivalent circuit and calculate the current through the  $127\text{k}\Omega$  load resistor. **(10 marks)**



(B). For the circuit shown below, calculate and determine the Norton equivalent circuit. **(10 marks)**



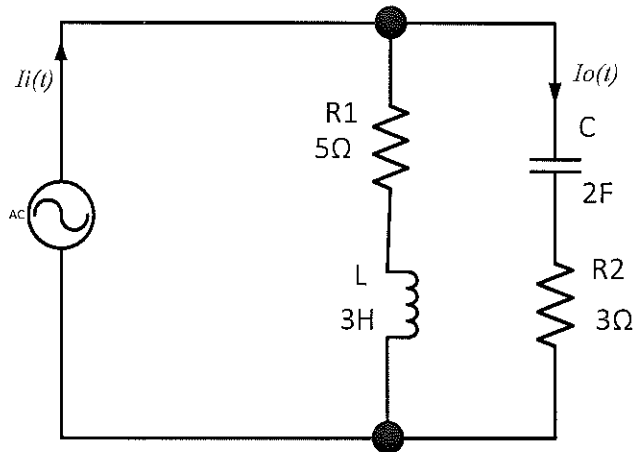
**[Total: 20 marks]**

**Section – B:** Select only TWO (2) question from.

**Question 1**

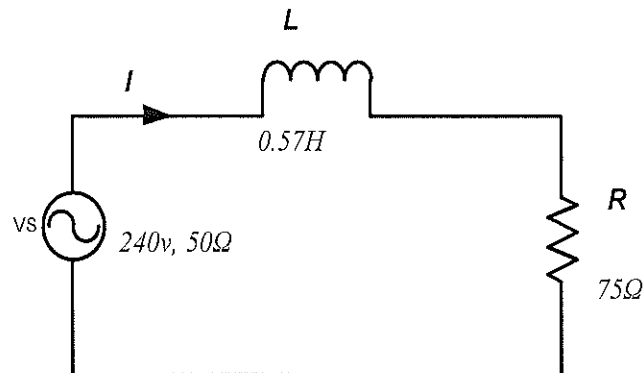
[20 marks]

(A). For the circuit below, show the full calculation of the **Gain =  $I_O(\omega) / I_I(\omega)$**  and determine the **poles** and **zeroes** of the circuit below using the RL and RC responses. (10 marks)



(B). The circuit shown below is connected to 240V, 50Hz supply. Determine the impedance of the circuit, and its phase angle?

(6 marks)



(C). The voltage across a 1- $\mu$ F Capacitor is given as  $v = 30 \sin 400t$ . What is the sinusoidal expression for the current and Sketch the voltage and current curves.

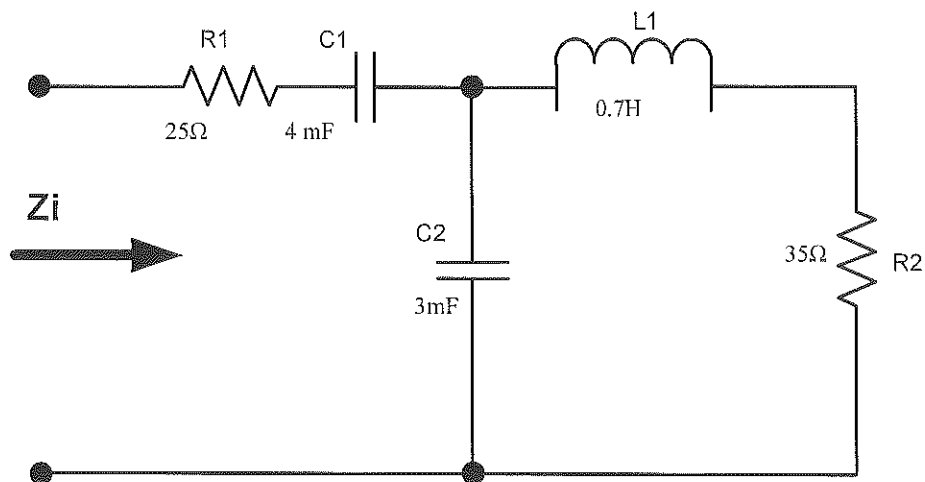
(4 marks)

[ Total: 20marks ]

## Question 2

Use complex algebra [j-notation] application to:-

- Determine the input impedance of the circuit shown below. [15 marks]
- Plot its phasor diagram [5 marks]

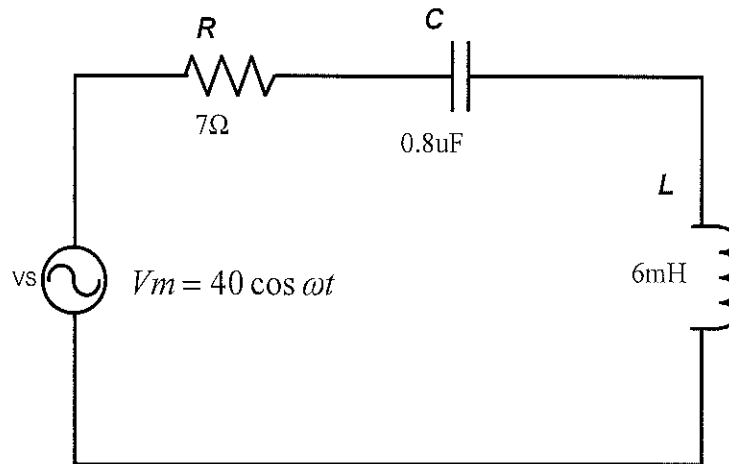


(use  $\omega = 10\text{ rad/s}$ )

[20 marks]

### Question 3

For the RLC circuit below, use  $\pi = 3.14$  ,



Show All necessary calculation by determining the following:-

- |  |           |
|--|-----------|
| a) The resonant frequency                              | (3 marks) |
| b) Half power frequencies                              | (6 marks) |
| c) Quality Factor                                      | (4 marks) |
| d) Bandwidth   | (2 marks) |
| e) Current Amplitude of $\omega_0, \omega_1, \omega_2$ | (5 marks) |

[Total:20 marks ]

----- END OF PAPER -----



## Appendix 1

### Formulas

$$1. \quad w_x = R/2L + \sqrt{(R/2L)^2 + 1/LC}$$

$$2. \quad w_y = -R/2L + \sqrt{(R/2L)^2 + 1/LC}$$

$$3. \quad f_0 = 1/2\pi\sqrt{LC}$$

$$4. \quad Q = \frac{1}{w_0 CR}$$

$$5. \quad B = w_0^2 CR$$

$$6. \quad X_L = 2\pi fL$$

$$7. \quad X_C = \frac{1}{2\pi fC}$$

$$9. \quad I_D = I_{DSS} \left(1 - \frac{V_{GS}}{V_P}\right)^2, \quad \beta_1 [(V_{DD} - 2V_T)V_{ON} - 0.5^2 V_{ON}^2]$$

$$10. \quad f_H = \pm \frac{8fo}{V_C}, \quad V_{DS} = V_{DD} - I_D R_D$$



**EQP RECEIPT CHECKLIST FORM**

Particulars		Details/Comments (To be filled by Unit Lecturer)	Tick if present on EQP (To be filled by exams staff)
<b>Cover Page</b>			
Fiji National University with Logo			
College		✓ CEST	
School		SECE	
Program		DEEL / DEEN	
Unit Code		EEE466	
Unit Name		CIRCUIT ANALYSIS	
Examination Period		9-12-16	
Duration of Examination		3hr 10m	
Instructions			
Total Number of Pages			
<b>Other Pages</b>			
Footer	Page Number	8	
	Unit Code	EEE466	
	Examination Period		
<b>Last Page</b>			
The End			
<b>Overall</b>			
Proper Print			
Examination Requirements (FNU/E-1)			
Moderator's Report (FNU/E-3)		✓	
ERRS (Class List)		✓	
Unit Coordinator/Principal Lecturer's Name		Mr. JULIAN ULLIBUROTA	

DISPATCHED BY (SCHOOL REP)

NAME: \_\_\_\_\_

SIGN: \_\_\_\_\_

DATE: \_\_\_\_\_

RECEIVED BY (EXAMS REP)

NAME: \_\_\_\_\_

SIGN: \_\_\_\_\_

DATE: \_\_\_\_\_

