



**COLLEGE OF ENGINEERING, SCIENCE AND TECHNOLOGY
SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING
ADVANCED DIPLOMA IN ENGINEERING
(ELECTRICAL & ELECTRONICS)
EEE 606 CIRCUIT AND SIGNALS**

FINAL EXAMINATION (SEMESTER 1, 2016)

DATE/TIME/ROOM – Refer to Timetable

INSTRUCTIONS TO CANDIDATES

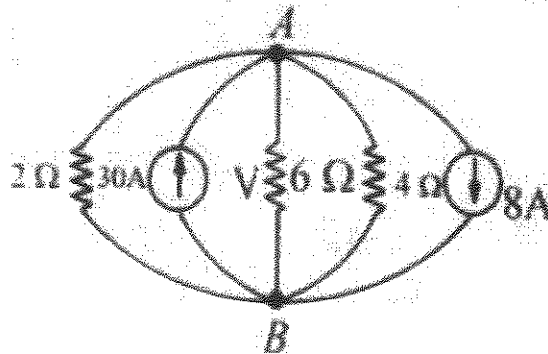
1. You are allowed 10 minutes extra reading time during which you are NOT to write.
2. Begin each answer on a fresh new page and use both sides of the sheets.
3. Write your candidate number on the top of each attached sheet.
4. Attempt all questions.
5. For all sheets of paper in which rough work has 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. Good handwriting and way of representation of answers has weight with respect to marks.
8. **Draw diagrams if any with pencil only and label it and show all working where necessary.**
9. Always check your work before you leave the exam room.
10. **The paper is of 100 marks and contains 5 pages.**

1. With respect to Kirchhoff's Laws:

[10 marks]

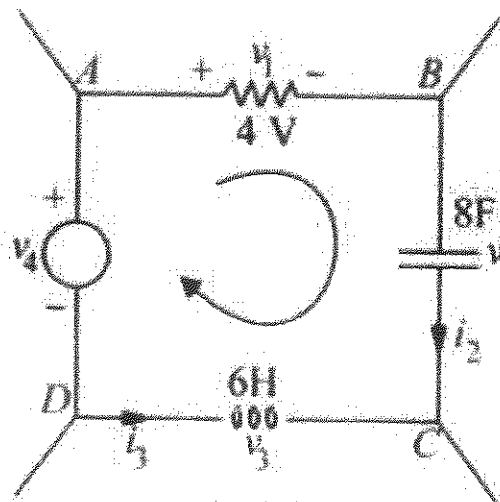
(a) Explain KCL and KVL

(b) Find the magnitude and the polarity of voltage v in the below figure. Directions of the two current sources are as shown.



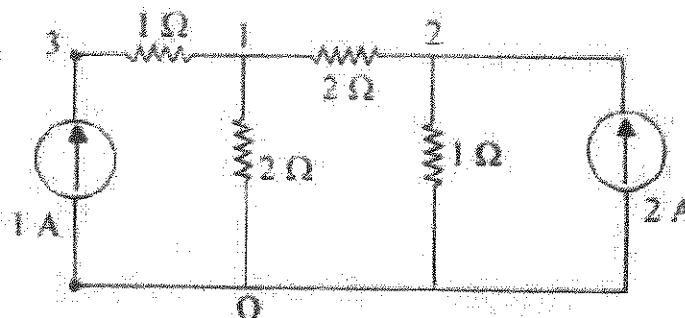
2. In the network shown below, $v_1 = 4V$, $v_4 = 4 \cos 2t$, and $i_3 = 2 e^{-t/3}$. Determine i_2 .

[5 marks]

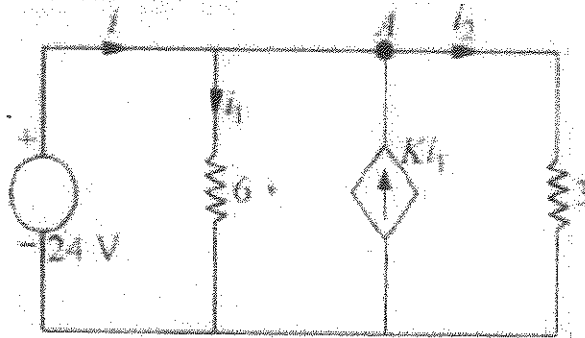


3. State and explain Node analysis. Determine the voltages 1 and 2 of the network given below by nodal analysis.

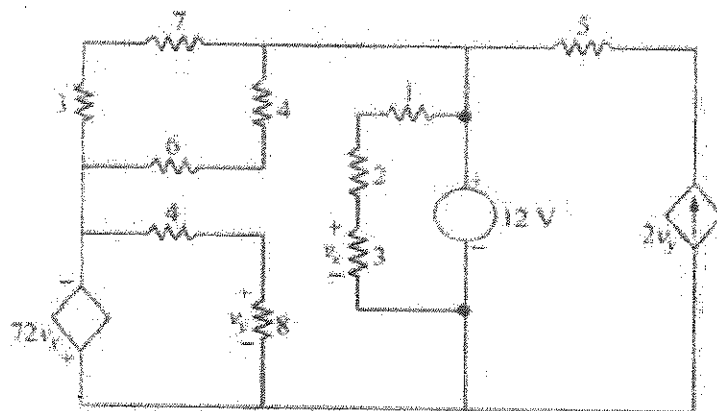
[10 marks]



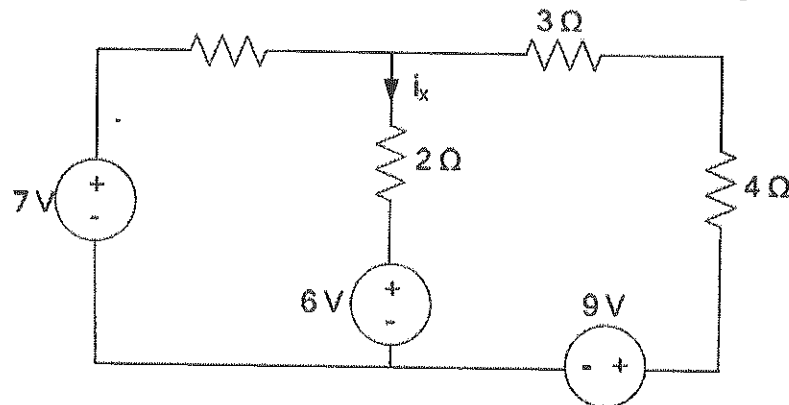
4. In the circuit shown below, apply KCL to find the value of current i when (a) $k = 2$, (b) $k = 3$ & (c) $k = 4$. Both resistances are in ohms. [10 marks]



5. By using voltage divider rule, calculate the voltage v_x and v_y in the network shown in the below figure. [5 marks]



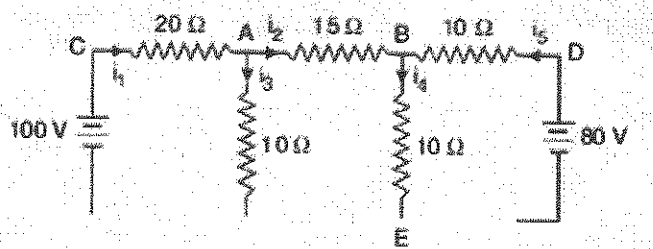
6. For following circuit find the mesh currents and use the mesh currents to find i_x . [5 marks]



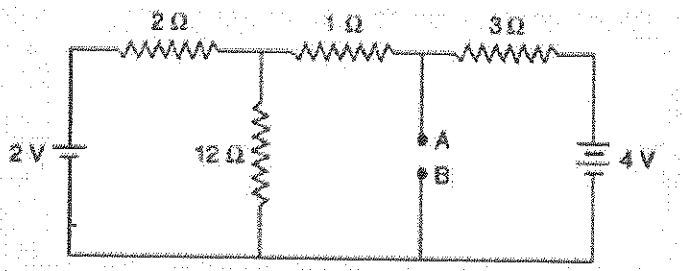
7. Write explanatory notes on the following: [10 marks]
- High Pass RL filter
 - RC Band stop filter
 - Low Pass RC filter
 - RC Band stop filter
 - Low Pass RL filter

8. What do you mean by multiplexing technique? Briefly explain TDM, FDM & OFDM. [5 marks]

9. Determine the currents in all the branches of the network shown below. [5 marks]

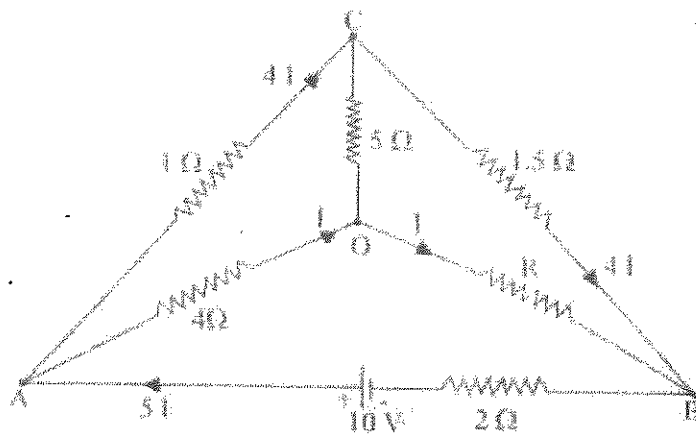


10. Determine the current through 2 ohm resistor connected between A and B in the circuit shown using Thevenin Theorem. [5 marks]

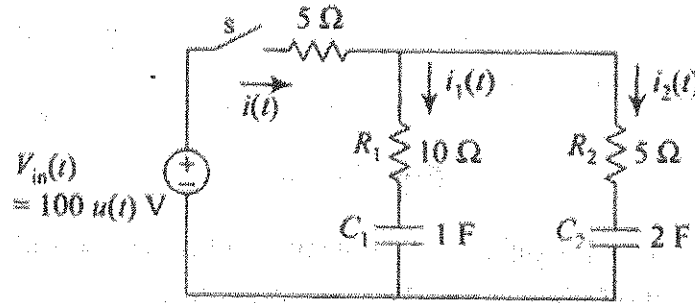


11. Explain QAM with graphical representation. [5 marks]

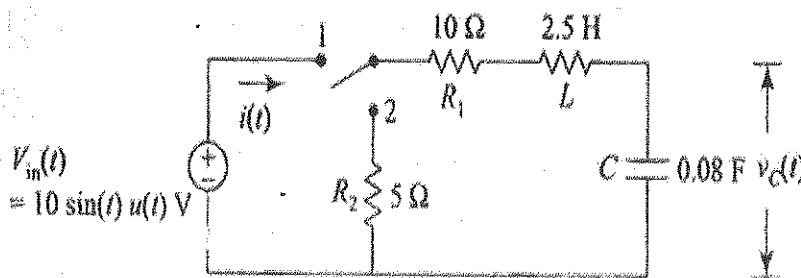
12. In the circuit shown below, calculate the value of unknown resistor R and the current flowing through it when the current in branch OC is zero. [5 marks]



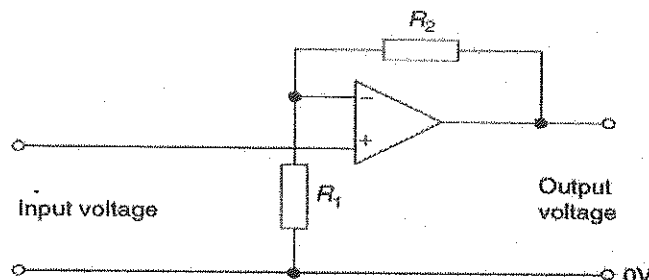
13. The parallel RC circuit shown in below figure is energized by a step voltage $v_{in}(t) = 100 u(t)$ V. If the capacitors carry no charge initially, compute [5 marks]
- Current supplied by the source
 - Current in each branch when switch S is closed at $t = 0$ s.



14. A sinusoidal voltage function denoted by $v_{in}(t) = 10 \sin(t)$ V is connected to the RLC series circuit shown in the figure. At $t = 0$ s the switch S is moved to position 1. After $t = 2.0$ s, S is moved to position 2. Compute [10 marks]
- Capacitor current
 - Capacitor voltage in the time frame of reference.
- Assume initial conditions to be zero at $t = 0$ s.



15. For the op amp shown in below figure, $R_1 = 4.7 \text{ k}\Omega$ and $R_2 = 10 \text{ k}\Omega$. If the input voltage is -0.4 V, determine [5 marks]
- The voltage gain
 - The output voltage



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

EQP RECEIPT CHECKLIST FORM

Particulars	Details/Comments (To be filled by Unit Lecturer)	Tick if present on EQP (To be filled by exams staff)
Cover Page		
Fiji National University with Logo	✓	
College	✓	
School	✓	
Program	✓	
Unit Code	✓	
Unit Name	✓	
Examination Period	✓	
Duration of Examination	✓	
Instructions	✓	
Total Number of Pages	✓	
Other Pages		
Footer		
Page Number	✓	
Unit Code	✓	
Examination Period	✓	
Last Page		
The End	✓	
Overall		
Proper Print	✓	
Examination Requirements (FNU/E-1)	✓	
Moderator's Report (FNU/E-3)	✓	
ERRS (Class List)	✓	
Unit Coordinator/Principal Lecturer's Name	Shashank Upadhyay	

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