FNU FIJI NATIONAL UNIVERSITY

COLLEGE OF ENGINEERING, SCIENCE AND TECHNOLOGY

SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING

ADVANCED DIPLOMA IN ENGINEERING

(ELECTRICAL & ELECTRONICS)

EEE 606 CIRCUIT AND SIGALS

FINAL EXAMINATION (SEMESTER 1, 2017)

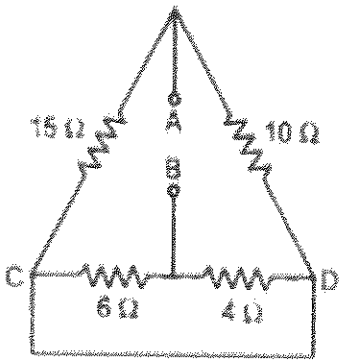
DATE/TIME/ROOM – Refer to Timetable

INSTRUCTIONS TO CANDIDATES

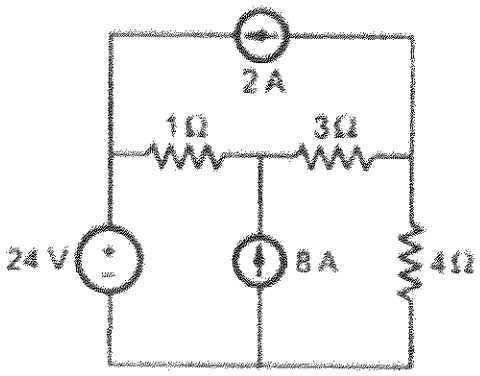
1. You are allowed 10 minutes extra reading time during which you are NOT to write.
2. Begin each answer on a fresh new page and use both sides of the sheets.
3. Write your candidate number on the top of each attached sheet.
4. Attempt all questions. The paper is divided into two sections i.e. **Sec –A & Sec -B**
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 6 pages.**

Section A (Attempt all the questions in this section)

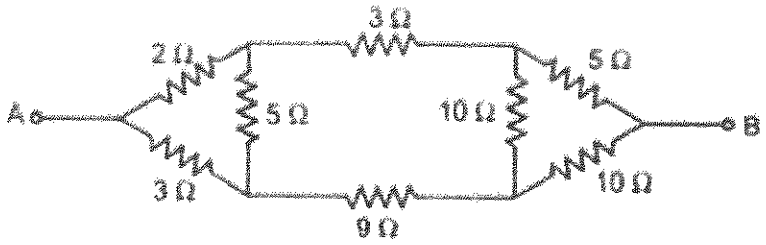
1. Find equivalent resistance between points A –B. [5 marks]



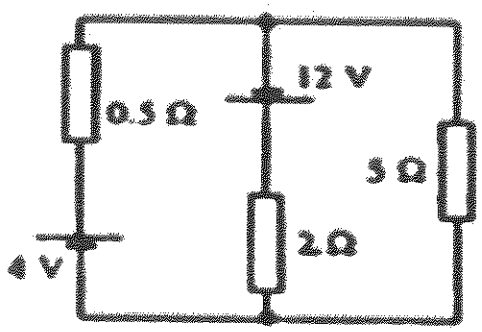
2. In the circuit shown in the Figure below, use the loop analysis (Mesh) to find the power delivered to the 4 Ω resistor. [5 marks]



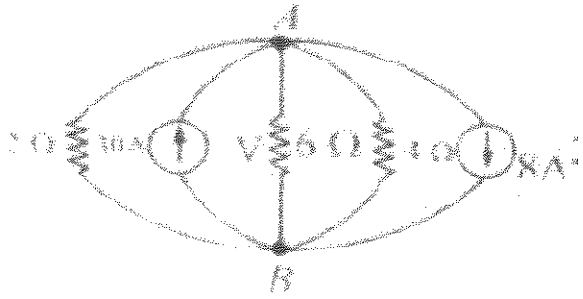
3. Find the voltage to be applied across AB in order to drive a current of 5 A into the circuit using star delta transformations. [5 marks]



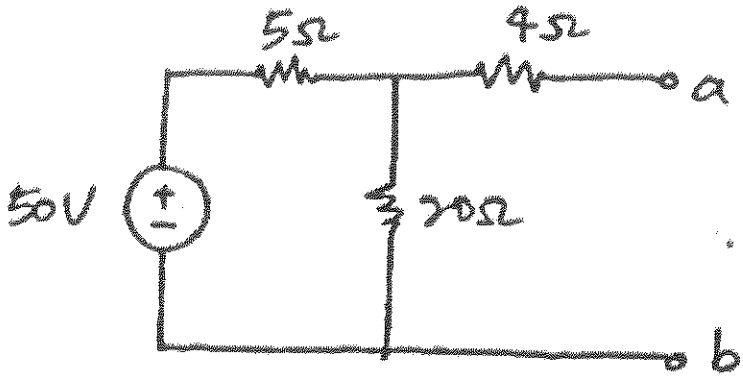
4. Determine the current in the 5 Ω resistance of the network shown in the Figure below using Norton's theorem. Hence find the currents flowing in the other two branches. [5 marks]



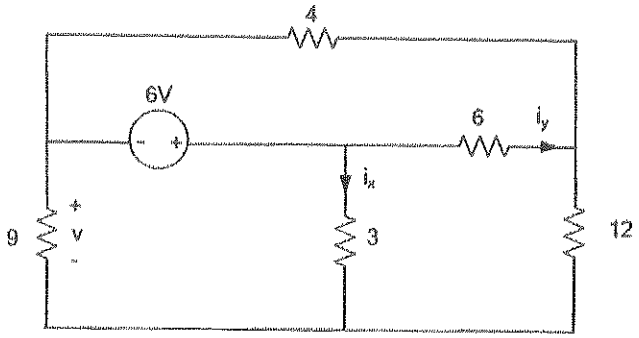
5. Using KCL and ohm's law, find the magnitude and polarity of voltage V in the below figure. Directions of the two current sources are as shown. [5 marks]



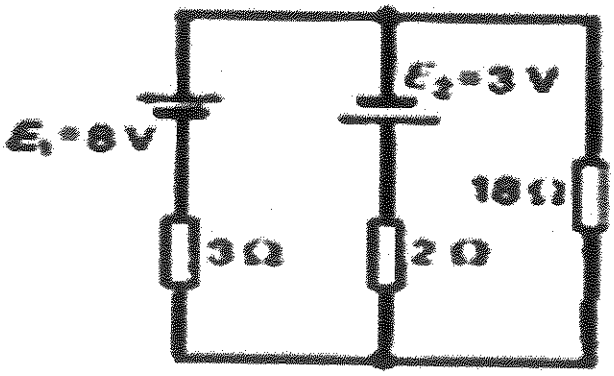
6. a) Explain Thevenin's Theorem. [5 marks]
   b) In the circuit given below calculate R_{th} & V_{th}. [5 marks]



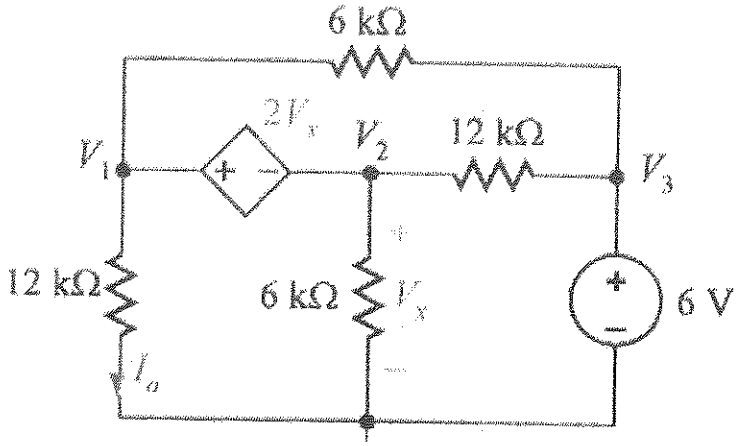
7. Write the mesh (loop) equations for the following circuit and then find i_x, i_y & v.
[4 marks]



8. For the circuit shown in figure below find using the Superposition theorem
   a) The current flowing in and the voltage drop across the 18 Ω resistor.
   b) The current in the 8 v battery.
   c) The current in the 3 v battery.
[6 marks]

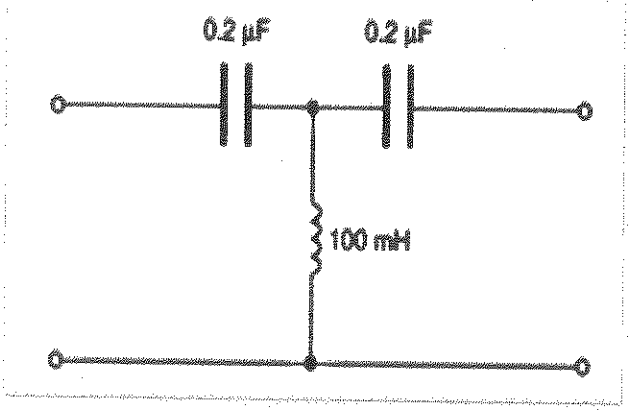


9. Use node analysis method to find the current I_0 shown in the figure below.
[5 marks]



Section B (Attempt any 5 questions ; Each carry 10 marks)

1. Determine the cut-off frequency and the nominal impedance for the high-pass T-connected section shown in the below figure.

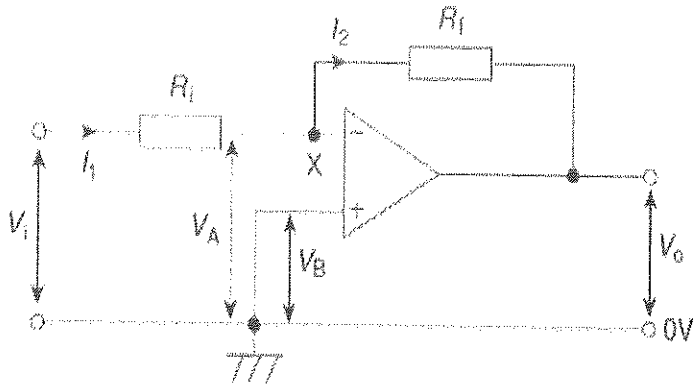


2. A filter section is required to pass all frequencies above 25 KHz and to have a nominal impedance of 600 Ω. Design the below filters to meet the above requirements.
   (a) A high-pass T- section filter

   (b) A high-pass π- section filter

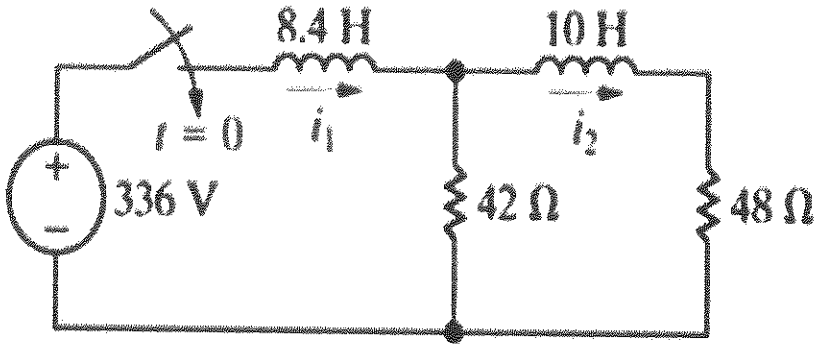
3. In the inverting amplifier of the figure given below, $R_i = 1$ KΩ and $R_f = 2$ KΩ. Determine the output voltage when the input voltage is:
   (a) +0.4 V

   (b) – 1.2 V

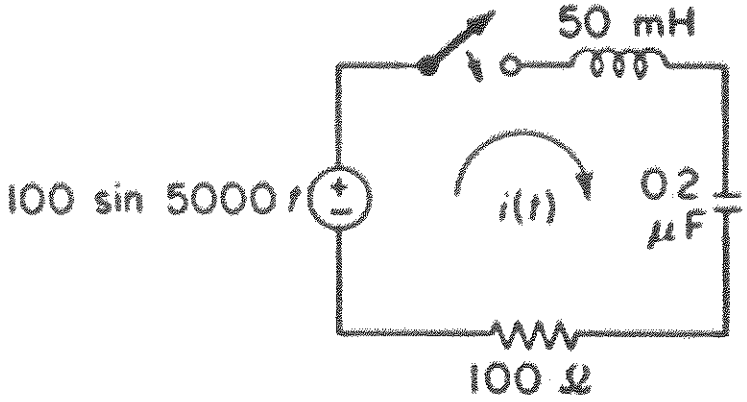


4. Design an inverting amplifier to have a voltage gain of 40 dB, a close-loop bandwidth of 5 KHz and an input resistance of 10 KΩ.

5. For the RL circuit shown below, there is no initial energy stored. By using Laplace technique, find i_1 (t) and i_2 (t) for t > 0.



6. The relaxed series RLC circuit of below figure is excited at t= 0 by the sinusoidal source shown. Solve for the current i (t) for t > 0.
Note: Use Laplace transform for doing the same.



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