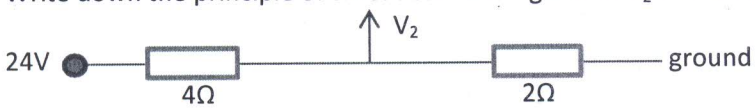
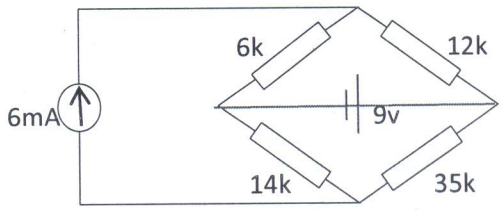
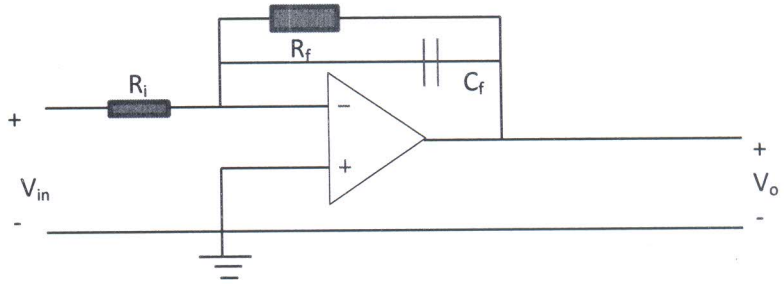
A4. a) Write down the principle of wheat-stone bridge. Find V_2 of the following network $3\frac{2}{3}$



b) Using the principle of Superposition, find the current I_2 through 12K resistor 4



c) Design a low-pass active filter as shown below with a dc gain of 4 and a corner frequency of 500Hz. Given C_f=0.2μF. 4



Section B

B1. a) What is CRO? Explain the working principle of an oscilloscope with proper diagram. 3

b) What do you mean by avo-meter? What are quantities those can be measured using avo-meter and how? $5\frac{2}{3}$

c) What do you mean by constant-k filter? 3

B2. a) What do you mean by Lissajous Patterns? Why it is used? $3\frac{2}{3}$

b) During electrostatic deflection in an oscilloscope, the displacement in y-direction is $y = \frac{1}{2}\frac{e\epsilon_y}{m.V_{OX}^2}.x^2$ 5

using the information prove that the deflection $D = \frac{L\, eE_d l_d}{m.dV_{OX}^2}$

c)  Find the frequency of the vertical plates if the frequency applied to horizontal Plate is 50Hz for the patterns shown in first and second figure. 3

B3. a) What is m-derived section? Show that for a m-derived section $\omega_\infty = \frac{\omega_c}{\sqrt{1-m^2}}$ 4

b) Determine the transfer function and cut-off frequencies for an active band-pass filter. $3\frac{2}{3}$

c) Design a notch filter considering the value of $\omega_0 = 20Krad/s$, K=5 and Q=10. Assume R=$R_i = 10K\Omega$ 4

B4. a) Write short note(any two) i)P^H meter ii) thermostats iii) Spectrophotometer 4

b) Show that, for symmetrical two part network, terminal impedance is $\sqrt{\frac{B}{C}}$ (where B,C = two port parameter) 5

c) What is the difference band pass and band-reject filter? $2\frac{2}{3}$

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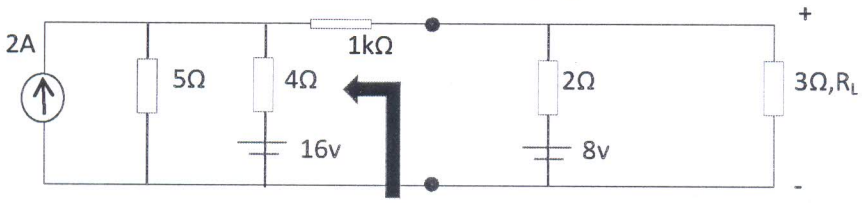
MARKS: 70 EEE104: Electrical Circuit Analysis TIME: 3 Hr

Answer any three from each section on separate script marked A and B.

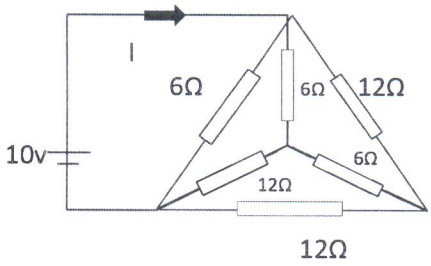
Section-A

A1. a) Define node, junction, loop and mesh from circuit diagram and also identify it. 3

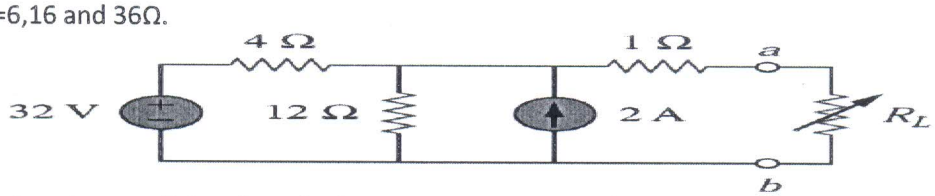
b) Draw the norton's network from the following fig $4\frac{2}{3}$



c) Find the resistance R_T and I from the circuit 4



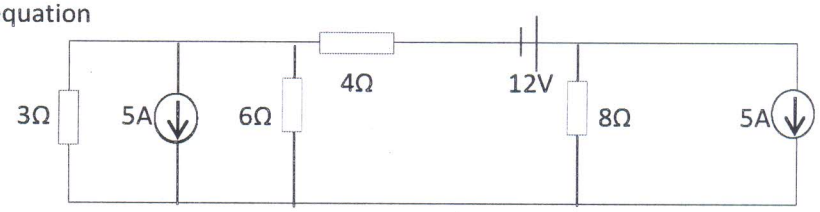
A2. a) Find the Thevenin equivalent circuit to the left of the terminal a-b. then find the current through R_L=6,16 and 36Ω. 6



b) Derive the condition for which maximum power will be transferred to the receiving terminal. $3\frac{2}{3}$
At this condition Prove that efficiency of this system is 50%.

c) State and Explain Nortons Theorem. 2

A3. a) Solve the fig by using nodal equation $4\frac{2}{3}$



b) For the network shown in Fig Q1(b), find the branch currents I_1 and I_2 also find current through R_2. 4

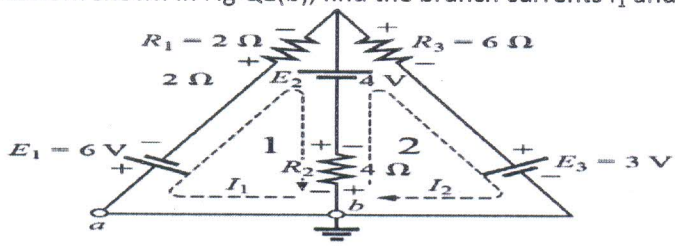


Fig.Q.1(b)

c) Prove that the following circuit satisfying the reciprocity theorem. 3