(iii) Determine the power dissipated at ω0, ω1 and ω2, if applied source voltage is Vs=10sinωt.

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1040 **C**

Unique Paper Code : 22512011102

Name of the Paper : Circuit Theory and Network Analysis

Name of the Course : **B.Sc. (H) Electronics (Core)**

Semester : I

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are **seven** questions in all, out of which you have to attempt **five** questions.
3. **First** Question is Compulsory.
4. **All** questions carry equal marks.
5. Use of Non-programable Scientific calculator is permitted.

1. (a) State superposition theorem. (3)

(b) (i) convert into polar form: $7 + 5j$

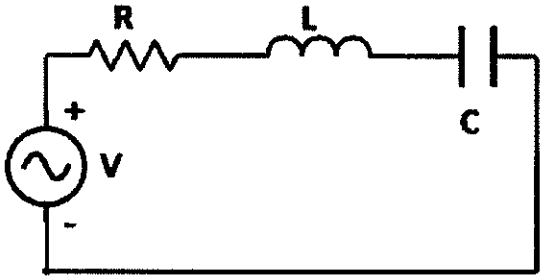
(ii) convert into cartesian form: $8\angle 60°$ (3)

(c) Find the total impedance in polar form of a 0.5 H inductor and a series 20 Ohms resistor at 10 Hz frequency. (3)

(d) Determine the cut off frequency of the low pass filter described by (3)

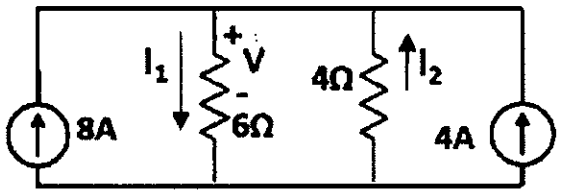
$$H(\omega) = \frac{4}{2 + j\omega 10}$$

(e) Draw dual of the given circuit (3)



(f) Draw the symbols of VCVS, CCVS (dependent sources). (3)

(b) Calculate I_1, I_2 and V in the given circuit (4)



(c) Show that a series RC circuit is a high pass filter if the output is taken across the resistor. Calculate the cut off frequency fc if C=1μF and R=1KΩ. (8)

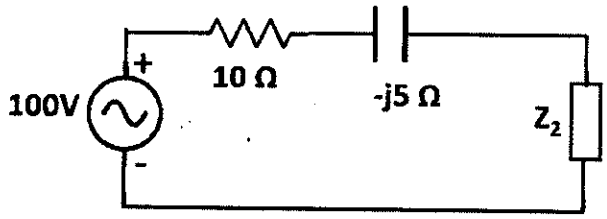
7. (a) Define Resonance in Parallel RLC circuit. Obtain expressions for resonance frequency ω0, the two half power frequencies ω1 and ω2, bandwidth B and the quality factor Q, for a parallel RLC circuit. (10)

(b) In a parallel RLC circuit, R=8KΩ, L=0.2mH and C = 8 μF, (8)

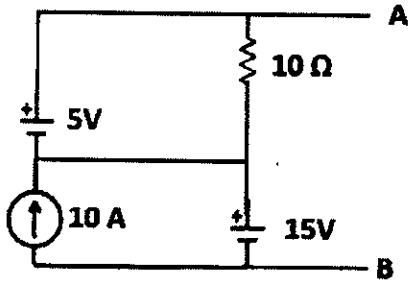
(i) Calculate the ω0, Q and B,

(ii) Find ω1 and ω2,

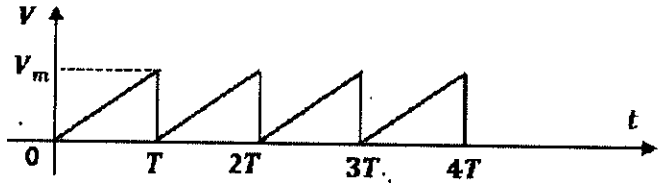
(b) Calculate impedande Z_2 in polar form for the given circuit if the total current is $2.5\angle -45°$. (5)



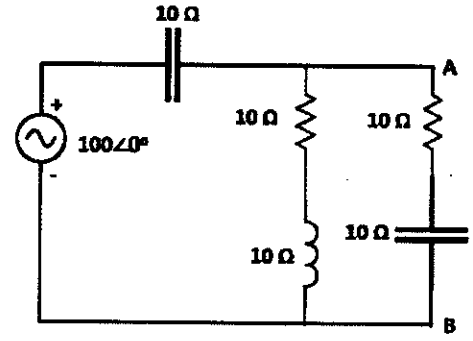
(c) Determine the voltage across AB terminal in the given circuit using superposition theorem. (6)



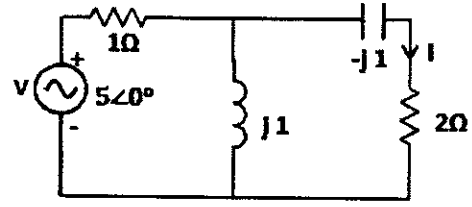
6. (a) Find the RMS value, average value and form factor of the saw tooth waveform (6)



2. (a) Use Norton's Theorem to find the current through AB terminal. Also draw its Norton's equivalent circuit (8)

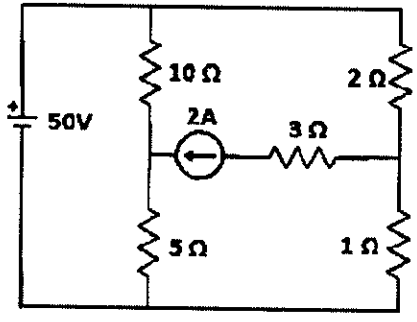


(b) Verify Reciprocity theorem for V and I in the given circuit (10)

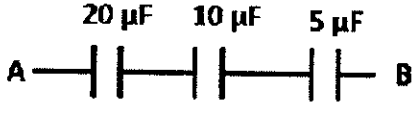


3. (a) State and prove Maximum power transfer theorem for AC source. (6)

(b) Determine the current in the 5 Ω resistor in the network (10)

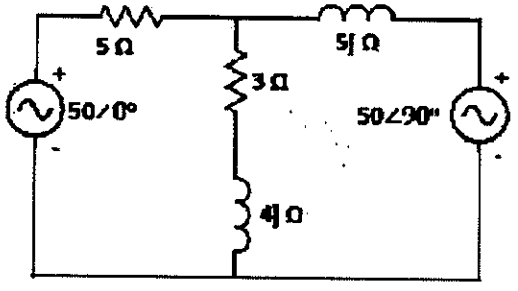


(c) Calculate equivalent capacitance between A and B terminal (2)

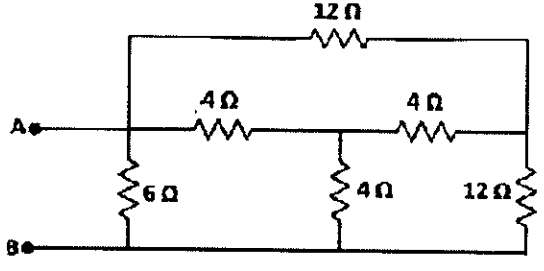


4. (a) Derive the formulae for conversion of star to Delta network. (6)

(b) Calculate node voltage and node current in the given circuit (8)



(c) Calculate equivalent resistance between terminal A and B (4)



5. (a) An impedance (3 + j5) Ohm is connected across a 10 V, 50 Hz source. Find :–

(i) power factor

(ii) real power, reactive power and apparent power

(iii) current drawn by the impedance. (7)