

Total Pages : 6

III/SEM/E&TC/2015(W)

**CIRCUIT THEORY**

Sub Code - EET-321

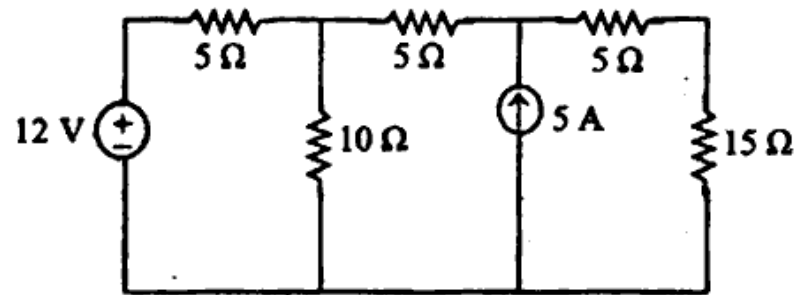
Full Marks : 70

Time : 3 hours

Answer any five questions

The figures in the right-hand margin indicate marks

1. (a) State maximum power transfer theorem.
- (b) State and explain Reciprocity theorem.
- (c) Determine the current flowing through the 10 Ω resistor using nodal analysis method.

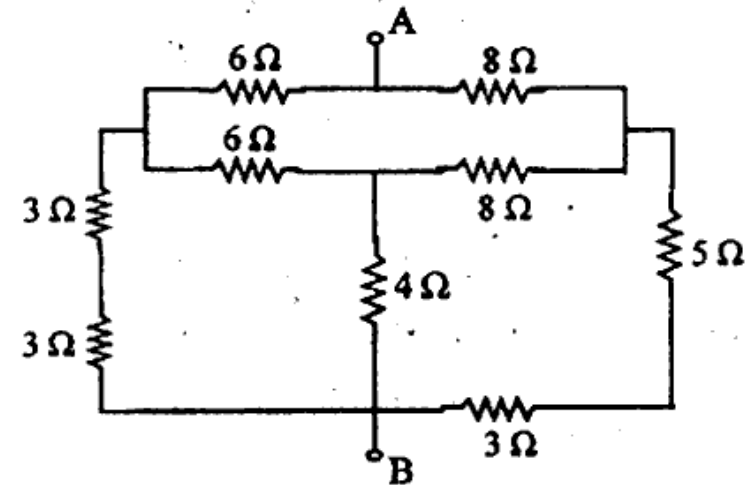


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( 2 )

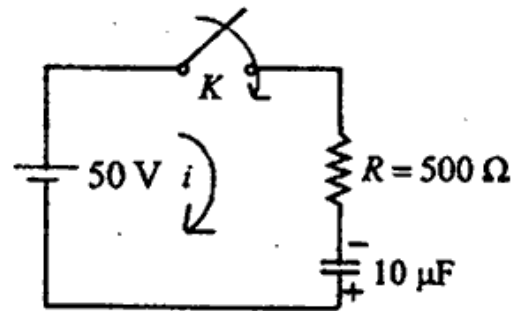
2. (a) Define KCL and KVL.
- (b) Determine the value of resistance across terminal A and B.



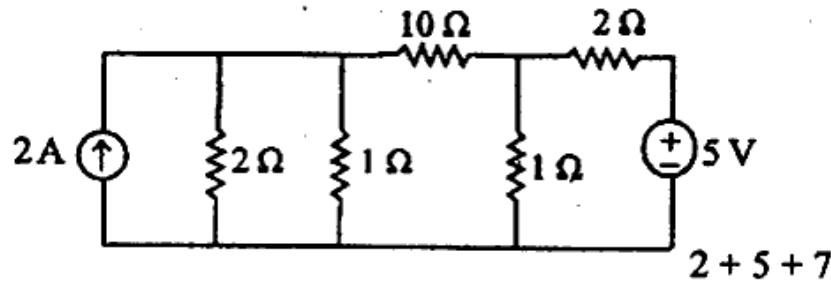
- (c) State and explain superposition theorem. 2 + 5 + 7

3. (a) What is the time constant for a series RC circuit ?
- (b) The 10 μF capacitor in the RC circuit has initial charge of 100 μC with polarities as shown in the figure. At t = 0, the switch being closed, a d.c. voltage of 50 V is applied. Find the expression for current.

( 3 )



- (c) Find the power loss in the  $10 \Omega$  resistor using Thevenin's theorem. <http://www.sctevtonline.com>

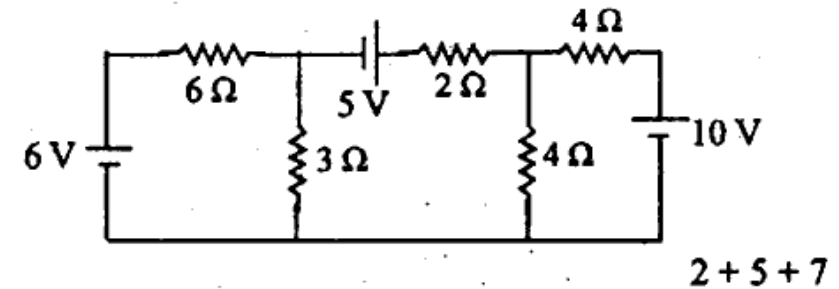


4. (a) Define Resonance.

- (b) Derive the expression for resonant frequency for a parallel RL-C circuit. (Capacitor is in parallel with series RL circuit).

- (c) Using Mesh analysis method find the current through the  $3 \Omega$  resistor.

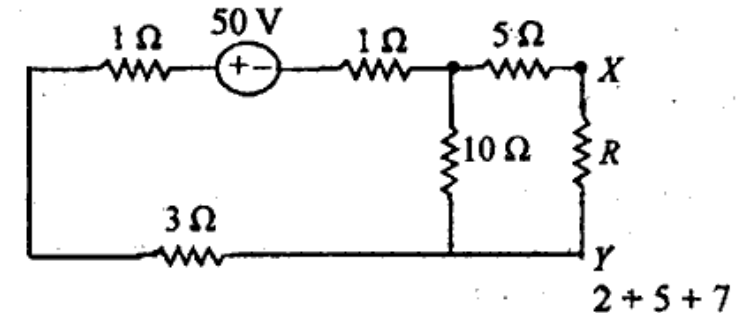
( 4 )



5. (a) Define amplitude, frequency and R.M.S. value.

- (b) If  $z_1 = 3 + 4j$ ,  $z_2 = 6 + 8j$  then find  $z_1 + z_2$ ,  $z_1 - z_2$ ,  $z_1 * z_2$ ,  $z_1/z_2$ ,  $z_2/z_1$  and  $z_2 - z_1$ .

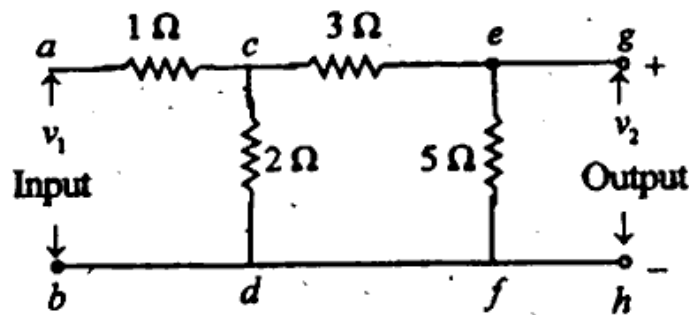
- (c) What should be the value of  $R$  such that maximum power transfer can take place from the rest of the network to  $R$ . Determine the amount of power.



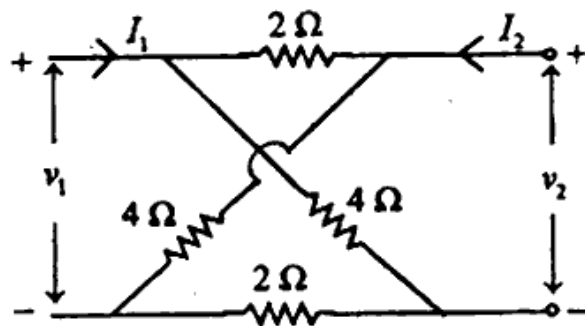
6. (a) What do you mean by two port network ?

- (b) Find the z-parameter for the circuit below :

( 5 )



(c) Find the h-parameter for the given circuit.



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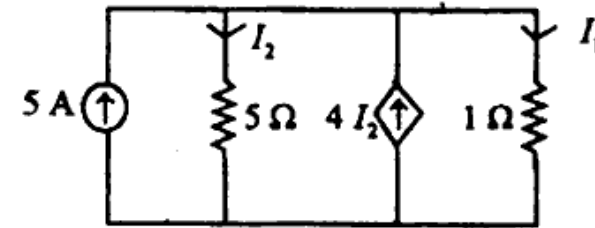
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7. (a) Define filter.

(b) The current in the resistive branch of a parallel RC circuit is given by  $I_R = 10 \cos (1000t + 10^\circ) \text{ A}$ .  
 What is the current in the capacitor ?  
 Assume  $R = 10 \Omega$ ,  $C = 10 \mu\text{F}$ .

( 6 )

(c) Find  $I_1$  and  $I_2$  for the given figure.



2 + 5 + 7

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