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[4957]-1043

**S.E. (E & TC/Electronics) (First Semester) EXAMINATION, 2016**

**NETWORK THEORY**

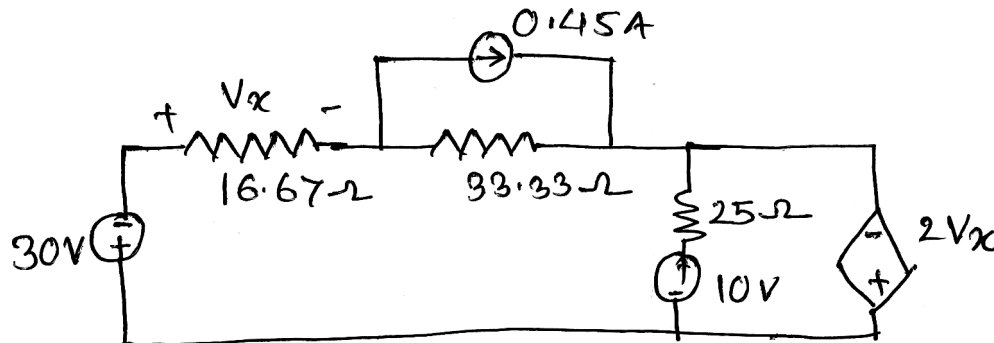
**(2012 PATTERN)**

**Time : Two Hours**

**Maximum Marks : 50**

- N.B. :—**
- (i) Neat diagrams must be drawn wherever necessary.
  - (ii) Figures to the right indicate full marks.
  - (iii) Use calculator is allowed.
  - (iv) Assume suitable data, if necessary.

1. (a) By using mesh analysis find  $V_x$ , in the circuit shown below : [6]

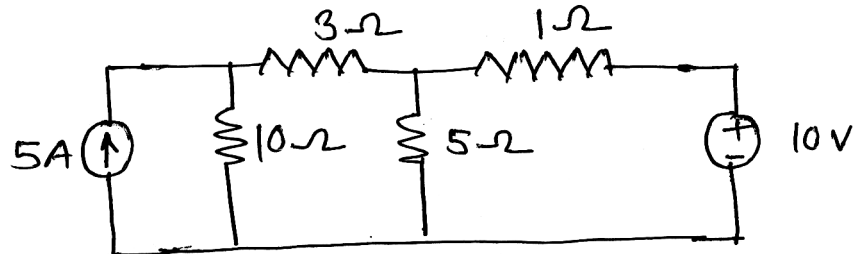


- (b) Explain the following terms with examples : [6]
- (i) Tree
  - (ii) Oriented Graph
  - (iii) Incident matrix.

P.T.O.

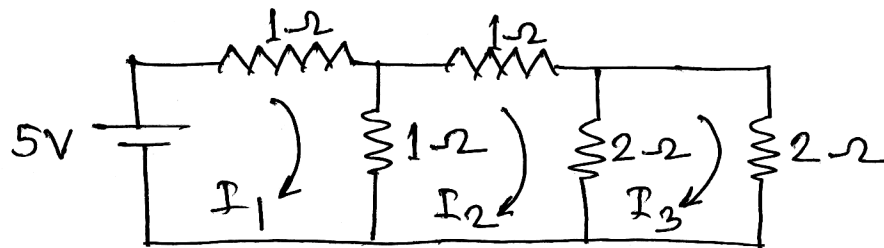
Or

2. (a) Write the node voltage equation and determine the current in each branch for the network. [6]

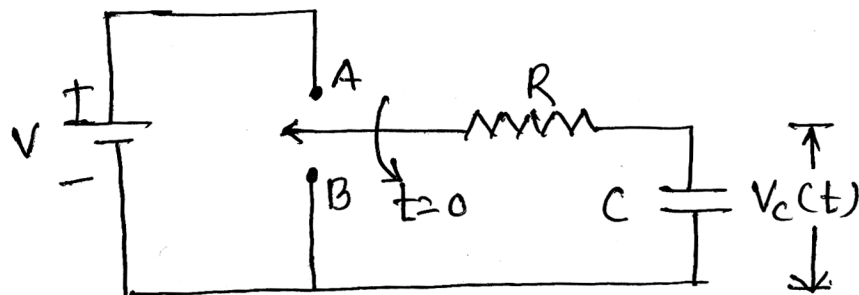


- (b) For the circuit shown below write : [6]

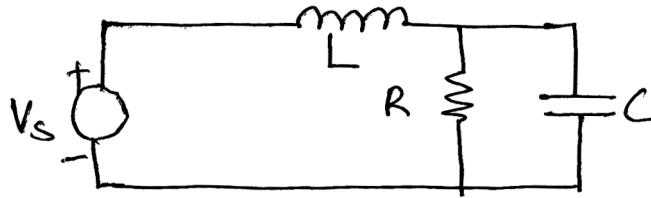
- (i) Tieset  
(ii) Branch voltage equation.



3. (a) Derive the expression for voltage across the capacitor of the circuit shown below. [6]

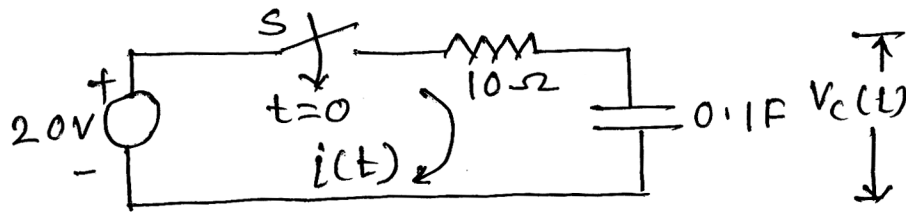


- (b) What is meant by quality factor and explain the significance of it. Obtain the expression of resonant frequency of the circuit shown below. [6]

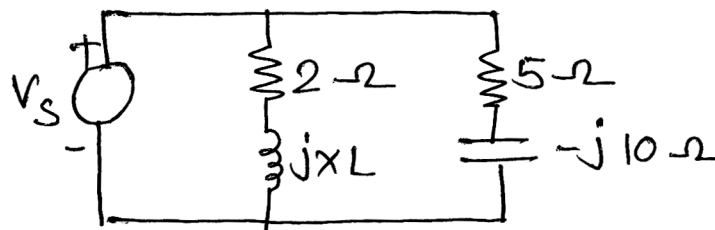


Or

4. (a) A series RC circuit consisting R and C, initially switch is open, at  $t = 0$  it is closed. Find the expression for  $V_C(t)$  and  $i_C(t)$ . [6]



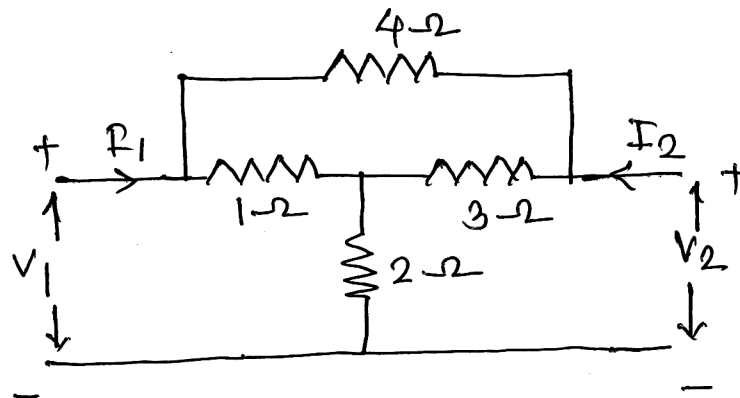
- (b) Obtain the value of 'L' for which the circuit is resonant at 5000 rad/sec. [6]



5. (a) Design a T and  $\pi$  section of a high pass filter having a characteristics impedance of  $600\ \Omega$  and cut off frequency of 10 KHz. Also find characteristics impedance and phase constant at 25 KHz. [7]
- (b) Design symmetrical attenuator with attenuation of 20 dB and design impedance of  $600\ \Omega$ . [6]

Or

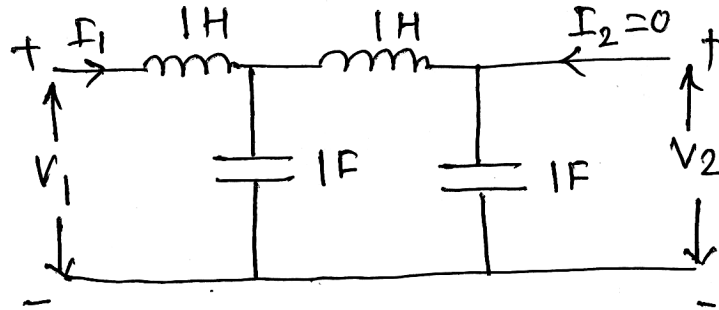
6. (a) For symmetrical 'T' network derive the expression for ' $Z_0$ ' and propagation constant in terms of circuit components. [6]
- (b) Explain the m-derived filter. Design a LPF T and  $\Pi$  section having a cutoff frequency of 2 KHz to operate with a terminated load impedance of  $500\ \Omega$ . [7]
7. (a) Find the open circuit parameter for the network. [7]



(b) Find the network function :

[6]

$$\frac{V_1}{I_1}, \frac{V_2}{V_1} \text{ \& } \frac{V_2}{I_1} \text{ for.}$$



Or

8. (a) Current  $I_1$  and  $I_2$  entering at port 1 and 2 respectively of a two port network are given by :

[6]

$$I_1 = 0.5 V_1 - 0.2 V_2$$

$$I_2 = -0.2 V_1 + V_2$$

Find 'Y' and 'Z' parameters.

- (b) What is mean by poles and zeros ? Explain the role of poles and zeros to network stability. Find the poles and zeros of the network given below.

[7]

