Total No. of Questions :10] *[Total No. of Printed Pages :6*

Roll No .....

EE/EX/EI/BM - 305

B.E. III Semester

Examination, December 2012

Network Analysis

Time : Three Hours

Maximum Marks : 70/100

Note : 1. *Answer Five questions, selecting One question from each unit.*

2. *All questions carry equal marks.*

Unit - I

1. a) Explain clearly with the help of examples, 'tie-set' and 'cut-set' matrix of a network.

   b) Explain the concept of duality with the help of suitable example.

   c) Discuss the properties of series-resonant circuit.

OR

2. a) Discuss the initial conditions in a network. Briefly outline the procedure for evaluating the initial conditions in network problems.

   b) In the network shown in Fig. 1, the switch 'k' is changed from position 'a' to 'b' at $t = 0$. Find the values of i, $\frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0+$.

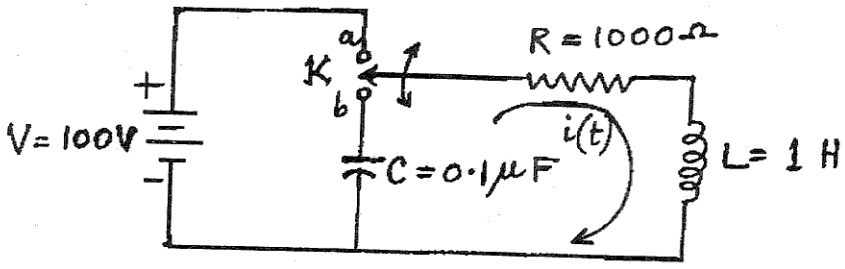

Figure-1

Unit - II

3. a) State and explain, 'Maximum power transfer theorem' for A.C. networks.

   b) In the network shown in Fig. 2, using Thevenin's theorem, find $\bar{v}_2$, such that the current through the (2 + j3) ohms impedance is zero.

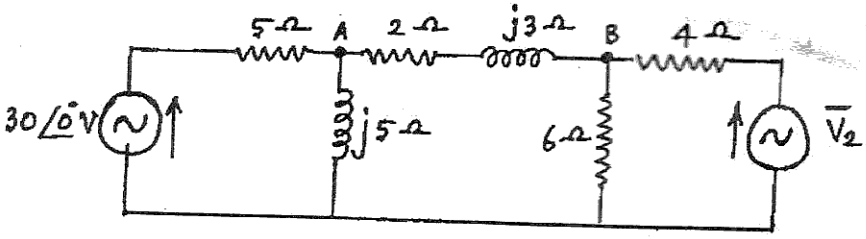

Figure-2

OR

4. a) State and explain the following:

   i) Millman's theorem

   ii) Reciprocity theorem

   b) In the network shown in Fig. 3, find the current flowing through 5 Ω resistor (I), by superposition theorem.

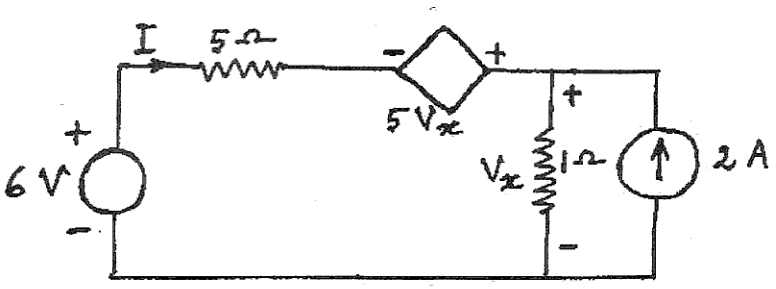

Figure-3

Unit - III

5. a) The waveform shown in Fig. 4, is non-recurring. Write an equation for $v(t)$ in terms of steps and related functions as needed. Find $v\ (s)$ for $v\ (t)$.

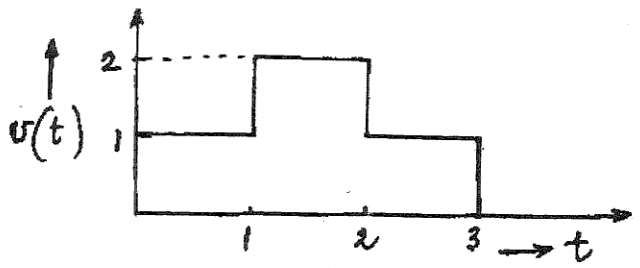

Figure-4

b) Find the current $i\ (t)$ in a series R-L-C network as shown in Fig. 5, comprising R = 5 Ω, L = 1H and C = 0.25 F, when an impulse voltage $3\,\delta\,(t-1)$ is applied.

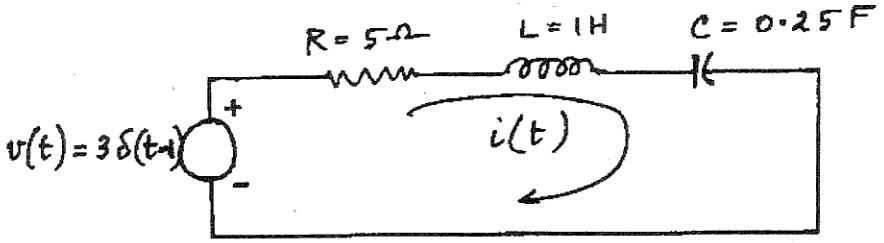

Figure-5

[4]

OR

6. a) Given the function, $F(s) = \frac{5(s+3)}{s(s+1)}$ find the initial value $f(0+)$ and the final value $f(\infty)$, without finding the inverse laplace transform of F(s).

b) If the capacitor is uncharged and the inductor current zero at $t = 0-$, in the network shown in Fig. 6, find I(s), the transform of the current $i(t)$.

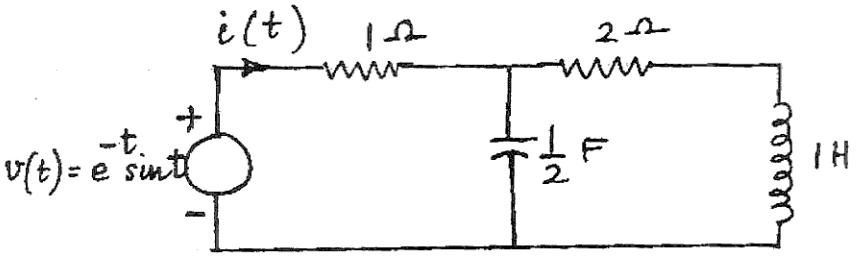

Figure-6

Unit - IV

7. a) Discuss the restrictions on poles and zeros locations in s-plane for driving point functions.

b) Find the open circuit transfer impedance $\frac{V_2(s)}{I_1(s)}$ and open-circuit voltage ratio $\frac{V_2(s)}{V_1(s)}$ for the network shown in Fig. 7.

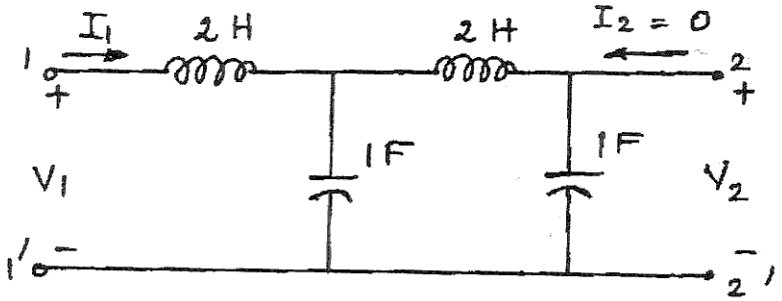

Figure-7

OR

8. Define open-circuit impedance (z) parameters of a two-port network. Determine 'z' parameters for the network shown in Fig. 8.

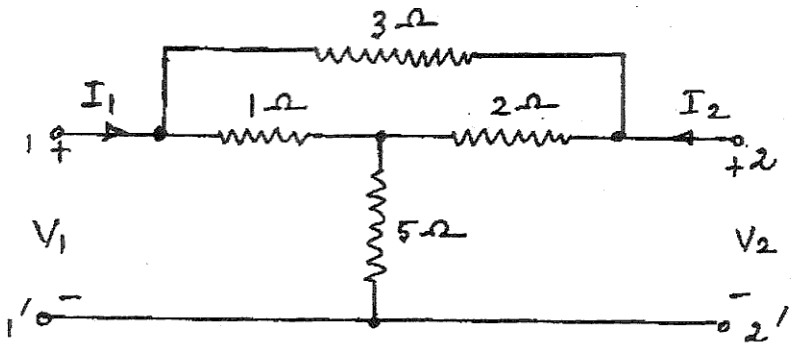

Figure-8

Unit - V

9. a) Discuss the effect of symmetry for a periodic function to determine the trigonometric Fourier series coefficients.

   b) Find the trigonometric Fourier series for the wave form shown in Fig. 9, and plot the line spectrum.

[6]

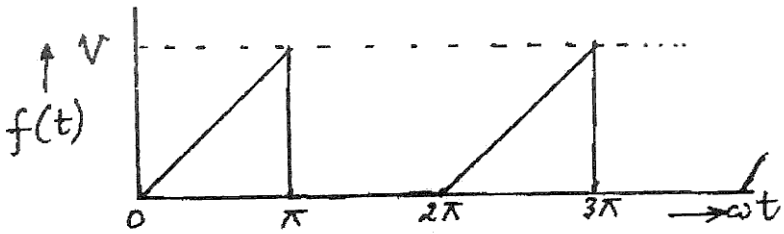

Figure-9

OR

10. a) Explain the terms 'Even symmetry' and 'odd symmetry' for periodic waveforms with Fourier series representation.

b) Find the trigonometric Fourier series for the square wave shown in Fig. 10, and plot the line spectrum.

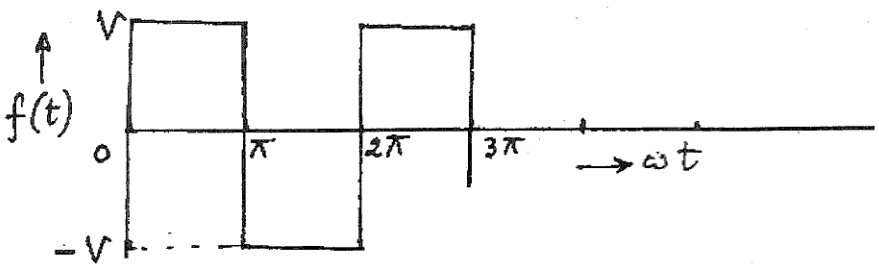

Figure-10

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