Total No. of Questions : 8]

SEAT No. :

P616

[Total No. of Pages : 3

[5869]-238
S.E. (Electrical Engineering)
NETWORK ANALYSIS
(2019 Pattern) (Semester - IV)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of calculator is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) In the circuit shown in fig. no. 1 initially switch is kept open for long time. At t = 0, switch K is closed. Obtain expression for current at t > 0. Find the value of the current at t = 0.25 sec. What will be the current in circuit in one time constant period. **[7]**

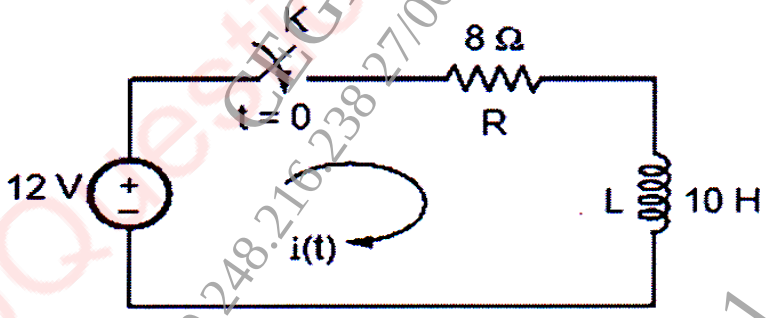

Fig. No. 1

b) Explain the behaviour of R, L and C elements for transients. Mention the representation at the instant of switching. **[5]**

c) Obtain the expression for voltage across capacitor in series RC circuit connected to a. d. c. voltage V for t > 0. Assume initial charge across capacitor is zero. **[5]**

OR

P.T.O.

Q2) a) What is time constant? Explain time constant in case of series R-L and series R-C circuit. **[7]**

b) A series R-L-C circuit shown in fig. no. 2 is excited by DC voltage source. Find current i(t) using conventional method. The switch is closed at t = 0 **[10]**

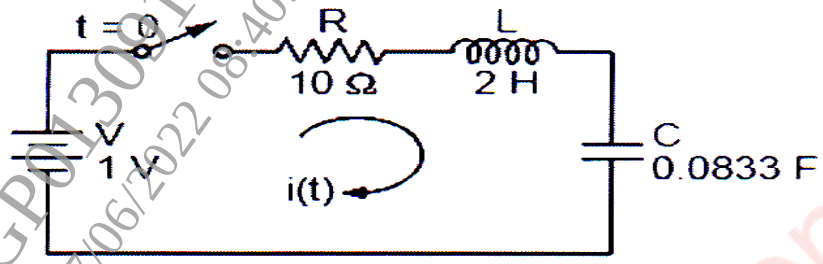

Fig. No. 2

Q3) a) State and prove initial and final value theorem. **[6]**

b) Find the Laplace transform of the function. **[6]**

f(t) = t for 0 < t < 1

= 0 for t > 1.

c) State any six properties of Laplace Transform. **[6]**

OR

Q4) a) Derive the relation between unit step function and unit ramp function. **[6]**

b) Find the Laplace transform of sin ωt. **[6]**

c) Find i(t), by using convolution integral : **[6]**

$$F(s) = \frac{1}{s^2 + 9s + 18}$$

Q5) a) Express hybrid parameters in terms of transmission line parameters. **[9]**

b) Find Z parameters of the network shown in figure no. 3 **[8]**

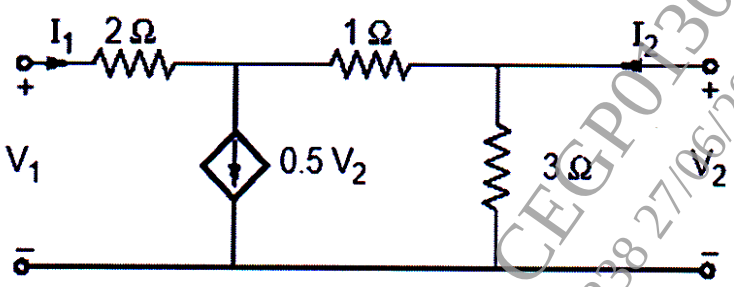

Fig. No. 3

OR

Q6) a) What is high pass filter? Derive the expression for the cut-off frequency of prototype low pass filter in terms of L and C. **[9]**

b) Design a prototype high pass filter sections if design impedance R_0 = 600 ohm and cut-off frequency f_c = 1000 Hz. **[8]**

Q7) a) State and explain all possible network functions of one port network. **[9]**

b) Determine the driving point impedance for the network shown in fig. No.4 **[9]**

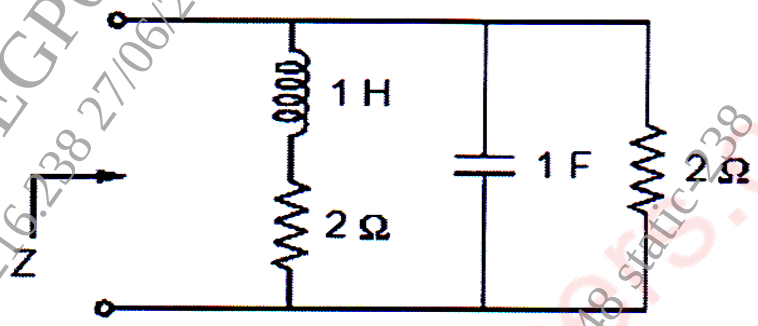

Fig. No. 4

OR

Q8) a) What is pole-zero plot? Explain with suitable example. **[9]**

b) Obtain the pole zero plot in the s-plane of the driving point impedance function for the network shown in fig. no. 5 **[9]**

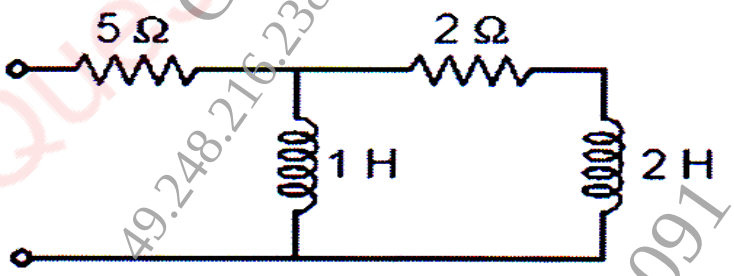

Fig. No. 5

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