Total No. of Questions : 8]

SEAT No. :

**PE-4242**

[Total No. of Pages : 3

# [6582]-13

## S.E. (Electrical Engineering)

## NETWORK ANALYSIS

## (2019 Pattern) (Semester - IV) (203147)

*Time : 2½ Hours]* *[Max. Marks : 70*

***Instructions to the candidates :***

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***
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) A series R-L circuit with initial current $I_0$ in the inductor is connected to a d.c. voltage V at t = 0. Derive the expression for the instantaneous current through the inductor for t > 0. **[7]**

b) Find current i(t) through inductor using conventional method. The switch is closed at time t = 0. Refer fig. no. 1. **[5]**

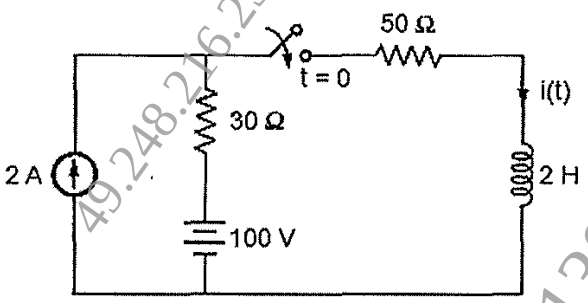


Fig. No. 1

c) Obtain the expression for current in series RL circuit connected to a d. c. voltage V for t > 0. Assume initial current through inductor as 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-C circuit shown in fig. 2 consists of R = 10 ohm and C = 0.1 F. Initially switch K is kept open for very long time. At t = 0 it is closed. Find the expression for $v_c(t)$. **[10]**

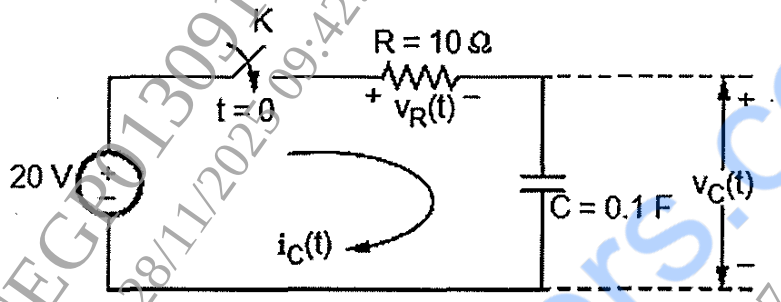


Fig.No.2

***Q3)*** a) Explain the properties of Laplace Transform. **[6]**

b) Obtain inverse Laplace transform of **[6]**

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

by using convolution integral.

c) Explain advantages and disadvantage of Laplace transform. **[6]**

OR

***Q4)*** a) Define and explain the characteristics if **[6]**

i) Unit step function

ii) Unit ramp function

iii) Unit impulse function

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

c) Obtain F(s) for the signal shown in fig. no. 3. Also determine its Laplace transform. **[6]**

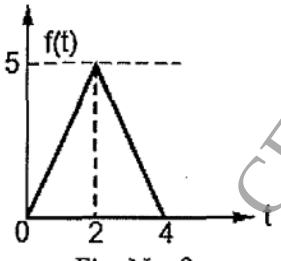


Fig. No. 3

***Q5)*** a) Express z-parameters in terms of y-parameters. **[9]**

b) Find Y parameters of the network shown in figure no. 4 **[8]**

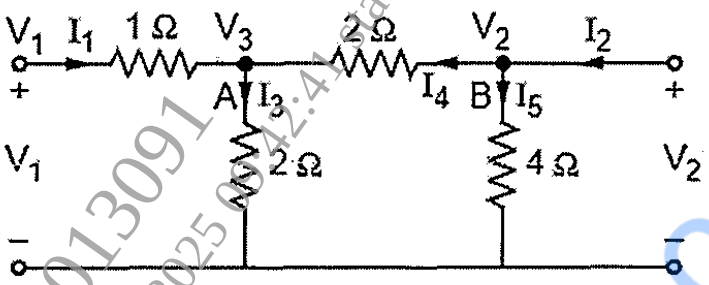


Fig. No. 4

OR

***Q6)*** a) What is low 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 low pass filter sections if design impedance $R_0$ = 500 ohm and cut-off frequency $f_c$ = 2 kHz. **[8]**

***Q7)*** a) Explain the necessary conditions for transfer function. **[9]**

b) Find the network functions Z11(s) and Z21(s) for the network shown in fig. No.5. **[9]**

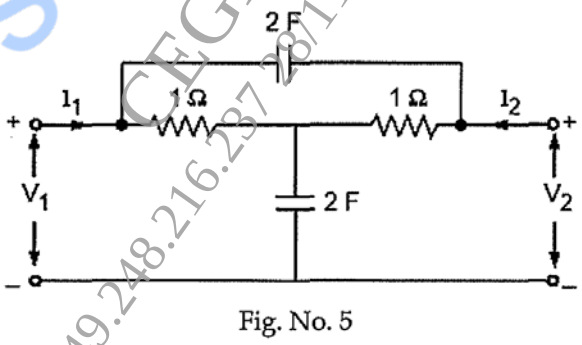


Fig. No. 5

OR

***Q8)*** a) Explain the significance of poles and zeros. **[9]**

b) How to obtain time domain behaviour from a pole-zero plot? **[9]**

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