

Total No. of Questions : 8]

SEAT No. :

PC2789

[6352]-13

[Total No. of Pages : 4

S.E. (Electrical Engineering)

NETWORK ANALYSIS

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

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) The switch is closed at $t=0$ for the network shown in Fig. No.1 Find $i(t)$,

$\frac{di(t)}{dt}$ at $t=0+$, if the capacitor is initially uncharged. [6]

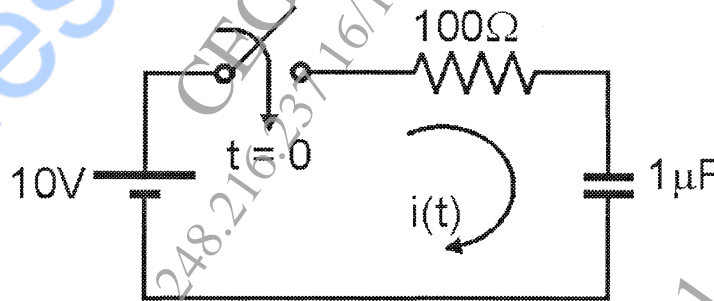


Fig. No.1

- b) i) State behaviour of R, L and C based on initial condition. [6]
- ii) State behaviour of R, L and C based on Steady state condition.
- iii) State the formula for current flowing through inductor and current flowing through capacitor.

P.T.O.

- c) A coil which has a Inductance of 40mH and a resistance of 2Ω is connected to form an LR series circuit. If they are connected to a 20V DC supply. Find: [6]

- Value of induced emf across inductor after 10 ms.
- Value of current flowing through inductor after 5 ms.

$$i(t) = \frac{V}{R} \left(1 - e^{-\frac{t}{\tau}} \right)$$

- Time constant of the LR series.

OR

- Q2) a) A series R-L-C circuit shown in fig. No.2, find current $i(t)$ using conventional method. The switch is closed at $t = 0$. [10]

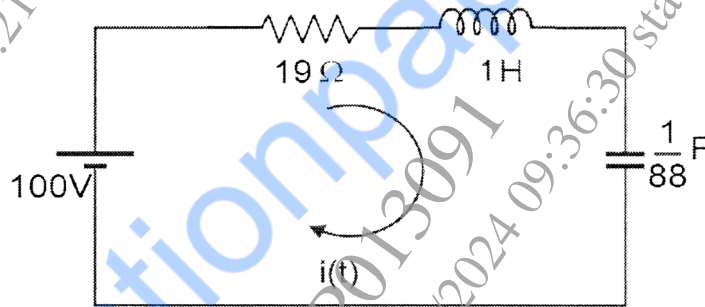


Fig. No.2

- b) Explain time constant in case of series R-C and series R-L circuit. [8]

- Q3) a) Using Laplace Transform solve differential equation. [6]

$$\frac{d^2 i(t)}{dt^2} + 3 \frac{di(t)}{dt} - 28i(t) = 0 \text{ with } I(0^-) = 0 \text{ and } I'(0^-) = 1$$

- b) State any six properties of Laplace Transform. [6]

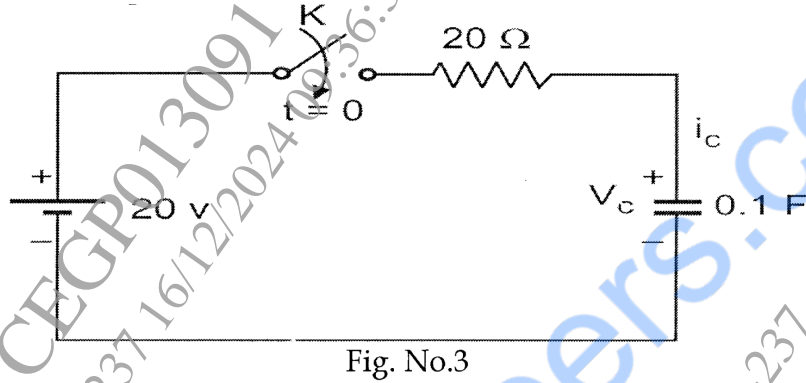
- c) Find Laplace Transform of the following: [6]

- $e^{-3t} \cdot t^2$
- $t \cdot e^{-3t}$ and
- $\cosh \frac{3}{2} t$

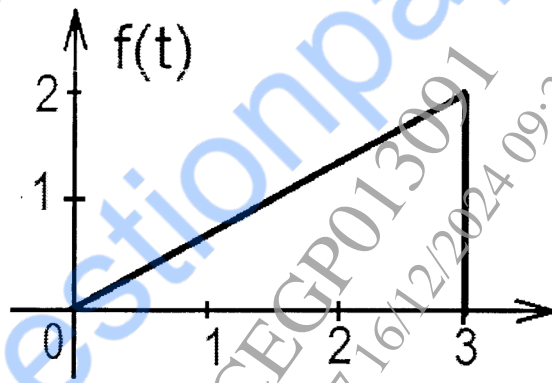
OR

- Q4) a)** A series RC circuit in Fig No.3, the switch is closed at $t=0$. Find the expression for $V_c(t)$ using Laplace Transform method. [6]

$$\left[V_c(s) = \frac{1}{sC} I(s) \right]$$



- b)** Find Laplace Transform of the waveform given in Fig No.4. [6]



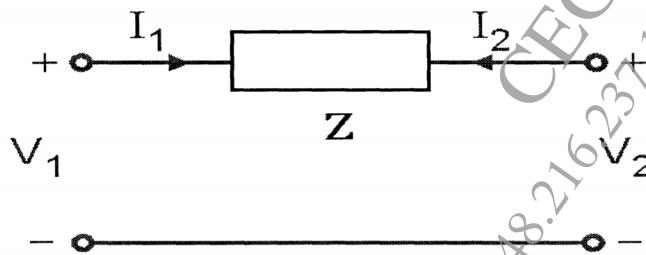
- c)** Explain Initial Value Theorem and Final Value Theorem. [6]

- Q5) a)** Design a prototype low pass filter sections if design impedance $R_0 = 500 \Omega$ and cut-off frequency $f_c = 2000 \text{ Hz}$. [9]

- b)** Express Y-parameters in terms of Z-parameters. [8]

OR

- Q6) a)** Find the Y- parameters of the network shown in Fig. No.5 [9]



- b) Define the following terms: [8]
- Band pass filter
 - Band stop filter
 - Low pass filter
 - High pass filter

- Q7) a) Draw pole-zero plot of the driving point impedance of the network shown in Fig. No.6. [9]

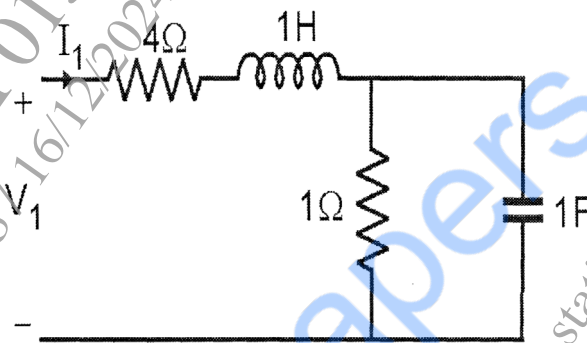


Fig. No.6

- b) Define the following terms: [8]
- Driving point Impedance
 - Driving Point Admittance
 - Transfer impedance function
 - Transfer admittance function

OR

- Q8) a) Draw pole-zero plot of the driving point impedance of the network shown in Fig. No.7. [9]

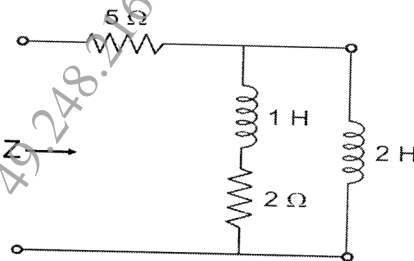


Fig. No.7

- b) Write short note on following terms: [8]
- Poles of system function
 - Zeros of system function

