[Total No. of Questions - 9] [Total No. of Printed Pages - 3] (2064)

14677

B. Tech 4th Semester Examination

Network Analysis & Synthesis (O.S.)

EC-4004

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : (i) Section E is compulsory.

(ii) Attempt other four sections selecting one from each section A, B, C and D.

SECTION - A

1. A voltage v = 300 sin 314t is applied at t = 2.14 msec to a series R–C circuit having resistance 10Ω and capacitance 200μF. Find an expression for current. Also, find the value of current 1msec after switching on. (20)

2. In the circuit of Fig. 1, S_1 is closed at t = 0 and S_2 is opened at t = 4 msec. Determine i(t) for t>0 (assume inductor is initially de-energised) (20)

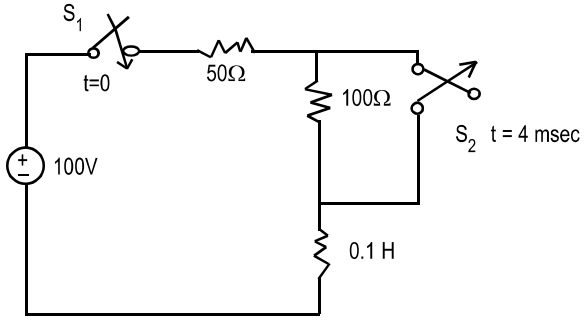

Fig. 1

SECTION - B

3. Discuss poles and zeros of network function and hence obtain pole-zero location for the function

$$p(s) = \frac{(2s+4)\,(s+4)}{s(s+1)\,(s+3)}$$ (20)

4. (a) Explain the necessary conditions for driving point immittance function and transfer function. (10)

   (b) Check the stability of the system with characteristics equation $s^5 + 4s^4 + 8s^3 + 8s^2 + 7s + 4 = 0$. (10)

SECTION - C

5. For the network shown in Fig. 2, determine

   (a) tie-set matrix.

   (b) Loop impedance matrix

   (c) Loop currents. (20)

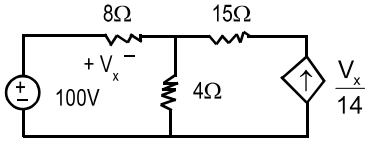

Fig. 2

6. Find the short circuit and open circuit impedances of the network shown in Fig. (3) and hence obtain its π equivalent. (20)

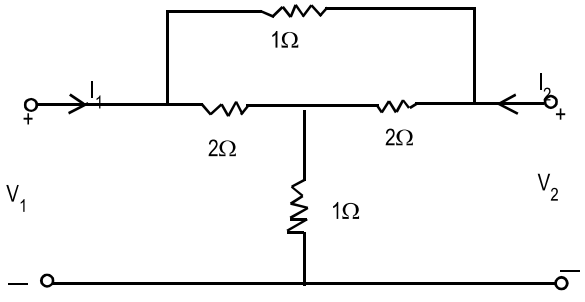

Fig. 3

SECTION - D

7. Explain the significance of passive filter alongwith a performance parameters. Discuss the performance parameters of constant-K high pass filters. (20)

8. Write down the properties of a positive real function and hence determine whether the function

$$p(s) = \frac{2s^2 + 5}{s(s^2 + 1)}$$ is positive real or not (20)

SECTION - E

9. (i) What is Hurwitz function? List its properties.

(ii) Find the hybrid parameters of the network shown in Fig. 4.

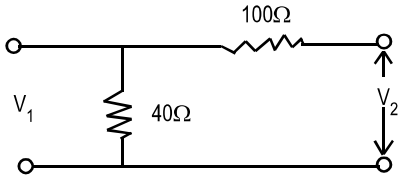

Fig. 4

(iii) Explain Routh Hurwitz stability criteria with suitable example.

(iv) Synthesize the network if

$$z(s) = \frac{s^5 + 5s^3 + 4s}{s^4 + 3s^2 + 1}$$ as caner-I form

(v) Define the following with examples.

(a) Fundamental cut-set matrix

(b) Fundamental tie-set matrix

(c) Twigs

(d) Links (5×4=20)