[Total No. of Questions - 9] [Total No. of Printed ges - 3]
(2126)

16045(D) - 0 DEC 2016

B. Tech 3rd Semester Examination

Circuit Theory and Network Analysis & Synthesis (NS)

EC-213

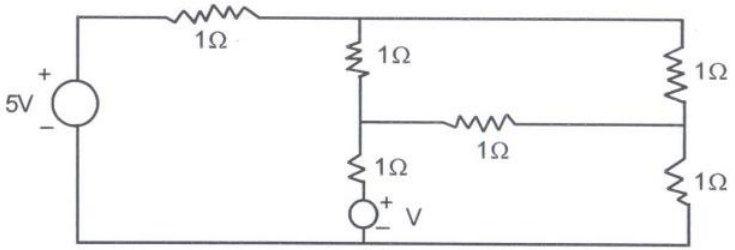
Time : 3 Hours **Max. Marks : 100**

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

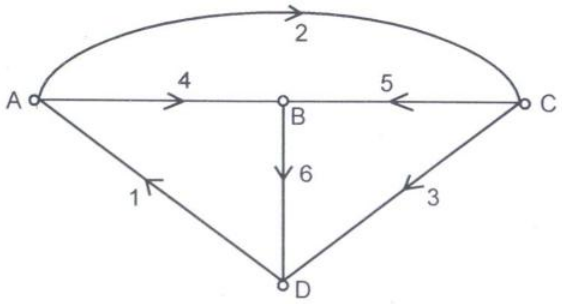
Note : Attempt five questions in all, selecting one question from each sections A, B, C and D. Section E is compulsory.

SECTION - A

1. In the following circuit find V by mesh method such that the current through the 5V source is zero. (20)



2. Find the number of possible trees of the graph shown in Fig. below. (20)



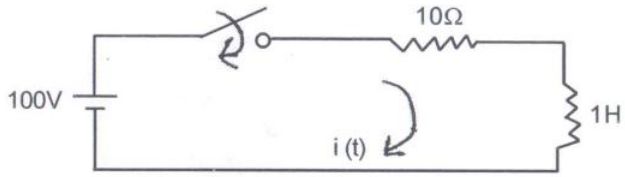
SECTION - B

3. Determine the Inverse Laplace transform of

$$\frac{s+4}{2s^2+5s+3}$$ (20)

4. In the given network of following figure the switch is closed at t=0 with zero current in the inductor find

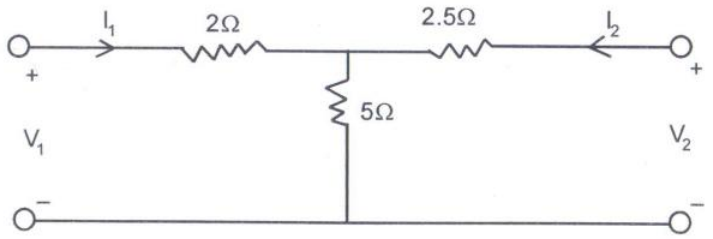
i, $\frac{di}{dt}, \frac{d^2i}{dt^2}$ at $t = 0^+$ (20)



SECTION - C

5. Express z parameters in terms of y parameters. (20)

6. Find the equivalent π network shown in figure below. (20



SECTION - D

7. Test whether the polynomials

(i) $P(s) = s^4 + s^3 + 3s^2 + 2s + 12$

(ii) $P(s) = s^4 + s^3 + 5s^2 + 3s + 4$

are Hurwitz? (20)

[P.T.O.]

8. Realize cover form of following LC impedance function

$$Z(s)=\frac{10s^4+12s^2+1}{2s^3+2s} \qquad (20)$$

SECTION - E

9. (a) Define Kirchhoff's Current Law (KCL) and Kirchhoff's Voltage Law (KVL).

(b) State Superposition Theorem.

(c) The number of independent loops for a network with n nodes and b branches is

(i) n–1 (ii) b–n (iii) b–n+1

(iv) Independent of number of nodes.

(d) What are the advantages of Laplace transform method?

(e) In hybrid parameter what is short circuit input impedance and what is short circuit forward current gain?

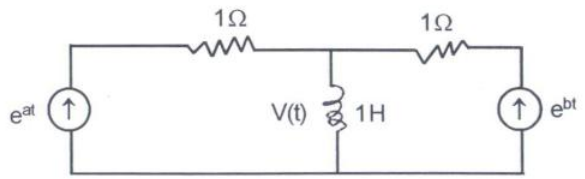
(f) Give any two properties of positive real function.

(g) Function $F(s)=\frac{s+3}{s+1}$. Find its pole and zero.

(h) What do you mean by casuality in synthesis procedure?

(i) What is half power and cutoff frequency?

(j) In the circuit below the voltage V(t) is



(i) $e^{at}-e^{bt}$ (ii) $e^{at}+e^{bt}$ (iii) $ae^{at}-be^{bt}$ (iv) $ae^{at}+be^{bt}$

(2×10=20)