



## Network Analysis & Synthesis (1050)

P. Pages : 3

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :

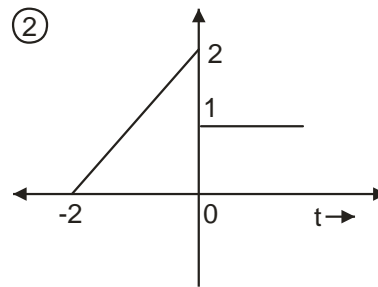
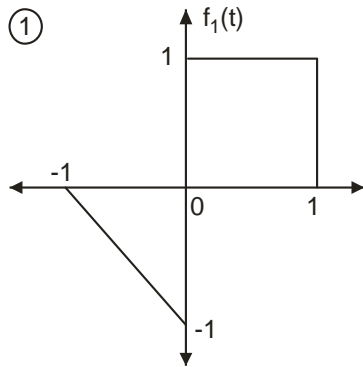
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory and carries equal marks.
5. Assume suitable data if necessary.
6. Use of non programmable calculator is allowed.
7. Figures to right indicate full marks.

### UNIT – I

1. Attempt **any two**.

a) Resolve the following functions into odd and even functions.

10

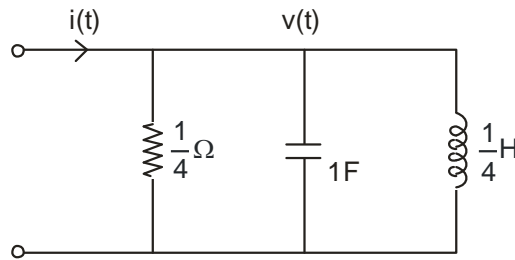


b) State and prove the following properties of Laplace transform.

10

- i) Differentiation Theorem.
- ii) Integration Theorem.

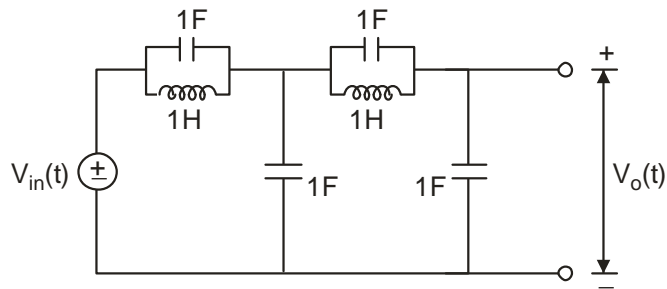
- c) Using Laplace transform method find  $v(t)$  when  $i(t) = 2e^{-t}u(t)$ . Assume zero initial energy. 10



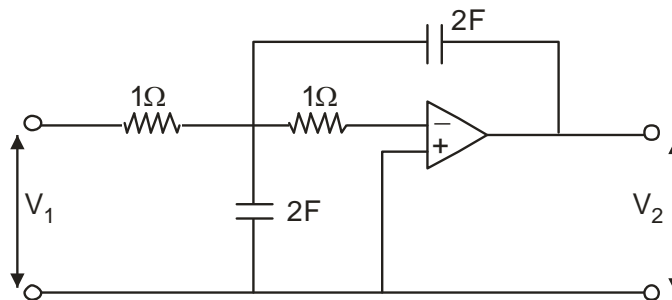
## UNIT – II

2. Attempt **any two**.

- a) For the LC ladder network shown below find the voltage transfer function. 10



- b) Find  $\frac{V_2(S)}{V_1(S)}$  for the network shown below. 10



- c) Graphically determine residues at poles of the following function. 10

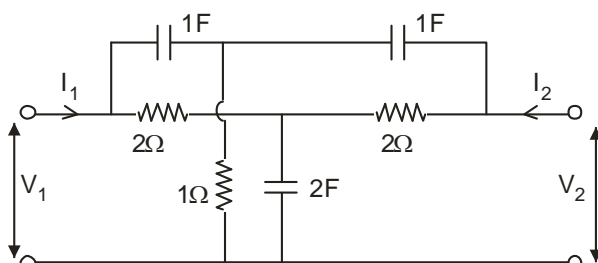
$$F(S) = \frac{S^2 + 4}{(S + 2)(S^2 + 9)}$$

### UNIT – III

3. Attempt **any two**.

a) Find the reciprocity and symmetry condition in terms of z-parameters. 10

b) Find out short circuit parameters for the following network. 10



c) Determine ABCD parameters in terms of y and h parameters. 10

### UNIT – IV

4. Attempt **any two**.

a) State whether  $F(S) = \frac{S^2 + 4}{S^3 + 3S^2 + 3S + 1}$  is positive real function. 10

b) Synthesize  $F(S) = \frac{S^6 + 5S^4 + 6.75S^2 + 2.25}{S^5 + 3S^3 + 2S}$  in Foster I and Cauer I form. 10

c) State properties of Hurwitz polynomials and test whether P(S) is Hurwitz.  
 $P(S) = S^7 + 2S^6 + 2S^5 + S^4 + 4S^3 + 8S^2 + 8S + 4$  10

### UNIT – V

5. Attempt **any two**.

a) Explain frequency and network transformation. 10

b) Realize the network for a third order low pass butterworth filter whose transfer function is given by 10

$$H(S) = \frac{1}{(S+1)(S^2 + S + 1)}$$

c) Design a Butterworth LPF of first order with : 10  
 i) Pass band gain of 10 dB and  
 ii) Cut-off frequency of 1 KHz.

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