M.Sc. - II (Electronics) (NEP Pattern) Semester-IV

PSCELT402 - Paper-II : Network Analysis and Synthesis

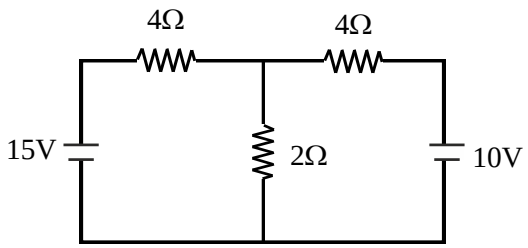
P. Pages : 2 **GUG/S/25/16340**

Time : Three Hours * 3 9 3 4 * Max. Marks : 80

Notes : 1. All questions are compulsory and carry equal marks.
2. Draw a neat and Labeled diagram and use supporting data wherever necessary.
3. Avoid vague answers and write specific points/answers related questions.

Either:

1. a) What is mesh analysis? Find current though 2 Ohm register in the following figure using mesh analysis. **8**



b) Explain the nodal analysis method for solving a network. **8**

OR

c) Explain the following **8**

i) Planner graph, ii) Tree

iii) Cotree iv) Reduced incidence matrix.

d) What is source transformation? Explain the conversion method of voltage source to current source and vice versa with example. **8**

Either:

2. a) State and prove superposition **8**

b) State and prove reciprocity theorem. **8**

OR

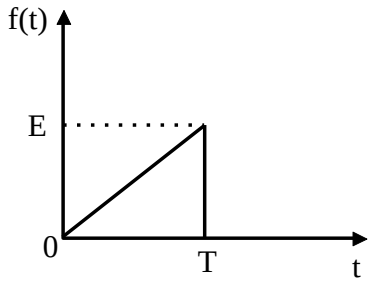
c) Explain the star – delta and delta – star transformation in the network. **8**

d) State and prove Millman's theorem. **8**

Either:

3. a) Discuss the Heaviside's expansion theorem with suitable example. **8**

b) Determine the Laplace transform of saw – tooth waveform shown in following Figure. **8**



OR

c) Find the inverse transform of the function **8**

$$F(s) = \frac{1}{(s+1)^4} + \frac{s-3}{(s-3)^2+6}$$

d) State and explain initial value theorem.

Either:

4. a) Explain time domain behavior from Pole zero plot. **8**

b) Describe Hurwitz polynomials with suitable examples. **8**

OR

c) Describe the synthesis of RC network by Foster method. **8**

d) Describe the Routh-Hurwitz criterion. **8**

5. Attempt the followings:

a) Explain State variable analysis. **4**

b) What is duality of network? Explain. **4**

c) Explain partial function expansion. **4**

d) A linear System is described by the differential equation. **4**

$$\frac{d^2y}{dt^2} + 5\frac{dy}{dt} + by = \frac{2dy}{dt} + 1$$

Find the system poles and zeros.

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