

**B.Tech Sem - III (2007 Course) (Electronics) : SUMMER - 2019**  
**SUBJECT: NETWORK ANALYSIS**

Day : Saturday  
Date : 11/05/2019

Time : 02.30 PM TO 05.30 PM  
Max Marks : 80

S-2019-2979

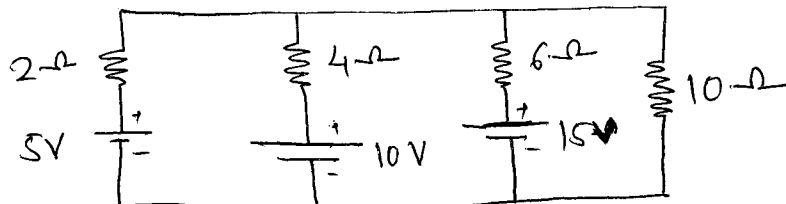
**N.B.:**

- 1) **Q. No. 1 and Q. No. 5 are COMPULSORY.** Out of remaining attempt ANY TWO questions from Section – I and Section – II.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SAME ANSWER** books.
- 4) Use of non-programmable calculator is **ALLOWED**.
- 5) Draw neat and labeled diagram **WHEREVER** necessary.
- 6) Assume suitable data, if necessary.

**SECTION – I**

- Q. 1**
- a) State and prove Norton's theorem. (05)
  - b) Derive the expression for resonance frequency for series resonance circuit. (05)
  - c) Describe propagation constant. (04)

- Q. 2**
- a) Write short notes on: (06)
    - i) Duality in networks
    - ii) Source transformation
  - b) Find the current through the  $10\ \Omega$  resistor using Millman's theorem. (07)



- Q. 3**
- a) Derive expression for current and voltage of driven RC circuit. (07)
  - b) A series RLC circuit has quality factor of 5 at  $50\ \text{rad/s}$ . The current flowing through the circuit at resonance is 10 A and the supply voltage is 100 V. Find the circuit constants. (06)
- Q. 4**
- a) Show that for symmetrical T network  $Z_0 = \sqrt{Z_{oc} Z_{sc}}$  (07)
  - b) A symmetrical  $\pi$  network has following parameters: (06)  
series arm impedance =  $350\ \Omega$  (resistive)  
Each shunt arm impedance =  $800\ \Omega$  (resistive)  
Find the characteristic impedance and propagation constant of the network.

**P. T. O.**

**SECTION - II**

- Q. 5 a)** Derive the design equations and cut-off frequency of low pass filter. **(05)**
- b)** Check whether the polynomial is Hurwitz or not. **(05)**  
 $s^5 + 2s^4 + 5s^3 + 10s^2 + 9s + 18$ .
- c)** State properties of RC impedance and RC admittance functions. **(04)**
- Q. 6 a)** Design a 'T' &  $\pi$  section constant K high pass filter having cut-off frequency of 12 KHz and design impedance  $R_0 = 800 \Omega$ . **(07)**
- b)** Write short note on Composite filter. **(06)**
- Q. 7 a)** Derive the expression for Z parameter in terms of **(07)**
- i)** H parameter
- ii)** Y parameter
- b)** Derive the condition for reciprocity and symmetry in terms of ABCD parameters. **(06)**
- Q. 8 a)** List the properties of positive real function. **(07)**
- b)** Test whether  $F(s) = \frac{s^2 + 1}{s^3 + 4s}$  is positive real function. **(06)**

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