

B.TECH SEM - III (2007 COURSE) (ELECTRONICS) : SUMMER

- 2018

SUBJECT: NETWORK ANALYSIS

Day : **Tuesday**
Date : **22/05/2018**

S-2018-2576

Time : **02.30 PM TO 05.30 PM**
Max Marks : **80**

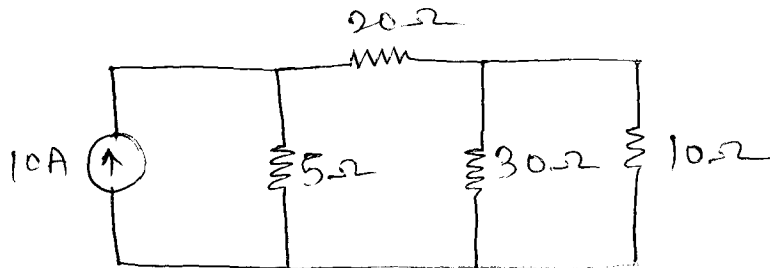
N.B.:

- 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 separate **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 superposition theorem. (05)
- b) What is Q factor? Derive the expression for Q factor of capacitor. (05)
- c) Describe characteristic impedance. (04)

- Q. 2** a) State and explain maximum power transfer theorem. (06)
- b) Find the current through the $10\ \Omega$ resistor using Thevenin's theorem. (07)



- Q. 3** a) Derive expression for cut off frequency for parallel resonance circuit. (07)
- b) Find the values of R, L and C in a series RLC circuit that resonates at 1.5 KHz and consumes 50 W from a 50 V ac source operating at the resonant frequency. The Bandwidth is 0.75 KHz. (06)
- Q. 4** a) The impedance of series arm and shunt arm of 'L' network are $j300\ \Omega$ and $j700\ \Omega$ respectively. Calculate image and iterative impedances. (06)
- b) Derive the expression for the characteristic impedance of symmetrical π network. (07)

P. T. O.

SECTION - II

- Q. 5** a) Explain the working of high pass filter and derive the expression for cut-off frequency of high pass filter. (05)
- b) Test whether $F(s) = s^5 + 8s^4 + 24s^3 + 28s^2 + 23s + 6$ is Hurwitz or not. (05)
- c) List the properties of RC driving point immittance function. (04)
- Q. 6** a) Design an m-derived high pass filter having a design impedance of 800 Ω , cut off frequency of 6 KHz and $m = 0.35$. (07)
- b) Compare m-derived and prototype filter. (06)
- Q. 7** a) Derive the condition for reciprocity and symmetry in terms of h-parameter. (06)
- b) Derive the expression for ABCD parameter in terms of
- i) Y - parameter
 - ii) Z - parameter

- Q. 8** a) Test whether (07)

$$F(s) = \frac{s^5 + 5s^3 + 4s}{s^4 + 8s^2 + 15}$$

is a positive real function.

- b) Obtain the Foster – I form of the following impedance function: (06)

$$Z(s) = \frac{(s^2 + 1)(s^2 + 9)}{s(s^2 + 4)}$$

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