

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III (OLD) EXAMINATION – WINTER 2018

Subject Code:130901

Date:28/11/2018

Subject Name:Circuits And Networks

Time:10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Define self and mutual inductance with dot convection method **07**
(b) What is mesh? Determine i_1 , i_2 , and i_3 using Mesh analysis in shown in Fig1.1 **07**
- Q.2** (a) State, Prove and Summarize conditions for Maximum power transfer in DC circuit and different case in AC circuit. **07**
(b) Compare Thevenin theorem and Norton theorem. **07**
- OR**
- (b) Classify DC response of first order RL and RC circuits **07**
- Q.3** (a) Analyze time domain response of source free second order linear networks **07**
(b) In the network of figure 3.1, If $t=0$, switch 'k' is closed. Find the values of i , di/dt and d^2i/dt^2 at $t=0^+$ for element values as follows; $V= 100V$, $R= 1000$ and $L= 1H$. **07**
- OR**
- Q.3** (a) Analyze time domain response of second order linear networks with constant inputs **07**
(b) Consider the R-C circuit shown in fig 3.2, switch 'S' is closed at $t=0$ and assume that there is no initial charge in the capacitor. Find the initial conditions $i(0^+)$ and $di(0^+)/dt$. Discuss this for RLC series circuit. **07**
- Q.4** (a) A function in Laplace domain is given by **07**
- $$F(S) = \frac{2(s+4)}{(s+3)(s+8)}$$
- Find the initial and final value by initial and final value theorem.
- (b) A 10 volts step voltage is applied across a RC circuit at $t=0$. Find $I(t)$ at $t=0^+$ and obtain the value of $di/dt|_{t=0^+}$. Assume $R=100\Omega$, $C=100\mu F$ **07**
- OR**
- Q.4** (a) The system response of a function in frequency domain is describe by the following equation **07**
- $$S^2F(s) + sF(s) = \frac{2}{S^2}$$
- Find $f(t)$.
- (b) A differential equation is represented by **07**
- $$\frac{d^2x}{dt^2} - x = e^{-t}$$
- Assuming zero initial condition, find $x(t)$ at $t>0$
- Q.5** (a) Derive the condition of reciprocity and symmetry in Z-parameter and **07**
(b) Describe cut-set method **07**

OR

- Q.5 (a) Derive equation of ABCD parameters in terms of h-parameter
(b) Describe Tie-set method

07
07

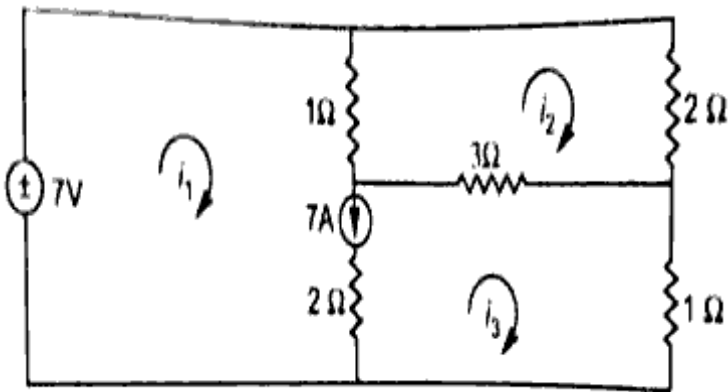


Fig 1.1

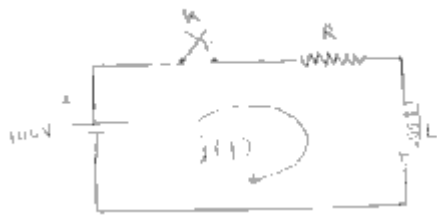


Fig 3.1

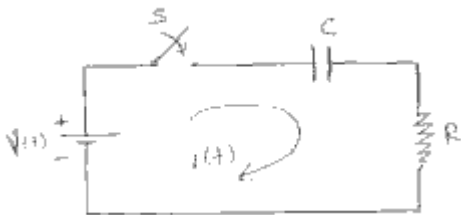


Fig 3.2
