

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-III EXAMINATION – WINTER 2015

Subject Code:130901

Date:02/01/2016

Subject Name: Circuits & Networks

Time: 2:30pm to 5:00pm

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) Explain: 06**
(1) Conservation of charge (2) Conservation of Energy
- (b) State and prove maximum power transfer theorem. 08**
- Q.2 (a) Discuss initial conditions in basic elements of network. 07**
- (b) For the Fig.1, the capacitor has an initial charge $q_0=500\mu\text{C}$ with polarity as shown in fig. At $t=0$, the switch is closed, thereby applying the constant voltage $V=50\text{V}$. Find the current transient. 07**
- OR**
- (b) In Fig.2, the switch is moved from position 1 to 2 at $t=0$, steady state having previously been attained. Find the voltage $V_c(t)$. 07**
- Q.3 (a) State properties of Laplace Transform and prove any one of them. 07**
- (b) Under what conditions, the final value theorem cannot be used? Explain with example. 07**
- OR**
- Q.3 (a) Summarize significance of pole-zero location in S-plane. 07**
- (b) Explain necessary conditions for driving-point functions. 07**
- Q.4 (a) Enlist conditions for reciprocal and symmetrical network in all types of parameters. 07**
- (b) For Fig.3 Find $G_{12}(s)$. 07**
- OR**
- Q.4 (a) Discuss various interconnection of two-port networks 07**
- (b) Calculate the Y-parameter of the fig.4 07**
- Q.5 (a) Explain Duality. 07**
- (b) Derive Z-parameters in terms of Y-parameters 07**
- OR**
- Q.5 (a) Determine the voltage V_2 and V_3 in Fig.5 using cut set analysis. 07**
- (b) Derive Y-parameters in terms of Z-parameters 07**

Note: In Figure 1 value of capacitor is 20uF.

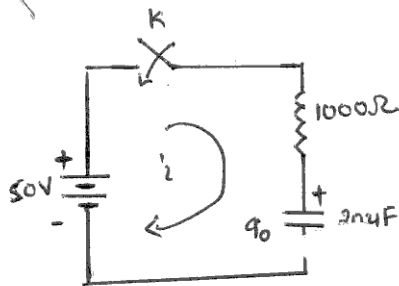


Fig. 1

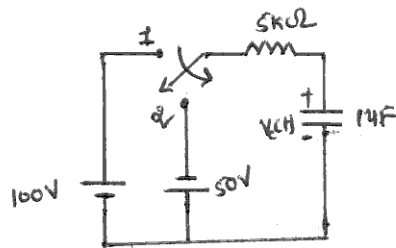


Fig. 2

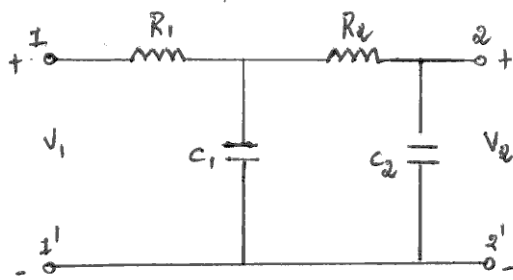


Fig. 3

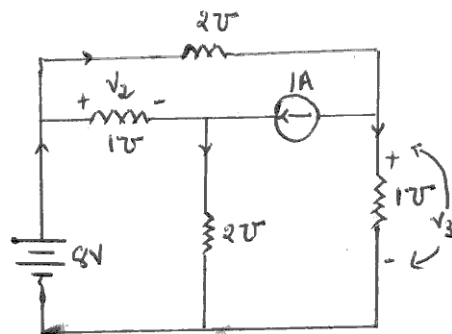


Fig. 5

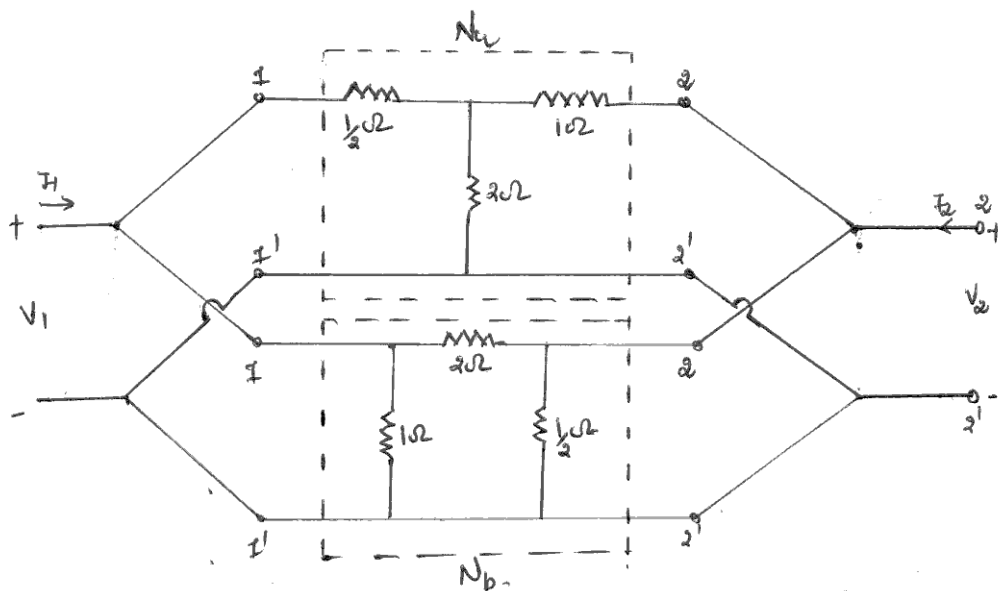


Fig. 4