Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Electrical & Electronics Engg./Electronics & Electrical)

(2018 Batch) (Sem.–3)

ELECTRICAL CIRCUIT ANALYSIS

Subject Code : BTEEE-301-18

M.Code : 76463

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a. Discuss the significance of compensation theorem.

b. State Norton theorem.

c. What do you mean by time constant? Discuss its effect on the circuit performance.

d. Why Laplace transform is used in circuit analysis? Discuss.

e. What do you mean by complex power? Discuss.

f. Define the coefficient of coupling.

g. What is characteristic impedance? Explain.

h. Write down the disadvantages of constant-k filters.

i. What do you mean by driving point impedance? Explain.

j. Discuss the importance of frequency response.

SECTION-B

2. State and prove (by considering an example) maximum power transfer theorem as applied to ac circuits.

3. In a RC series circuit R = 1 ohm and C = 0.5 farad. Find the current i(t) if an exponential voltage v(t) = 10e-t is suddenly applied at t = 0. Assume no initial charge in the capacitor.

4. Find the second Cauer form of the function $Z(s)=\dfrac{(s+1)(s+3)}{s(s+2)}$

5. Two 2 port networks A and B are connected in parallel.

   The Y parameters of the network A are

   Y_{11a} = 1mho, Y_{12a} = –2 mho , Y_{21a} = 2 mho , Y_{22a} = 5 mho

   The Y parameters of the network B are

   Y_{11b} = –1.5 mho , Y_{12b} = –1 mho , Y_{21b} = 2 mho , Y_{22b} = 2 mho

   Determine the Z parameters of the resultant network.

6. A series circuit consists of a resistance of 4Ω, an inductance of 500mH and a variable capacitance connected across a 100V, 50Hz supply. Calculate the capacitance require to produce a series resonance condition, and the voltages generated across both the inductor and the capacitor at the point of resonance.

SECTION-C

7. Using the principle of superposition, calculate the voltage $V_2(t)$ in the figure. Assume R_1=R_2= 1 ohm, R_3=0.5 ohm, C=2 F, β=2, α =1 and $i(t)$=sin t, v(t) = t.

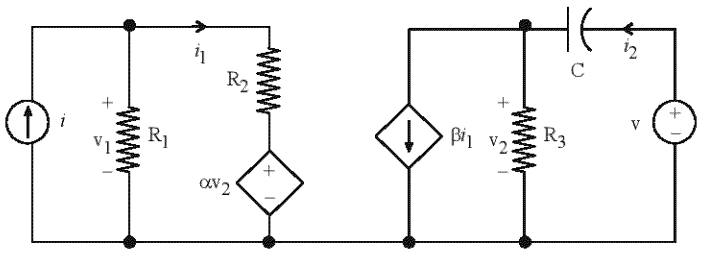

FIG.1

8. a. Determine the stability of the system using the Routh-Hurwitz criterion for the given polynomial F(s) = $2S_5$+ $2S_4$+ $4S_3$+ $4S_2$+22S+20

   b. Discuss the concept of poles and zeros in a network function. Also discuss the restrictions on the location of poles and zeros in the driving point functions.

9. Discuss the following in detail :

   a. Filters and their classification

   b. Design of m-derived filters

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.