



R17 Regulation

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

Subject code: 1P3BD

B.Tech II Year I Semester Supplementary Examinations, February 2021

Network Theory

(Electrical and Electronics Engineering)

Maximum Marks: 70

Date: 26.02.2021 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Define Mutual Inductance.
- 2 Write down the properties of incidence matrix
- 3 Write the relationship between phase and line quantities of voltage and current in a three-phase, balanced, star connected system
- 4 Write the advantages of three-phase circuits over single phase circuits.
- 5 Define natural response.
- 6 How a charged inductor and charged capacitor behave, just after the switching action
- 7 Define driving point impedance.
- 8 List out the conditions for reciprocity for Z, Y, ABCD and h parameters
- 9 Give the classification of filters based on frequency
- 10 Write down the limitation of constant k filters

Part-B

Answer All the following questions.

(10M X 5=50Marks)

- 11 A. Define co-efficient of coupling. Derive an expression for it in terms self and mutual inductances. (5M)
B. Coil 1 of a pair of coupled coils has a continuous currents of 5 A and the corresponding fluxes ϕ_{11} and ϕ_{12} are 0.2 and 0.4 m. Wb respectively. If the turns are $N_1 = 500$ and $N_2 = 1500$. Find, M and coefficient of coupling. (5M)

OR

- 12 A. Define the following terms (i) Tree (ii) cut- set (5M)
B. Define tie-set matrix. For the graph shown in figure 1, obtain the tie-set matrix and express branch currents in terms of link currents. Consider branches 2, 4 and 5 as branches of tree. (5M)

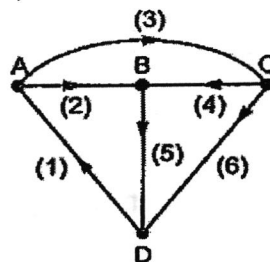
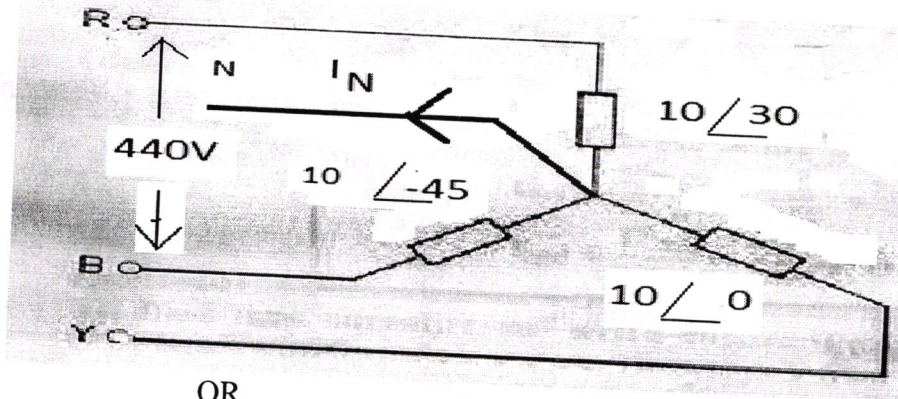


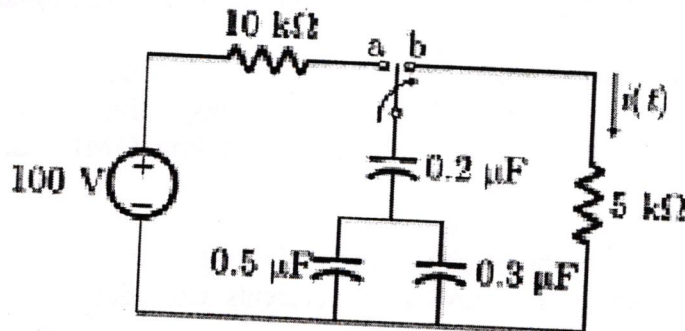
Figure 1

- 13
- Show that two-watt meters are enough to measure the total active power in a three-phase circuit. (5M)
 - Calculate the Line currents of the unbalanced three phase four wire star connected system shown below also calculate the current in the neutral wire? Assume the phase sequence as RYB. (5M)



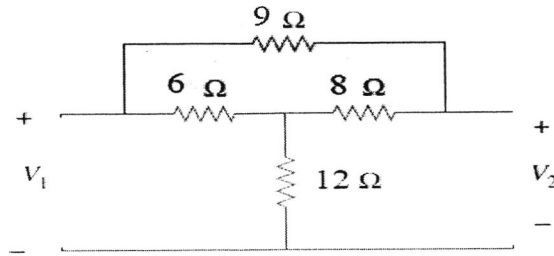
OR

- Show that single watt meter is enough to measure the total reactive power in a three-phase circuit. (5M)
 - A balanced three-phase delta connected load of $(9+j2)$ ohm is connected across a 400V, 3-Phase balanced supply. Determine the phase currents and Line currents. Assume phase sequence to be RYB. Also calculate the power drawn by the load. (5M)
- 15
- Derive an expression for transient response of a R-L series circuit excited by constant DC source. Also derive the expression for voltage across inductor. (5M)
 - The circuit shown below was there in position 'a' for long time and then moved to position 'b' at time $t=0$ sec. Determine the expression for $i(t)$. (5M)



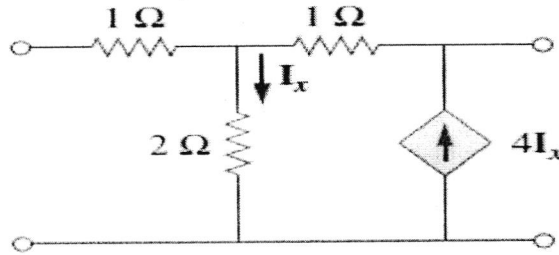
OR

- 16
- Derive an expression for transient response of a R-C series circuit excited by sinusoidal AC source. (10M)
- 17
- Express Y parameters in terms of h parameters. (5M)
 - Determine the Z parameters of the bridged T network shown in the figure below (5M)



OR

- 18 A. What are poles and zeros. Discuss the significance of poles and zeros? (5M)
 B. Determine the transmission parameters of the two-port network shown below (5M)



- 19 Derive an expression for characteristic Impedance of a symmetrical "T" filter. Also deduce the relation between open circuit and short circuit impedances and characteristic Impedance. (10M)

OR

- 20 Design the T section of an m-derived high pass filter having a design impedance of 300 and cut off frequency of 2000 Hz. The frequency of infinite attenuation is 1700Hz. (10M)

