R20 Regulation *Subject code: 3P5BC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Regular/Supplementary Examinations, February 2024

POWER SYSTEMS-II

(Electrical And Electronics Engineering)

Maximum Marks: 70 Date: 22.02.2024 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	CO	Bloom Tx
All the following questions carry equal marks	(10x2M=20 Marks)		
1	What are bundled conductors?	CO1	L1
2	State the factors which governs the capacitance of a transmission line?	CO1	L3
3	What is short transmission line?	CO2	L1
4	Define ABCD parameters of transmission line?	CO2	L2
5	Define surge impedance?	CO3	L2
6	Explain why the parameters of long line are distributed ?	CO3	L2
7	Define reflection and refraction coefficients?	CO4	L3
8	What is Ferranti effect?	CO4	L2
9	List the methods for improving string efficiency?	CO5	L3
10	Define stringing chart?	CO5	L2
	Part-B		
Answer All the following questions.	(5X10M=50Marks)		Bloom Tx level
11	a) Derive an expression for the loop inductance of single phase overhead transmission line. [5M]	CO1	L3
	b) Explain the concept of GMD and GMR. [5M]	CO1	L2
	OR		
12	a) Derive an expression for the capacitance of single phase overhead transmission line. [5M]	CO1	L3
	b) The three conductors of a 3 phase line are arranged at the corners of a triangle of sides 2 m, 2.5 m and 4.5 m. Calculate the inductance per km of the line when the conductors are regularly transposed. The diameter of each conductor is 1.24 cm. [5M]	CO1	L5
13	a) Derive the expressions for regulation and efficiency of a short transmission line. Draw required circuit and phasor diagram. [5M]	CO2	L3
	b) Explain the classification of lines based on their length of transmission. [5M]	CO2	L2
	OR		
14	a) Derive the A, B, C and D constants for Nominal-T model. [5M]	CO2	L3

	b) Input to a single-phase short line is 2000 KW at 0.8 pf lagging. The line has a series impedance of (0.4 + j0.4) ohms. If the load voltage is 3 KV, find the load and receiving end power factor. Also find supply voltage and supply power factor. [5M]	CO2	L5
15	a) Explain surge impedance loading. [5M]	CO3	L2
	b) Derive the A, B, C and D constants of long transmission lines using Rigorous solution. [5M]		L3
	OR		
16	a) Explain Wave Length and Velocity of Propagation Of Waves. [5M]	CO3	L2
	b) Explain Equivalent-T network model of long line. [5M]		L2
17	a) Explain about travelling wave phenomenon. [5M]	CO4	L2
	b) Derive an expression for critical disruptive voltage? [5M]		L3
	OR		
18	a) Write short notes on radio interference due to corona? [5M]	CO4	L2
	b) From fundamentals obtain the expressions for reflection and transmission co-efficient on a line terminated with load impedance equal to the surge impedance of the line. [5M]		L3
19	a) Derive the relationship between sag and tension for equal height of towers. [5M]	CO5	L3
	b) An overhead transmission line has a span of 220m, the conductor weighing 804 kg/km. Calculate the maximum sag if the ultimate tensile strength of the conductor is 5,758 kg. Assume safety factor 2. [5M]		L3
	OR		
20	a) Explain various types of insulators. [5M]	CO5	L2
	b) In a 33 kV overhead line there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self capacitance of each insulator, find (i) distribution of voltage over three insulators (ii) string efficiency. [5M]		L3