Question Paper Code: R18A22EE04

R18

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech II Semester Supplementary Examinations, Jan/Feb-2024

POWER SYSTEMS - II

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Time: 3 Hours **Max. Marks: 75**

Section – A (Short Answer type questions) (25 Marks)

Answer All Questions		Course Outcome	B.T Level	Marks
1.	Define Geometric mean distance in a transmission line?	CO1	L1	2M
2.	Explain the importance of a bundled conductor?	CO1	L2	3M
3.	Classify the transmission lines based on the length?	CO2	L2	2M
4.	Discuss why the capacitance is neglected in short transmission lines?	CO2	L2	3M
5.	Write the expression for the reflected voltage wave of a long transmission line?	CO3	L2	2M
6.	What do you mean by surge impedance and surge impedance loading of transmission line?	CO3	L2	3M
7.	Define string efficiency?	CO4	L1	2M
8.	Give brief about power loss due to corona.	CO4	L2	3M
9.	Give applications of sag template.	CO5	L2	2M
10.	What are the disadvantages of having more sag in the transmission lines?	CO5	L1	3M

Section B (Essay Questions)

Answer all questions, each question carries equal marks. **(5 X 10M = 50M)**

11. A)	i) Derive the expression for the capacitance of a three phase line?	CO1	L3	5M
	ii) Calculate the loop inductance of a single phase line with two parallel conductors spaced 3.7m apart. The diameter of each conductor is 1.5m?			5M
	OR			
B)	i) Derive the expression for the inductance of conductor due to external flux linkages in a single phase transmission line.	CO1	L3	5M
	ii) Calculate the inductance of a single phase circuit comprising of two parallel conductors of 6mm in diameter spaced 1.1m apart. If the material of the conductor is copper and steel with relative permeability of 50?			5M
12. A)	i) Derive the A, B, C and D constants for Nominal-Pie model.	CO2	L3	5M
	ii) A single phase over head transmission line is transmitting 1200kW power to factory at 11kV at 0.8 P.F lag. The line resistance and loop reactance of the line are 3ohm and 5ohm phase. Determine i) Source voltage ii) Percentage regulation iii) Efficiency			5M
	OR			
B)	A three phase transmission line is 135 km long. The series impedance is Z=0.04 + j 0.95 ohm per phase per km, and shunt admittance is Y=j 5.1×10^{-6} mho per phase per km. The sending end voltage is 132 kV and the sending end current is 154 A at 0.9 power factor lagging. Determine the voltage, current and power at the receiving end and the voltage regulation using medium line-T model.	CO2	L3	10M

13. A)	i) What are the various types of power system transients? Explain.	CO3	L2	5M
	ii) Explain the transient behavior of a line when it is connected to a cable?			5M
	OR			
B)	i) Derive the reflection and refraction coefficients of a line terminated with a resistance?	CO3	L3	5M
	ii) Discuss the concept of travelling waves on a transmission line?			5M
14. A)	i) Explain about the effect of radio interference due to corona on the transmission lines?	CO4	L2	5M
	ii) Obtain the mathematical expression for potential distribution over a string of suspension type insulators			5M
	OR			
B)	i) Explain how the string efficiency can be improved by grading of insulators?	CO4	L2	5M
	ii) Explain about the importance of critical voltage and power loss due to corona?			5M
15. A)	i) Derive the expression for sag of a transmission line between two supports of equal heights?	CO5	L3	5M
	ii) What is meant by stringing chart and explain its applications?			5M
	OR			
B)	i)What are disadvantages of providing too much or too small sag in a transmission line? Name different types of line supports with their place of use.	CO5	L2	5M
	ii) Determine the maximum sag of an overhead line conductor having a diameter of 19mm weighs 0.85 kg/m. The span length is 250 meters; wind pressure is 40 kg/m^2 of projected area with ice coating of 13 mm. The ultimate strength of the conductor is 8000 kg, the factor of safety is 2 and ice weighs 910 kg/m^3 .			5M