PVP 20

Code: 20EE3503

III B.Tech - I Semester – Regular Examinations - DECEMBER 2022

ELECTRICAL POWER GENERATION, TRANSMISSION AND DISTRIBUTION

(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

BL – Blooms Level CO – Course Outcome

			BL	CO	Max. Marks
UNIT-I					
1	a)	Sketch the schematic diagram of a typical pumped storage power plant and briefly explain each component in it.	L3	CO2	7 M
	b)	What is wind power? Illustrate the factors which affect the distribution of wind energy. What are the environmental effects of wind power plant?	L3	CO2	7 M
OR					
2	a)	Sketch the necessary diagram of thermal power plant and briefly explain the working of coal handling plant.	L3	CO2	7 M
	b)	Demonstrate PV module and PV array. What will be their effect on society?	L3	CO2	7 M

UNIT-II					
3	a)	Calculate the capacitance of a 100 km long 3-phase 50Hz Transmission line consisting of 3 conductors, each of diameter 2 cm and spaced 2 m at the corners of an equilateral triangle.	L3	CO3	7 M
	b)	Calculate the loop inductance per km of a single phase overhead transmission line when conductors have relative permeability of (*i*) 1 (*ii*) 100. Each conductor has a diameter of 1 cm and they are spaced 5 m apart.	L3	CO3	7 M
OR					
4	a)	Evaluate the inductance per conductor of 3-phase transposed line of conductors spaced at corners of a triangle of side 3m. Diameter of conductor is 1cm.	L3	CO3	7 M
	b)	Derive the expression for capacitance per phase balanced 3-phase 3 wire line with symmetrical spacing.	L3	CO3	7 M
UNIT-III					
5	a)	Find the expressions for i) sending end voltage ii) sending end current by analyzing the medium transmission line using nominal T network.	L4	CO4	7 M
	b)	Obtain ABCD constants by analyzing Rigorous Solution of long transmission line.	L4	CO4	7 M
OR					
6	a)	Solve efficiency and regulation of a 3-phase, 100km, 50Hz transmission line delivering 20MW at a P.f of 0.9 lagging and	L4	CO4	7 M

		132 KV to a balance load. The conductors are copper, each having resistance 0.1 ohm/km, 1.5 cms outside dia spaced equilaterally 2 meters, use nominal – T method.			
	b)	An overhead line has following data. Span length=200m, Conductor cross section area 1.29cm^2, Weight of conductor = 1.17kg/m, Ultimate stress=4250kg/cm^2 of projected area, Factor of safety = 5, wind pressure 122kg per square meter of projected area. Calculate sag.	L3	CO3	7 M
		UNIT-IV			
7	a)	What is an insulator, What are the requirements of Insulators? Explain different types of insulators and justify their application in practical power system.	L3	CO5	7 M
	b)	Explain the different factors effecting corona and mention its advantages and disadvantages.	L3	CO5	7 M
		OR			
8	a)	Explain grading of cables. Compare the grading of cables with respect to practical power system.	L3	CO5	7 M
	b)	In a 3-phase 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) the distribution of voltage over 3 insulators and (ii) String efficiency.	L3	CO3	7 M

UNIT-V					
9	a)	A 2-wire d.c. distributor cable AB is 2 km long and supplies loads of 150A, 250A, 400A situated 400 m, 1600 m and 2000 m from the feeding point A. Each conductor has a resistance of 0·025 ohm per 1000 m. Calculate the p.d. at each load point if a p.d. of 250 V is maintained at point A.	L4	CO4	7 M
	b)	Compare DC distribution and AC distribution systems.	L4	CO4	7 M
OR					
10	a)	A 2 wire dc distributor 300m long is uniformly loaded with 2A/m. Resistance of single wire is 0.3ohms/km. calculate voltage drop in distributor i) If the distributor is fed at one end, ii) If distributor is fed at both ends with equal voltages. Comment on the result.	L4	CO4	7 M
	b)	Analyze the voltage of calculations in AC distributor when power factors referred to receiving end voltage.	L4	CO4	7 M