4TH SEM./ EEE /ELECTRICAL /ELECTRICAL(I & C) /EME / 2022(S)

Th4 Generation, Transmission and Distribution

Full Marks: 80 Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions 2 x 10

a. What is photovoltaic effect?
b. Why transmission of electric power by high voltage DC is superior to that of high voltage AC system?
c. State Kelvin's law.
d. What are the factors affecting sag in an overhead line?
e. Write the methods of reducing corona effect?
f. What is a booster transformer?
g. Write the characteristics of Tariff.
h. Define diversity factor.
i. What do you mean by Ferranti effect?
j. Define voltage regulation.

2. Answer **ANY SIX** questions 6 x 5

a. Describe the working of Nuclear power plant with proper sketch.
b. Differentiate between EHVAC and HVDC system.
c. Explain different connection schemes of distribution system.
d. A two wire distribution AD is 225m long. The various loads and their positions are given below

At point	Distance from A in meters	Concentrated load in A
B	75	12
C	175	15
D	225	20

The cross sectional area of each conductor is 0.27 cm^2. The end A is supplied with 250 V. Resistivity of the wire is 1.78μΩ cm. Calculate the current in each section of the conductor, the two core resistance of each section and the voltage at each tapping point.

e. Describe Murray loop test for localization of earth fault in underground cables.
f. Explain different types of insulator.

	g	A generating station has following data Installed capacity= 300 MW, capacity factor= 50%, Annual load factor=60%, Annual cost of fuel, oil, etc= Rs. 9×10^7, capital cost= Rs. 10^9, annual interest & depreciation= 10%. Calculate minimum reserve capacity of the station and the cost per kWh generated?	
3		a. Define Sag. b. A transmission line has a span of 250m between supports, the supports being at same level. The conductor has a cross-sectional area of 1.29 cm^2. The ultimate strength is 4220 kg/cm^2 and factor of safety is 2. The wind pressure is 40 kg/cm^2. Calculate the height of the conductor above ground level at which it should be supported if a minimum clearance of 7m is to be kept between the ground and the conductor.	02 08
4		A 3 phase, 50 Hz overhead transmission line has following constants Resistance/phase=9.6 ohm, Inductance/phase= 0.097mH, Capacitance/phase=0.765µF If the line is supplying a balanced load of 24000 KVA 0.8 p.f lagging at 66 KV, using nominal π method Calculate i. Sending end current ii. Line value of sending end voltage iii. Sending end power factor iv. Percentage regulation v. Transmission efficiency.	10
5		A three phase ring main ABCD fed at A at 11 KV supplies balanced loads of 50A at 0.8 p.f lagging at B, 120A at unity p.f at C and 70A at 0.866p.f lagging at D, the load currents being referred to the supply voltage at A. The impedances of the various sections are: Section AB=(1+j0.6)Ω ; Section BC=(1.2+j0.9)Ω ; Section CD=(0.8+j0.5)Ω ; Section DA=(3+j2)Ω. Calculate the currents in various sections and station bus-bar voltages at B, C & D.	10
6		a. State different type of Bus-bar arrangements in substation. b. Draw the layout of 66/11 KV substation.	03 07
7		Write short notes on a. Necessity of EHVAC Transmission. b. Laying of Underground cables.	5×2