

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 $1.78 \mu\Omega \text{ cm}$. 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. 02
 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. 08
- 4 A 3 phase, 50 Hz overhead transmission line has following constants 10
 Resistance/phase=9.6 ohm, Inductance/phase= 0.097mH,
 Capacitance/phase=0.765 μ F
 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.
- 5 A three phase ring main ABCD fed at A at 11 KV supplies balanced loads of 10
 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= $(1+j0.6)\Omega$; Section BC= $(1.2+j0.9)\Omega$; Section CD= $(0.8+j0.5)\Omega$;
 Section DA= $(3+j2)\Omega$. Calculate the currents in various sections and station bus-bar voltages at B, C & D.
- 6 a. State different type of Bus-bar arrangements in substation. 03
 b. Draw the layout of 66/11 KV substation. 07
- 7 Write short notes on 5 \times 2
 a. Necessity of EHVAC Transmission.
 b. Laying of Underground cables.