4TH SEM./ELEECTRICAL./ELE. & MECH/ELE. AND ETC./EE(I & C)/ 2024(S)

Th-4   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 indicate marks

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

   a.   Name the important components of an overhead transmission line.

   b.   State the types of conductor materials used in overhead lines.

   c.   Define voltage regulation and state the expression for the same.

   d.   Write down the important components of the thermal power station.

   e.   What is feeder and distributor?

   f.   Define demand factor.

   g.   Define transmission efficiency.

   h.   What do you understand by tariff?

   i.   What is strain insulator? Where it is used?

   j.   What is the function of spillways and surge tank?

2.   Answer **Any Six** Questions   6 x 5

   a.   What is corona? State the factors affecting corona.

   b.   Discuss the factors for the choice of site for a nuclear power plant.

   c.   State and prove Kelvin's law for size of conductor for transmission.

   d.   Explain advantages and limitations of HVDC transmission system.

   e.   A consumer has maximum demand of 200kw at 40% load factor. If the tariff is Rs.100 per kW of maximum demand plus 10 paisa per kwH. Find the overall cost per kwh.

   f.   Explain the ring main distribution system.

   g   State the causes of low power factor. What are the methods to improve the low power factor?

3   Draw a schematic diagram of a thermal power plant and discuss its   10
         operation.

4   A 3-phase, 50 Hz transmission line 100 km long delivers 20MW at 0.9 pf lagging and at 110KV. The resistance and reactance of the line per phase is 0.2Ω and 0.4Ω respectively, while capacitive admittance is 2.5×10^{-6} siemen/km/phase. Evaluate
    (i) Sending end voltage,   2
    (ii) sending end current   4
    (iii) Transmission efficiency. Use nominal T method.   4

5   The towers of height 30m and 90m respectively support a transmission line   10
    conductor at water crossing. The horizontal distance between the towers is 600m. If the tension in the conductor is 1600 kg, find the minimum clearance of the conductor and water and clearance mid-way between the supports. The weight of the conductor is 2 kg/m. Bases of towers can be considered to be at water level.

6   Describe the Varley loop test for the location of the earth fault in an   10
    underground cable.

7   A 2-wire D.C. ring distributor is 300 m long and is fed at 240 V at point A.   10
    at point B, 150 m from A, a load of 120 A is taken and at C, 100 m in the opposite direction, a load of 80 A is taken. If the resistance per 100 m of single conductor is $0\cdot03\ \Omega$, find :

    (i) Current in each section of distributor

    (ii) Voltage at points B and C