Duration: 3 Hours **[Max Marks: 80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any Three questions out of the remaining Five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

Q1 Attempt any **four** **[20]**

a Draw a single line diagram of a typical AC supply system and explain.

b List the various types of Insulators? Explain Pin type Insulator.

c Explain step and touch potential.

d Why long transmission lines are transposed?

e What is per unit system? State its advantages?

Q2

a A 3 – unit insulator string is fitted with a guard ring. The capacitance of the link pins to metal work and guard ring can be assumed to be 15% and 5% of the capacitance of each unit. Determine the voltage distribution and string efficiency. **[10]**

b Draw phasor diagram for a nominal Π (pi) circuit of a transmission line. Derive expression for sending end voltage and current. **[10]**

Q3.

a A 200 km long 3-phase overhead line has a resistance of 48.7 ohms per phase, inductive reactance of 80.20 ohms per phase and capacitance (line to neutral) 8.42 nF (nano farad) per km. It supplies a load of 13.5 MW at a voltage of 88 kV and power factor 0.9 lagging. Using nominal T circuit, find the sending end voltage, current, regulation and power angle. **[10]**

b Write a short note on Grading of Cables. **[10]**

Q4.

a Derive the expression for capacitance per phase per km of a single phase line taking into account the effect of ground. **[10]**

b Explain Skin effect and Proximity effect. **[10]**

Q5.

a What is neutral grounding? Explain any two methods of neutral grounding? **[10]**

b Derive expression for inductance of a three phase line with un-symmetrical spacing. **[10]**

Q6.

a Write a short note on **[10]**
Tuned Power line and Surge impedance loading.

b Discuss the measurement of earth resistance and soil resistivity. **[10]**

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