

- 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  $\Pi$  (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 Tuned Power line and Surge impedance loading. [10]
  - b Discuss the measurement of earth resistance and soil resistivity. [10]

\*\*\*\*\*