

Duration – 3 Hours

Total Marks- 80

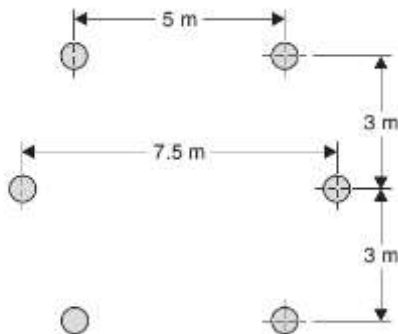
- N.B.:** - (1) Question No.1 is compulsory.
 (2) Attempt any three questions out of the remaining five questions.
 (3) Assume suitable data if necessary and justify the same.

Q 1. Answer any four questions.

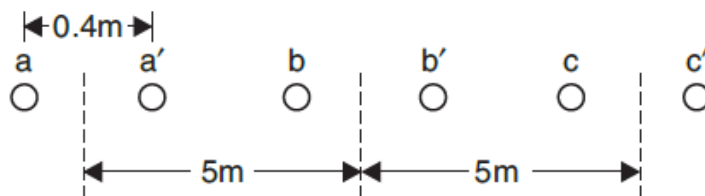
- A) State the advantages and disadvantages of Solar cell power generation. **05**
- B) State the advantages of Suspension type insulators. **05**
- C) What are ACSR conductors? Explain the advantages of ACSR conductors when used for overhead transmission lines **05**
- D) Discuss in details skin effect with a neat diagram. **05**
- E) Define per unit system and discuss its advantages. **05**

Q 2 a) Derive the expression for inductance in a three phase line with conductors untransposed. What is the significance of imaginary term in expression for inductance **10**

Q 2 b) Determine the inductance per km of a double circuit 3-phase line as shown in figure below. The transmission line is transposed within each circuit and each circuit remains on its own side. The dia of each conductor is 15 mm. Explain why the given arrangement is better as compared to when conductors of the same phase are placed in the same horizontal plane. **10**



Q 3 a) Determine the capacitance and charging current per unit length of the line when the arrangement of the conductor is shown in Fig. The line is completely transposed. The dia of conductor is 15 mm, and operating voltage is 220 kV. **10**



Q 3 b) Write short note on grading of underground cable. **10**

- Q 4 a) Draw the equivalent circuit representation and phasor diagram of a medium transmission line in Nominal pi method. Derive the expressions for its A, B, C, D constants. **10**
- Q 4 b) Determine the efficiency and regulation of a three phase, 50Hz, 150 km long transmission line having three conductors spaced 3.5 metres delta formation when the receiving end delivers 25 MVA at 120 kV 0.9pf lagging. The resistance of the conductor is 0.25 ohm per km and the effective dia is 0.75 cm. Use the nominal T method. Neglect capacitance and assume temperature of 20°C. **10**
- Q 5 a) Develop the expression of string efficiency for 3 disc insulators string. **10**
- Q 5 b) Each conductor of a 33 kV, 3-phase system is suspended by a string of three similar insulators; the capacitance of each disc is nine times the capacitance to ground. Calculate the voltage across each insulator. Determine the string efficiency also. **10**
- Q 6 a) Explain the single line diagram of Power system network **10**
- Q 6 b) Write short note on neutral grounding **10**
