Instructions:
(1) All Questions are compulsory.
(2) Answer each next main Question on a new page.
(3) Illustrate your answers with neat sketches wherever necessary.
(4) Figures to the right indicate full marks.
(5) Assume suitable data, if necessary.
(6) Use of Non-programmable Electronic Pocket Calculator is permissible.
(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any TEN :

(a) State any two reasons for the necessity of transmission of electricity.

(b) Draw simple line diagram or block diagram of A.C. supply system.

(c) State any four properties of conductor material used for transmission line or cable.

(d) State any four names of insulating materials used in manufacturing of cable.

(e) Enlist various types of supports (poles) used for transmission and distribution.

(f) Define regulation of transmission line and write formula.

(g) Write classification of transmission line according to distance.

(h) State assumption made while calculating performance of transmission line in ‘T’ network.

(i) State any two applications of HVDC transmission system.
(j) State why three-phase four wire supply system is preferred for secondary
distribution system.

(k) State main components of distribution system.

(l) State types of line insulators used in Transmission and distribution.

2. **Attempt any FOUR :**

   (a) State any four factors that are considered while designing a distributor.

   (b) State long form of ‘ACSR’ conductors. State its three advantages.

   (c) State any four desirable properties of cable.

   (d) Compare RCC pole and steel tubular pole based on (i) cost (ii) life (iii) tensile
        strength (iv) application.

   (e) State any four reasons of failure of line insulators.

   (f) State what is skin effect ? How it can be reduce ?

3. **Attempt any FOUR :**

   (a) Compare on any four points primary and secondary distribution system.

   (b) A three phase transmission line system is suspended by a string of three discs.
        The lowest insulator voltage is 13 kV and across the next is 11 kV. Find out
        line voltage and string efficiency.

   (c) Define string efficiency. What does it indicates ? What will be the value of
        string efficiency of HVDC transmission line.

   (d) State what is proximity effect ? How it can be reduce ?

   (e) Draw figure of transposition of conductor. Why it is necessary ?

   (f) Draw equivalent circuit of medium transmission line of nominal ‘π’ network.
        Draw vector diagram.
4. Attempt any FOUR:

(a) State what is corona. State its two disadvantages.

(b) State any four possible conditions when Ferranti effect will occur.

(c) An overhead three-phase transmission line delivers 5 MW at 22 kV at 0.8 lagging power factor. The resistance and reactance of each conductor is 4 Ohm and 6 Ohm respectively. Determine sending end voltage and percentage regulation.

(d) State effect of low power factor on efficiency and regulation of transmission line.

(e) Draw basic block diagram for HVDC transmission line starting from generating station and end at receiving station.

(f) State four advantages and four limitations of EHVAC transmission line.

5. Attempt any FOUR:

(a) State generalized constants A, B, C and D of formula for nominal ‘T’ network.

(b) Draw line diagram of “grid system”. State its two advantages.

(c) State why radial distribution system is used for short distance only.

(d) State any four requirements of an ideal distribution system.

(e) Compare Indoor and outdoor substation any four points.

(f) Draw layout of 33/11 kV sub-station.

P.T.O.
6. Attempt any FOUR:

(a) A single phase 11 kV short transmission line delivers 1000 kW power at 0.8 p.f. lagging total resistance and inductive reactance of the line are 5 Ohm and 5.6 Ohm. Determine sending end voltage and regulation.

(b) Write sequence of operation of isolator, earthing switch and circuit breaker while opening and closing.

(c) State the factors to be considered while selecting site for sub-station.

(d) Compare on any four points nominal ‘T’ and nominal ‘π’ network of medium transmission line.

(e) Name four important protective devices used in sub-station and mention their function.

(f) Compare pin type and suspension type insulator on any four points.