11718

3 Hours / 100 Marks   Seat No. ☐☐☐☐☐☐☐☐

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 of the following :**   **20**

(a)   State necessity of transmission of electricity. (any two points)

(b)   State any four transmission line components.

(c)   Define stranded conductor. State its two advantages.

(d)   Classify cables according to voltage level.

(e)   Define : (i) VCV (ii) DCV referred to corona.

(f)   Classify transmission lines as per voltage levels.

(g)   State two transmission routes of HVDC transmission line in Maharashtra.

(h)   Draw single line diagram of 11 kV/440V distribution system.

(i)   Define voltage regulation of transmission line.

(j)   Define : (i) Feeder (ii) Distributor

(k)   Define : (i) Primary (ii) Secondary distribution system

    (l)   State the function of equipments used in sub-station (a) CT and PT (b) Isolator.

    (m)   State the primary & secondary distribution standard voltages in our country.

    (n)   State any four advantages of H.V. transmission.

2.   **Attempt any FOUR of the following :**   **16**

    (a)   Draw a neat sketch of Bipolar HVDC transmission system. State its advantages and disadvantages.

    (b)   State any four causes of failure of line insulators.

    (c)   State factors on which proximity effect depends ? How it can be reduced ?

    (d)   State advantages and disadvantages of corona. (any two each)

    (e)   State assumption made and draw phasor diagram for transmission line represented as a nominal 'T' network.

    (f)   Compare between nominal "T" and nominal "π" transmission line network. (any four points)

3.   **Attempt any FOUR of the following :**   **16**

    (a)   Define skin effect. State methods to reduce it.

    (b)   State Ferranti effect. When these effects occur ?

    (c)   Draw block diagram for HVDC transmission starting from generator.

    (d)   Compare HVAC and HVDC transmission system. (any eight points)

    (e)   Compare indoor and outdoor sub-station. (any eight points)

    (f)   Classify sub-station on the basis of (i) service requirements (ii) constructional features.

4. **Attempt any FOUR of the following :** 16

   (a) Write any four advantages of Disc insulators.

   (b) Write any four properties of conductor material used for transmission line.

   (c) An overhead three phase transmission line delivers 5000 kW at 22 kV at 0.8 lagging P.F. The resistance and reactance of each conductor is 4 ohm and 6 ohm respectively. Determine sending end voltage and regulation.

   (d) Define transposition of conductor with the help of diagram.

   (e) Define sub-station. State factors to be considered for its site selection.

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

5. **Attempt any FOUR of the following :** 16

   (a) State (any eight points) the advantages of underground system of transmission over overhead system.

   (b) State the different methods of laying underground cable. Draw figure of any one type.

   (c) A single phase AC distributor of 600 mtr length has total impedance of (0.02 + j 0.04) ohm and is fed from one end at 220 volt. If it is loaded as shown in fig. Calculate the voltage drop and voltage at far end.
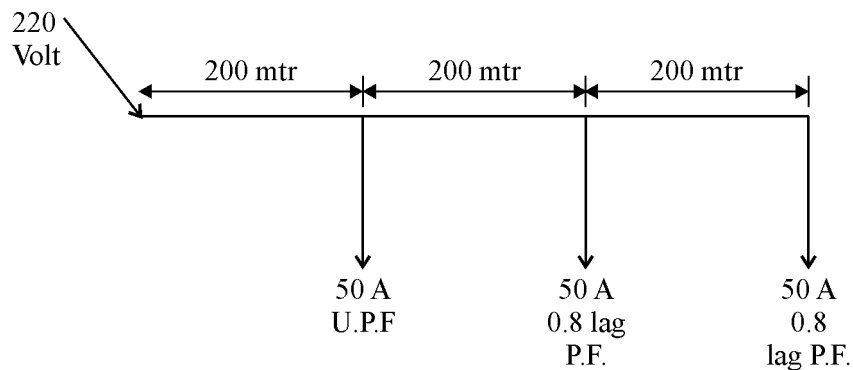
   (d) Derive an expression for voltage regulation of short transmission line.

(e)   State the requirements of an ideal distribution system.

(f)   Draw Grid A.C. distribution system scheme of connection and state its two advantages.

6.   Attempt any FOUR of the following : **16**

(a)   State any eight characteristics or properties of line support.

(b)   State on any four points comparison between AC distribution and DC distribution system.

(c)   A three phase overhead line is being supported by three disc insulators. The potential across line unit is 17.5 kV. Assume that shunt capacitance between each insulator and each metal work of tower to be $1/10^{th}$ of capacitance of insulator. Calculate :

   (i)   Line voltage

   (ii)   String efficiency

(d)   State any four factors to be considered while designing the feeders.

(e)   Compare radial distribution system and ring distribution system on the basis of

   (i)   Initial cost

   (ii)   Reliability to maintain supply

   (iii) Application

   (iv)   Time required for completion of layout (work)

(f)   Draw layout of power system and show primary and secondary distribution system on layout drawn.

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