

17417

14115

3 Hours / 100 Marks

Seat No.

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- 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) Assume suitable data, if necessary.
(5) Use of Non-Programmable Electronic Pocket Calculator is permissible.

Marks

1. Attempt any TEN :

20

- State the standard voltages in India – Transmission line and Distribution line.
- State the classification of transmission line.
- State the different types of conductors used in transmission system.
- State the classification of cables based on voltage levels.
- Define ‘Disruptive Critical Voltage’ and ‘Visual Critical Voltage’ with reference to phenomenon of corona.
- Define the string efficiency and state its significance.
- State the difference between HV transmission and EHV transmission.
- State any two HVDC transmission line rates in India.
- State the expression for efficiency and regulation of transmission line.
- List out the components of distribution system.
- State the requirement of an ideal distribution system.
- State the classification of substation according to application.



P.T.O.

2. Attempt any FOUR :**16**

- (a) State any four advantages of HV for power transmission.
- (b) State the electrical and mechanical properties of insulating materials.
- (c) What is proximity effect ? How it affects the performance of the line ?
- (d) State the advantages and disadvantages of corona.
- (e) Draw vector diagram of a short transmission line for lagging power factor.
- (f) Define the generalized circuit constants and state their equations for medium (π type) transmission line.

3. Attempt any FOUR :**16**

- (a) What is skin effect ? How it affects the performance of transmission line ?
- (b) What is meant by transposition of conductors and state its advantage ?
- (c) Compare EHVAC and HVDC transmission line on the basis of voltage level, amount of power delivered, equivalent essential & economical viability.
- (d) Draw layout of Bi-polar HVDC transmission line.
- (e) List out the parameters to be considered for site selection for sub-station.
- (f) Draw symbols of components of 33/11 kV sub-station given below.
 - (i) Incoming feeder
 - (ii) Power transformer
 - (iii) Circuit breaker
 - (iv) Control panel
 - (v) Lightning arrester
 - (vi) Horn gap
 - (vii) CT & PT
 - (viii) Outgoing line

4. Attempt any FOUR :**16**

- (a) State the applications of following type of insulators used in transmission & distribution system.

Pin type ; Suspension type ; Strain type ; Stay insulator

- (b) State any four advantages of bundled conductors used in transmission line.

- (c) 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 5Ω and 5.6Ω . Determine sending end voltage.

- (d) Explain the formation of resistance and capacitance in transmission line.

- (e) State the function of following components in 11 kV/400 V distribution transformer sub-station.

(i) AB switch

(ii) Cross Bracing

(iii) Drop down fuse

(iv) Distribution transformer

- (f) State any two advantages and any two disadvantages of Indoor sub-station.

5. Attempt any FOUR :**16**

- (a) Compare underground cable and overhead line on the basis of flexibility, fault location, safety and capacity.

- (b) Explain the procedure of cable laying.

- (c) A single phase 11 kV short transmission line is transmitting 500 kVA at 0.8 p.f. lagging. If the $R_{\text{total}} = 7.5 \Omega$ and $X_l = 4.5, \Omega$ calculate the efficiency of the line.

- (d) Derive the expression for voltage regulation of short transmission line.

- (e) List out the factors to be considered while designing of feeder.

- (f) State any four requirements of ideal distribution system.

6. Attempt any FOUR :

16

- (a) Compare RCC pole and steel tubular pole based on cost, life, tensile strength, insulating properties.
- (b) Give the comparison between single circuit and double circuit transmission line.
- (c) Explain the potential distribution over a string of three disc suspension insulators.
- (d) “A feeder is designed based on its current carrying capacity rather than voltage drop in it.” Justify.
- (e) State the advantages and disadvantages of radial and ring distribution scheme.
- (f) A single phase AC distributor of 700 m length has total impedance $(0.022 + j 0.42)$ ohms. It is fed at one end at 250V. If the load distribution is as shown in following figure, calculate voltage at far end.

