

17417

11819

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) 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 :

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- (a) Write any two advantages of high voltage of Transmission line.
- (b) State standard voltage in India for the following :
  - (i) Generation Voltage
  - (ii) Primary Transmission Voltage
- (c) State the necessity of transmission of electricity. (any two reason)
- (d) State long form of
  - (i) AAC
  - (ii) AAAC

- (e) State effect of line parameter on performance of transmission line.
- (f) State any two HVDC transmission line in India.
- (g) State the classification of substation according to the method of construction.
- (h) Why radial distribution system used for short distance ?
- (i) State four requirements of a distribution system.
- (j) Draw a vector diagram at leading power factor in transmission line. State its effect on regulation.
- (k) State desirable properties of Cable. (any four)
- (l) State any four Trade name of ACSR conductor.

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

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- (a) Draw single line diagram of a Electric supply system.
- (b) State the advantage and disadvantages of stranded conductors.
- (c) A string of three unit suspension insulator observed to have voltage distribution on top disc 9 kV, middle disc 12 kV. Find
  - (i) Line voltage
  - (ii) String efficiency
- (d) Draw a neat labelled diagram of the following :
  - (i) Pin type
  - (ii) Strain type insulator
- (e) State and explain any one method for improving string efficiency.

- (f) Compare EHVAC and HVDC transmission line on given points :
- (i) Number of conductors for double circuit.
  - (ii) Capital cost of sub-station
  - (iii) Skin effect
  - (iv) Proximity effect
  - (v) Ferranti effect
  - (vi) Corono loss
  - (vii) Copper loss
  - (viii) String efficiency

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

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- (a) Under which conditions Ferranti effect occurs, state any four conditions ?  
What is Ferranti effect ?
- (b) State any four factors which affects Corona. State two points how Corona effect can be reduced.
- (c) Draw layout of Homopolar HVDC transmission line mention polarity of overhead conductor.
- (d) Write sequence of operation of isolator and circuit breaker while opening and closing.
- (e) State the function of equipments used in sub-stations :
  - (i) Earth Switch
  - (ii) Relay
  - (iii) Lighting Arrester
  - (iv) Auxiliary transformer

**P.T.O.**

- (f) 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 :

- (i) Sending end voltage
- (ii) Percentage regulation of transmission line.

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

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- (a) State two reasons the transposition of conductor. Draw figure of transposition of conductor.
- (b) Compare indoor and outdoor sub-station on given points :
  - (i) Capital cost
  - (ii) Time required for completion
  - (iii) Availability of natural light
  - (iv) Space required
- (c) Compare pin type and suspension insulators on given points :
  - (i) Position of insulator on cross arm.
  - (ii) Position of conductor on insulator.
  - (iii) Reaction on cross arm.
  - (iv) Possibility of flash over due to large birds
  - (v) Maintenance/Replacement cost
  - (vi) Maximum voltage level
  - (vii) Effect on height of supporting structure.
  - (viii) Life

- (d) Which are the factors to be considered while designing feeders ?
- (e) State the four methods of laying of cable. State precautions while laying of underground cable in the situation :
  - (i) Minimum clearance between cable and water pipe line when running in parallel.
  - (ii) Minimum clearance between cable and water pipe line when running in parallel.
  - (iii) If cable is laid through pipe what should be diameter of pipe.
  - (iv) When more than one cable is to be laid in the same trench, what should be minimum spacing between two cables ?
- (f) Give the classification of cables.
  - (i) According with voltage levels.
  - (ii) According to numbers of core.

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

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- (a) State any eight requirements or properties of the line supports used in transmission and distribution.
- (b) A overhead three phase transmission line delivers 5000 kW at 22 kV at 0.8 lagging p.f. The resistance and reactance per phase is 4 ohm and 6 ohm respectively. Determine
  - (i) Sending end voltage
  - (ii) Percentage regulation of Transmission line

**P.T.O.**

- (c) While calculating performance of medium transmission line, what assumptions are made in case of
- (i) Nominal 'T' Method
  - (ii) Nominal 'TT' Method.
- (d) State the effect of lag, lead and unity power factor on regulation of transmission line.
- (e) State the effect of inductance and capacitance on performance of transmission line.
- (f) A single phase 11 kV line with a length of 20 km is to transmit 750 kVA load. The total inductive reactance of line is 0.5 ohm per km and total resistance is 0.2 ohm per km. Calculate the sending end voltage and efficiency of the line at 0.8 p.f. lagging.

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

**16**

- (a) Define EHV line. State its necessity any four points.
- (b) Write limitation and application of High Voltage DC (HVDC).
- (c) Give comparison between Feeder and Distribution.
- (d) What are different types of distribution scheme.
- (e) Draw layout of Grid distribution scheme and write two advantages.

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- (f) A single phase AC distributor of 900 m length has total impedance of  $(0.03 + j 0.05)$  ohm and is fed from one end at 250 V. If it is loaded as in figure No. 1, calculate the voltage drop and voltage at far end.



