C14–EE–503

# 4638

## BOARD DIPLOMA EXAMINATION, (C–14)

## OCT/NOV—2016

## DEEE—FIFTH SEMESTER EXAMINATION

POWER SYSTEMS—II (T & D)

*Time* : 3 hours ] [ *Total Marks* : 80

### PART—A

3×10=30

***Instructions*** : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Write the relative advantages of DC transmission over AC.
2. Compare 3-phase AC three-wire system with DC 2-wire system.
3. State Ferranti effect.
4. List any three locations of HVDC transmission systems along with their ratings.
5. Define sag and state factors affecting the sag.
6. State the properties of insulating materials used for underground cables.
7. Classify the underground cables based on voltage rating.
8. Discuss the relative merits of indoor and outdoor substations.



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9. Distinguish between primary distribution and secondary distribution.

10. State the future of a distributor fed at one end.

## PART—B

10×5=50

***Instructions*** : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. Derive an expression for loop inductance of a single-phase transmission line.

12. A single-phase transmission line with loop resistance of 16 Ω, loop inductance of 0·2 H and capacitance of 0·6 μF delivers 1·2 MVA, 0·8 lagging load at 22 kV and 50 Hz. Calculate the *(a)* voltage, *(b)* current and *(c)* power factor at the sending end by nominal π-method.

13. *(a)* Derive an equation for percentage regulation of a short transmission line. 5

*(b)* State the advantages and disadvantages of radial distribution system. 5

14. Define string efficiency and explain the methods to improve it.

15. A transmission line of span of 200 meters between level supports. The conductor has a cross section area of 1·29 $cm^2$, weighs 1170 kg/km and has a breaking ~~truss~~ Stress of 4218 $kg/cm^2$. Calculate the sag for a safety factor of 5, allowing a wind pressure of 122 $kg/m^2$.

16. *(a)* Derive an expression for insulation resistance of a cable. 5

*(b)* Find the insulation resistance/km of the cable of conductor diameter 1 cm and internal sheet diameter 1·75 cm and resistivity of a dielectric is $6 \times 10^{12}$ Ω-m. 5



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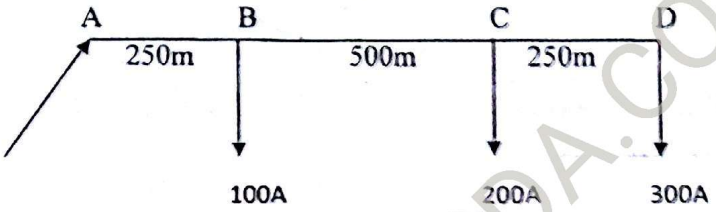
**17.** Explain various equipments used in substation.

**18.** A d.c. distributor of 1000 meter long and is loaded as under :

| | | | |
|---|---|---|---|
| Distance from the feeding point (meters) | : | 250 | 750 1000 |
| Load in amperes | : | 100 | 200 300 |

The resistance of each conductor is 0·025 Ω/km. Find the voltage at each load point if the voltage at the feeding point *A* is maintained at 250 V.

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