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C14-EE-503

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**BOARD DIPLOMA EXAMINATION, (C-14)  
OCT/NOV—2018  
DEEE—FIFTH SEMESTER EXAMINATION**

POWER SYSTEMS-II(TRANSMISSION & DISTRIBUTION)

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 any three advantages and disadvantages of A.C. transmission system.
2. State the need of transposition in transmission lines.
3. What are the methods of reducing corona?
4. Write any three advantages and three disadvantages of HVDC transmission.
5. State the factors on which the conductor spacing and ground clearance depend.
6. What are the factors affecting sag?
7. Determine the insulation resistance of a single core cable of length 3 km having a conductor radius of 12.5mm with insulation thickness 10mm and specific resistance of insulation of  $5 \times 10^{12} \Omega\text{-m}$ .
8. What are the purposes of (i) Busbars, (ii) Instrument transformers, (iii) Lightning arresters in a substation?

9. Write any three advantages and disadvantages of radial distribution system.

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10. What is the purpose of feeder, distributor and service main?

### PART-B

10×5=50

**Instructions :** (1) Answer *any five* questions.  
(2) Each questions carries **ten** marks.  
(3) Answers should be comprehensive and the criteria for valuation are the content but not the length of the answer.

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

12. A 3 phase 50Hz 100km over head transmission line delivers 20MW at 0.9pf lagging and 66kV. The reactances of the line per phase/km are 0.1 ohm and 0.5 ohm respectively while susceptance/phase/km is  $10^{-5}$  siemen. Calculate (a) sending end current, (b) sending end voltage(line to line), (c) sending end power factor, (d) transmission efficiency. Use nominal TT method.

13. (a) Derive an expression for sag in overhead lines when the supports are at equal levels and the tension is governed by the conductor weight and wind.

(b) A 220 kV transmission has the following data :

Weight of the conductor=680 kg/km, Length of span= 260m

Safety factor =2, Ultimate strength =3100 kg.

Calculate the hight above ground at which the conductor should be supported if the ground clearance required is 2 m.

14. (a) Define string efficiency. Explain method of improving string efficiency.

(b) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit and middle unit are 8 kV and 11 kV respectively. Calculate (i) Ratio of capacitance between pin and earth to self capacitance of earth unit, (ii) The string efficiency.

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15. (a) Compare overhead lines with underground cables in any five aspects. \*
- (b) Classify different types of underground cables.
16. (a) List the various equipments used in a substation and write their purposes.
- (b) Compare indoor and outdoor substation in any five aspects.
17. A single phase a.c. distributor AB 300m long is fed from end A and loaded as follows :
- (i) 100 A at 0.707 p.f. lagging 200m from point A.
- (ii) 200A at 0.8 p.f. lagging 300m from point A.

The resistance and reactance of the distributor 0.2  $\Omega$  and 0.1  $\Omega$  per km. Calculate the voltage at sending end when the load p.f. refers to voltage at far end of 230V.

18. (a) Explain the concept and applications of hot line technique.
- (b) Explain ring distribution systems. What are the advantages?

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