C16–EE–**503**

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BOARD DIPLOMA EXAMINATION, (C–16)

OCT/NOV—2018

DEEE—FIFTH SEMESTER EXAMINATION

POWER SYSTEMS—II (TRANSMISSION, DISTRIBUTION AND PROTECTION)

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. What is the effect of supply voltage on volume of conductor material?

2. Define short, medium and long transmission lines.

3. What are the methods of reducing corona?

4. Write any three advantages of HVDC transmission.

5. State the need of cross arms.

6. Determine the insulation resistance of a single-core cable of length 3 km having a conductor radius of 12·5 mm with insulation thickness 10 mm and specific resistance of insulation of 5×10^{12} Ω-m.

7. List any six equipments used in substations.

8. Compare between radial and ring distribution systems on any three aspects.

9. Explain feeder, distributors and service mains.

10. State the necessity of busbar protection.

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. *(a)* State the need of transposition of overhead lines and define regulation.   3+2=5

(b) A 3-phase overhead transmission line delivers 5000 kW at 22 kV at 0·8 p.f. lagging. The resistance and reactance per phase are 4 and 6 respectively. Calculate *(i)* percentage regulation and *(ii)* efficiency.   5

12. *(a)* Explain charging currents in transmission lines.

(b) Define corona. What are the effects of corona?   5+5=10

13. *(a)* State the factors affecting the sag.

(b) A transmission line has a span of 225 m and weight of 75 kg/100 m. The line conductor has a cross-section area of 3·1 sq. cm and ultimate breaking strength of 1250 kg/sq. cm. Line is covered with ice and its weight is 1 kg/m. If load due to wind pressure is 1·4 kg/m, calculate maximum sag. Take safety factor as 3.   5+5=10

14. *(a)* Explain any two methods 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 each unit and *(ii)* the string efficiency.   5+5=10

15. *(a)* Compare overhead lines with underground cables in any five aspects.

(b) Show that the insulation resistance of a cable is inversely proportional to its length. 5+5=10

16. *(a)* List the merits and demerits of gas insulated substations.

(b) Compare between indoor and outdoor substations in any five aspects. 5+5=10

17. A single-phase a.c. distributor *AB* 300 m long is fed from end *A* and loaded as follows :

(i) 100 A at 0·707 p.f. lagging 200 m from point *A*

(ii) 200 A at 0·8 p.f. lagging 300 m from point *A*

The resistance and reactance of the distributor are 0 2 and 0 1 per km to and from Calculate the voltage at sending end when the load p.f. refers to voltage at far end of 230 V. 10

18. *(a)* Explain time distance relay protection of transmission lines.

(b) Explain the effects of pilot wire relaying. 5+5=10

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