



C16-EE-503

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BOARD DIPLOMA EXAMINATION, (C-16)
NOVEMBER—2020
DEEE—FIFTH SEMESTER EXAMINATION
POWER SYSTEMS—II (T, D & P)

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 briefly about proximity effect.
2. Define short, medium and long transmission lines.
3. List the methods of reducing corona.
4. List the protective measures adopted for HVDC systems.
5. State any three advantages and disadvantages of steel towers.
6. Compare overhead lines with underground cables.
7. State the need for substation.
8. Define feeder and distributor.
9. Distinguish between primary distribution and secondary distribution.
10. State the different schemes of protection for busbars.

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PART—B

10×5=50

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

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

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

- 11.** A three-phase 50 Hz 250 km overhead transmission line delivers a load of 25 MVA at 132 kV an 0.8 p.f. lagging. For whole length of the line the resistance and inductive reactance per phase are 27.5 Ω and 97.4 Ω respectively. While shunt admittance is 7.38×10^{-4} mho per phase. Calculate (i) Sending end current (ii) sending end voltage (line to line) and (iii) voltage regulation. Use nominal π (pie) method. 10
- 12.** (a) Explain charging current in transmission lines and power loss due to it. 5
- (b) Explain the concept and applications of hot line techniques in transmission lines. 5
- 13.** (a) Define sag. State the factors affecting sag. 4
- (b) An overhead line at a river crossing is supported from two towers at heights of 40 m and 90 m above water level. The horizontal distance between the towers being 400 m. If the maximum allowable tension is 2000 kg, find the clearance between the conductor and water at a point mid-way between the towers. Weight of the conductor is 1 kg/m. 6
- 14.** (a) An insulator string consists of three units, each having a safe working voltage of 15 kV. The ratio of self capacitance to shunt capacitance of each unit is 8:1. Find the maximum safe working voltage of the string. Also find the string efficiency. 6
- (b) What are the causes of failure of insulators in transmission and distribution? 4

- 15.** (a) Classify the cables based on : 5
(i) Number of conductors
(ii) Voltage
(iii) Insulation and lead sheathing
- (b) A single core cable 5 km long has an insulation resistance of $0.4 \text{ M}\Omega$. The core diameter is 20 mm and the diameter of cable over the insulation is 50 mm. Calculate the resistivity of the material. 5
- 16.** List the equipments used in substations and state the purpose of any five. 10
- 17.** A single phase distributor 2 km long supplies a load of 140 A, 0.9 p.f. lagging at its far end and 90 A, 0.8 p.f. lagging at its midpoint. Both power factors are referred to the voltage at the far end. The resistance and reactance per km (go and return) are 0.5Ω and 0.1Ω respectively. Calculate the voltage at sending end, if the voltage at far end is maintained at 230V. 10
- 18.** Explain differential protection for parallel feeders of transmission line with a neat sketch. 10

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