



C14-EE-503

4638

**BOARD DIPLOMA EXAMINATION, (C-14)  
SEPTEMBER/OCTOBER - 2020  
DEEE—FIFTH SEMESTER EXAMINATION**

POWER SYSTEMS—II

Time : 3 hours ]

[ Total Marks : 80

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**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. State Ferranti effect.
2. State the applications of hot line technique.
3. State the empirical formula for determining the transmission line system voltage.
4. State any three advantages of HVDC transmission system.
5. What is the need for cross-arms in transmission lines?
6. State the need for arcing horns and guard rings.
7. State the requirements of underground cables.

- \* 8. List any six important equipments used in sub-station.
9. Distinguish between primary distribution and secondary distribution.
10. Define (a) feeder and (b) service main.

**PART—B**

10×5=50

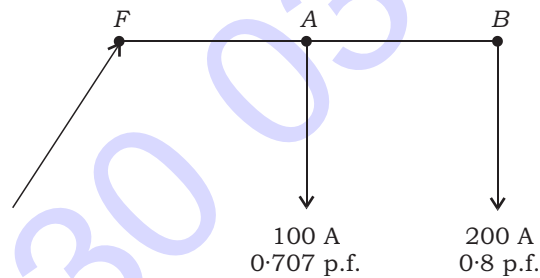
**Instructions :** (1) Answer *any five* questions.

(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. Derive an expression for capacitance in single-phase overhead transmission line. 10
12. A three-phase 50 Hz transmission line 100 km long delivers 20 MW at 0.9 p.f. lagging and at 110 kV. The resistance and reactance of the line per phase per km are 0.2 ohm and 0.4 ohm respectively while capacitance admittance is  $2.5 \times 10^{-6}$  mho/km/phase. Calculate (a) the current and voltage at the sending end and (b) efficiency of transmission. Use nominal T method. 10
13. (a) State the main components of overhead lines. 3
- (b) In a 33 kV overhead line, there are three units in the string of insulators. If the capacitance between each insulator pin and earth is 11% of self-capacitance of each insulator, find string efficiency. 7
- \* 14. (a) State any five causes for failure of insulators in transmission lines. 3
- (b) Derive an expression for sag when supports are at unequal level. 7

- \* 15. (a) Find the insulation resistance per km of a cable of conductor diameter 2 cm and internal sheath diameter 2.75 cm. Resistivity of the diameter is  $6 \times 10^{12}$  ohm-m. 5
- (b) Describe the general construction of an underground cable with neat sketch. 5
16. (a) Sketch the typical layout of 33/11 kV substation showing earthing pits. 5
- (b) State the merits of indoor and outdoor substations. 5
17. A two-wire AC feeder is loaded as shown in figure. The power factors are lagging and are referred to the voltage at the respective load points. The section impedance  $FA = 0.03 + j0.05$  and  $AB = 0.05 + j0.08$  ohm. If the voltage at the far end is to be maintained at 230 V, calculate the voltage at the supply end. 10



18. (a) Explain proximity effect. 5
- (b) State the advantages and disadvantages of radial distribution system. 5

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