C14–EE–503

4638

BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—2017

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. State the skin effect.

2. State the advantages of transmitting the power at high voltages.

3. Write the applications of hotline technique.

4. What are the advantages of HVDC transmission system than EHVAC transmission system?

5. State the need of cross-arms and mention its types.

6. State the requirements of a good insulator for overhead lines.

7. Define the following :

(a) Flash over

(b) Puncture

8. Classify the substations according to service.

9. What is the difference between the feeder and the distributor?

10. Write the advantages of feeding the distributor at both ends.

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PART—B   10×5=50

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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 15-km long 3-phase overhead line delivers 5 MW at 11 kV at 0.8 lagging power factor. Line loss is 12% of power delivered. Line inductance is 1·1 mH/phase. Find the sending end voltage and voltage regulation.
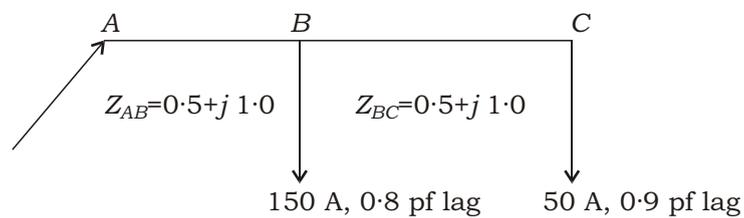
12. Using nominal -method, find the sending end voltage and voltage regulation of 250 km, 3-phase, 50 Hz transmission line deliver 25 MVA at 0·8 power factor lagging to a balanced load at 132 kV. The line has a series impedance of $27 \cdot 5 + j97 \cdot 4$ and shunt admittance of $7 \cdot 38 \times 10^{-4}$ mho.

13. *(a)* Explain the charging current in transmission line.   5

     (b) Write the steps to calculate the voltage drops in an a.c. distribution system.   5

14. An overhead transmission line conductor having parabolic configuration weights 1·925 kg/m. The area of cross-section of the conductor 2·2 cm^2 and the ultimate strength is 8000 kg/cm^2. The supports are 600 m apart having 50 m difference. Calculate the sag from the taller of the two supports which must be allowed so that the factor of the safety shall be 5. Assume that ice load is 1 kg/m and there is no wind pressure.

15. A 33-kV overhead line has four units of string insulator. If the capacitance between each insulator pin and the earth is 11% of self-capacitance of each insulator. Find *(a)* the distribution of the voltage over three insulators and *(b)* the string efficiency.

16. Explain the general construction of an underground cable with a neat sketch.

17. Draw the single line diagram of a 33/11 kV substation.

18. Find the sending end voltage and power factor of a.c. distributor as shown in figure. The power factors are with respect to receiving end voltage.

A B C

$Z_{AB}=0{\cdot}5+j\,1{\cdot}0$ $Z_{BC}=0{\cdot}5+j\,1{\cdot}0$

150 A, 0·8 pf lag   50 A, 0·9 pf lag

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