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C14-EE-503

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BOARD DIPLOMA EXAMINATION, (C-14)

JUNE—2019

DEEE—FIFTH SEMESTER EXAMINATION POWER  
SYSTEM—II (TRANSMISSION AND 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. List any three advantages of DC transmission over AC transmission.
2. What is Kelvin's law?
3. State Ferranti effect.
4. Draw the schematic diagram of an HVDC transmission.
5. List the factors influencing the selection of the line supports.
6. Define sag and list the factors affecting it.
7. A single core cable has core diameter of 2.5 cm and the thickness of insulation is 1.25 cm. Calculate the insulation resistance per km of the cable if the specific resistance of the cable is  $1.5 \times 10^{14} \Omega\text{-cm}$ .
8. What is the need of CT and PT in a substation?

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9. What are the disadvantages of distributor feeding at one end?
10. Compare radial and ring distribution systems.

**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 of singlephase transmission line. 10

12. A 3-phase, 50 Hz, 150 km line has a resistance, inductive reactance and shunt admittance of  $0.1 \Omega$ ,  $0.5 \Omega$  and  $3 \times 10^{-6}$  mho per km per phase. If the line delivers 50 MW at 110 kV and 0.8 p.f. lagging, determine the sending voltage and current. Use nominal- $\pi$  method. 10

13. (a) Derive an expression for sag in overhead lines when the supports are at equal levels. 5

(b) A transmission line has a span of 150 m between level supports. Conductor has a cross-section area of 2.0 sq. cm. The ultimate breaking strength is 5000 kg/sq. cm. The weight of the conductor is 1.78 kg/m and the wind pressure is 1.5 kg/m length of conductor. Calculate the sag for a safety factor of 5. 5

14. (a) Explain any three methods of improving string efficiency. 5

(b) A 33 kV (line to line voltage) 3-phase overhead line is supported on a string of a 3 similar insulators, the mutual capacitance of which is 10 times the shunt capacitance between the unit and earthed framework. Calculate the string efficiency. 5

15. (a) Compare overhead lines with under ground cables in any five aspects. 5

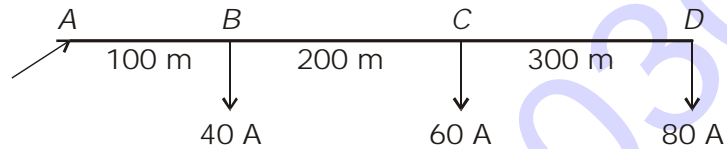
(b) Show that the insulation resistance of a cable is inversely proportional to its length. 5

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16. (a) Compare indoor and outdoor substations. 5  
(b) Explain substation auxiliary supply. 5

17. A DC 2 wire distributor 600 m long and fed at one end is loaded as shown in figure below. The total resistance of the distributor is 0.025 ohm. Calculate the voltage at the end A, when the voltage at the end D is 230 volts. 10



18. (a) Define corona. Explain factors affecting it. 5  
(b) Classify distribution systems. 5

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