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BOARD DIPLOMA EXAMINATION, (C-20)

MAY—2023

DEEE - FOURTH SEMESTER EXAMINATION

POWER SYSTEMS—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. State any three merits of bundled conductors.

2. Write any three advantages and disadvantages of AC transmission system.

3. Draw the vector diagram for short transmission line.

4. State any three disadvantages of HVDC transmission systems.

5. State any three disadvantages of loose span.

6. List the causes for failure of insulators in a transmission line.

7. State any three advantages and disadvantages of RCC poles.

8. Classify different types of underground cables based on voltage rating.

9. State the need for substation auxiliary supply.

10. List any three advantages of ring main distribution system.

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Instructions : (1) Answer **all** questions.

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

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

11. *(a)* Derive the expression for sending end voltage and efficiency of medium transmission line with given receiving end conditions and line parameters using nominal T-method.

(OR)

(b) A 3-phase, 50-Hz, transmission line having resistance of 5Ω per phase and inductance of 30 mH per phase supplies a load of 1000 kW at 0.8 lagging and 11 kV at the receiving end. Find :

(i) Sending end voltage and power factor

(ii) Transmission efficiency

(iii) Regulation

12. *(a)* Define string efficiency and explain the methods to improve it.

(OR)

(b) A transmission line conductor having span of 250 m and a diameter of 19.5 mm weighs 0.9 kg/m. The wind pressure is being 40 kg/m^2 of projected area with ice coating of 10 mm. The ultimate strength of the conductor is 8000 kg. Calculate the maximum sag if the factor of safety is 2 and ice weighs 910 kg/m^3.

13. *(a)* Define insulation resistance and show that the insulation resistance of a cable is inversely proportional to its length.

(OR)

(b) State the functions of the following layers in underground cable :

(i) Insulation

(ii) Bedding

(iii) Serving

(iv) Armouring

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14. *(a)* State any eight relative merits of outdoor substations over indoor substations.

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(OR)

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(b) State the purpose of various equipments used in a substation.

15. *(a)* List the steps involved in the voltage drop calculation in AC single-phase distributor. Draw a vector diagram taking receiving end voltage as a reference to illustrate the calculations.

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(OR)

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(b) A single-phase AC distributor AB 250 m long is fed from end A and loaded as follows :

   (i) 120 A at 0.8 pf lagging 100 m from point A

  (ii) 100 A at 0.707 pf lagging 250 m from point A

The total resistance and resistance of the distributor are 0.25Ω and 0.125Ω per km. Calculate the voltage at sending end when the load p.f refers to voltage at far end of 230 V.

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PART—C

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$10\times1=10$

Instructions : (1) Answer the following question.

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

               (3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

16. How could you make maintenance of live transmission line operating at very high voltages? Explain hot line technique.

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