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C16-EE-503

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BOARD DIPLOMA EXAMINATION, (C-16)

MARCH/APRIL—2021

DEEE - FIFTH SEMESTER EXAMINATION

POWER SYSTEMS - (U, 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. State the advantages of AC transmission systems.
2. What is skin effect in transmission lines?
3. State Ferranti Effect in medium and long transmission lines.
4. List the types of HVDC transmission systems.
5. Define string efficiency of suspension insulators.
6. Compare underground cables with overhead lines.
7. State the need of substation auxiliary supply.
8. Briefly write about feeders, distributors and service mains.
9. Write the advantages of ring main distribution system.
10. Write any three effects of pilot wires.

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## PART—B

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

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

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

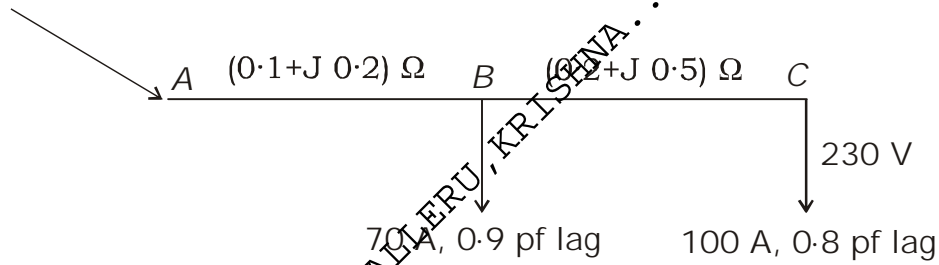
11. (a) Define voltage regulation of a transmission line. 4
- (b) A single-phase line is transmitting 100 kW power to an industry at 11 kV, 0.8 p.f. lag. It has a total loop resistance of  $2 \Omega$  and loop reactance of  $3 \Omega$ . Determine (i) the voltage at sending end, (ii) percentage voltage regulation and (iii) efficiency of line. 6
12. (a) State the effects of corona in transmission lines and mention the methods of reducing corona. 4
- (b) State 'Ferranti' effect in transmission lines and compute the rise in voltage at the receiving end of lines. 6
13. (a) State the necessity of pole guys. 4
- (b) Derive an expression for sag when line supports are at equal heights. 6
14. (a) State the causes of failure of insulators in transmission and distribution lines. 3
- (b) Each conductor of a 33 kV, 3-phase system is suspended by a string of three similar insulators. The mutual capacitance of which across the units is 9 times of shunt capacitance between unit and earthed framework. Calculate the voltage across each insulator and string efficiency. 7
15. (a) Classify underground cables based on operating voltage. 4
- (b) Determine the insulation resistance of a single core cable of length 3 km and having a radius of 12.5 mm with insulation thickness of 10 mm. Specific resistance of insulation used in the cable is  $5 \times 10^{12} \Omega\text{-m}$ . 6

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16. (a) List any six equipments used in substation and state the purpose of each equipment. 6

(b) Write advantages of outdoor substations over indoor substations. 4

17. A single-phase distributor ABC is loaded as follows. The power factors given are considered with respect to receiving end voltage of 230 volts (at point "C"). Find the voltage and power factor at sending end (at point "A"). 10



18. Explain the protection of parallel feeders using directional relays with a neat diagram. 10

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