6635

BOARD DIPLOMA EXAMINATIONS

DEEE-FIFTH SEMESTER

SEPTEMBER/OCTOBER-2020

POWER SYSTEMS-II (T,D & P)

Time: 3 hours   Max. Marks: 80

PART – A   **3 X 10 = 30**

Instructions: 1.   *Answer **all** questions.*
2.   *Each question carries **Three** Marks.*
3.   *Answer should be brief and straight to the point and should not exceed five simple sentences.*

1.   State Ferranti effect.

2.   Write the applications of hot line technique.

3.   State factors affecting corona.

4.   State the advantages of HVDC transmission system.

5.   State the need for cross arms.

6.   Classify the underground cables based on voltage ratings.

7.   List the equipments used in substations.

8.   State the advantages of ring main system.

9.   Classify the A.C distribution systems on basis of number of wires.

10.   Write a short note on pilot- wire protection system.

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Instructions: 1.   *Answer any **Five** questions*
                      2.   *Each question carries **TEN** Marks.*
                      3.   *Answer should be comprehensive and a criterion for*
                           valuation is the content but not the length of the answer.

11.   (a)   State the need for transposition of over head lines.

        (b)   Explain the effect of transmission line voltage on

                   (i) Line efficiency   (ii) Volume of conductor material.

12.   A three- phase 50 Hz transmission line 100 km long delivers 20 MW at

        0.9 p.f. Lagging at 110 kv. The resistance and inductive reactance of the

        line per phase per km are 0.2 Ω and 0.4 Ω respectively. While capacitive

        admittance is 2.5×10^{-6} mho per km per phase. Calculate

        (i) the current and voltage at the sending end

        (ii) Efficiency of transmission. Use nominal T method.

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

        equal   levels and the tension is governed by the conductor weight only.

        (b)   A transmission line has a span of 150 m between level supports. The

        conductor has   a cross-sectional area of 2 cm^2.The ultimate strength is

        5000 kg/cm^2.The specific gravity of the conductor material is 8.9 gm/cm^3

        the wind pressure is 1.5 kg/m. Calculate the sag at the centre of line .If

        factor of safety is 5.

[Cont..,

14. (a) Define string efficiency. Explain the methods of improving string efficiency.

(b) A three- phase transmission line is being supported b **[Cont..,** insulators. The potentials across top unit (i.e., near to the tower) and middle unit are 8 kv and 11 kv respectively. Calculate (i) the Ratio of capacitance between pin and earth to the self capacitance of each unit (ii) The string efficiency.

15. (a) Derive an expression for insulation resistance of a cable.

(b) Find the insulation resistance per km of cable of conductor diameter 1cm and internal sheath diameter 1.75 cm and resistivity of the dielectric

is 6×10^{12} Ω-m.

16. (a) Compare between indoor and outdoor substations in any five aspects.

(b) Explain the purpose of auxiliary supply in substation.

17. A single phase ac distributor AB, 300 m long is fed from end A and is loaded as follows

(i) 100 A at 0.707 p.f. lagging 200 m from point A

(ii) 200 A at 0.8 p.f. lagging 300 m from point A

The total resistance and reactance of distributor are 0.2 Ω and 0.1 Ω per km respectively. Calculate the voltage at sending end when the load power factors refer to voltage at far end of 230 V.

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

(b) Explain protection of transmission lines using impedance relays with a neat sketch.

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