A   **Reg. No. :**

Question Paper Code: 54304

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

Fourth Semester

Electrical and Electronics Engineering

15UEE404- TRANSMISSION AND DISTRIBUTION

(Regulation 2015)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which of the following is usually not the generating voltage ?   CO1- R

   (a) 6.6 kV   (b) 9.9 kV   (c) 11kV   (d) 13.2 kV.

2. A conductor which connects the substation to the area where power   CO1- R
   is to be distributed is

   (a) Distributor   (b) Service main   (c) Ring main   (d) Feeder

3. Factors affecting corona   CO2- R

   (a) Line voltage   (b) Line current   (c) Phase voltage   (d) All of the above

4. The volume of copper required for an A.C transmission line is   CO2- R
   inversely proportional to

   (a) current   (b) voltage

   (c) power factor   (d) both (b) and (c)

5. The length of a short transmission line is up to about   CO3- R

   (a) 200km   (b) 50km   (c) 120km   (d) 400km

6. The power delivered by a line to a purely resistive load equal to   CO3- R

   (a) Load impedance   (b) Load admittance

   (c) Impedance   (d) Surge impedance

7. Under operating conditions, the maximum stress in a cable is at   CO4- R

    (a) Conductor surface   (b) Lead sheath

    (c) Armoring   (d) Bedding

8.   For operating voltages beyond 66KV,_____cable are used   CO4- R

    (a) Oil filled   (b) belted   (c) S.L. type cables   (d) Screened cables

9. Earthing is necessary to give protection against   CO5- R

    (a) danger of electric shock   (b) voltage fluctuation

    (c) over loading   (d) high temperature of the conductor

10. The minimum clearance between the ground and 220kV line is   CO5- R
    about

    (a) 4.3 m   (b) 5.5 m   (c) 7.0 m   (d) 10.5 m

                    PART – B (5 x 2= 10Marks)

11. Why all transmission and distribution systems are 3 phase systems?   CO1- R

12. Define proximity effect.   CO2 -R

13. Define Ferranti effect.   CO3- R

14. Why are insulators used withoverhead lines?   CO4 -R

15. What is the reason for the sag in the transmission line?   CO5- R

                    PART – C (5 x 16= 80Marks)

16. (a) Draw and explain the basic structure of the power system with   CO1- U   (16)
         relevant voltage levels.
                                Or
    (b) (i) Explain the structure of electric power system with a neat   CO1- U   (8)
            Diagram.

         (ii) Explain the types of AC distribution system in detail.   CO1- U   (8)

17. (a) Derive an expression for capacitances of three phase un-   CO2- Ana   (16)
         symmetrically spaced transmission lines.
                                Or

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(b) (i) A single phase transmission line has 2 parallel conductors, each of 1.2cm diameter and 2.5 meters apart. Calculate the loop inductance per KM length of the line if the material of conductor is
(i) copper
(ii) steel with relative permeability of 200 .   CO2 -App   (8)

(ii) Derive an expression for inductance of a 3-phase transmission line with unsymmetrical Spacing.   CO2 -App   (8)

18. (a) A 3-phase, 50-Hz overhead transmission line 100 km long has the following constants: Resistance/km/phase = 0.1ohm, Inductive reactance/km/phase =0.2 ohm,Capacitive susceptance/km/phase =0.04×10^{-4}siemen. Determine (i) the sending end current (ii) sending end voltage (iii) sending end power factor and (iv) transmission efficiency when supplying a balanced load of 10,000 kW at 66 kV, p.f 0.8 lagging. Use nominal T method.   CO3- App   (16)

Or

(b) Using rigorous method, derive expressions for sending end voltage and current for a long transmission line..   CO3- U   (16)

19. (a) Explain the methods of grading of cables with neat diagrams and equations.   CO4-U   (16)

Or

(b) Explain the various methods of improving string efficiency in suspension insulators.   CO4- U   (16)

20. (a) (i) Derive an expression for sag of a line supported between two supports of unequal height.   CO5- App   (8)

(ii) A transmission line has a span of 150m between level supports. The conductor has a cross sectional area of $2cm^2$.the tension in the conductor is 2000kg.if the specific gravity of the conductor material is 9.9gm/cm^3 and wind pressure is 1.5 kg/m length. Calculate the sag. What is the vertical sag?   CO5- Ana   (8)

Or

(b) Derive the expressions for sag and conductor length under bad weather conditions. Assume Shape of overhead line is a parabola.   CO5- U   (16)

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