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Question Paper Code: 41343

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2016

Fourth Semester

Electrical and Electronics Engineering

14UEE403 - TRANSMISSION AND DISTRIBUTION

(Regulation 2014)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. In a three wire system, the area of cross section of neutral is generally _____ of either outer.

    (a) Double   (b) Same   (c) Half   (d) None of these

2. If Power P available from a hydro scheme is given by the formula $P = 9.81QH$, where Q is the flow rate through the turbine in l/s and H is the head in metres, then P will be in units of

    (a) HP   (b) W   (c) KJ/s   (d) kWh

3. The rated voltage of a three phase power system is given as

    (a) RMS phase voltage   (b) RMS line to line voltage
    (c) Peak line to line voltage   (d) Peak phase voltage

4. The charging current in a transmission line increases due to corona effect because corona increases

    (a) Line current   (b) Effective line voltage
    (c) Power loss in lines   (d) Effective conductor diameter

5. For transmission line, which one of the following relation is true?

    (a) AD-BC=(-1)   (b) AB-CD=1   (c) AD-BC =0   (d) AD-BC=1

6. Ferranti effect happens in transmission line when the line is

    (a) Short and loaded   (b) Long and loaded

    (c) Long and unloaded   (d) None of these

7. If the length of cable is doubled, its capacitance is

    (a) Halved   (b) Quadraupled

    (c) Doubled   (d) None of these

8. If the length of cross arm is increased, the string efficiency will be

    (a) Decreased   (b) of no change

    (c) Increased   (d) None of these

9. If the tension in the overhead line is doubled, then the sag is

    (a) Doubled   (b) Halved

    (c) Increased three times   (d) Load None of these

10. Most of the substations in the power system change _____of electric supply.

    (a) Current level   (b) Voltage level

    (c) Both (a) and (b)   (d) None of these

PART - B (5 x 2 = 10 Marks)

11. How does AC distribution calculations differ from DC distribution?

12. Why skin effect is absent in DC system?

13. Define voltage regulation of a transmission line.

14. In a three unit insulator string, voltage across lowest unit is 17.5KV and string efficiency is 84.28 %. Calculate the total voltage across the string.

15. Point out the factors that should be taken care of while designing and erecting a substation.

PART - C (5 x 16 = 80 Marks)

16. (a) Draw a schematic layout of a typical AC power supply scheme and explain the operation of various components involved in the system.   (16)

Or

    (b) (i) Describe briefly the different types of DC distributors.   (8)

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(ii) Discuss the significance of interconnector in a DC ring main distributor. (8)

17. (a) (i) Derive an expression for inductance per phase for a three phase overhead transmission line when conductors are symmetrically placed. (10)

(ii) Explain the significance of Self-GMD and Mutual-GMD in transmission line parameter calculation. (6)

Or

(b) (i) Derive an expression for capacitance of a single phase overhead transmission line. (10)

(ii) Discuss the concepts involved in skin effect. (6)

18. (a) (i) Show how regulation and efficiency are determined for medium lines using nominal Pi method. (10)

(ii) Determine the ABCD constants for a short transmission line. (6)

Or

(b) A three phase,50Hz overhead transmission line 100 km long has the following constants: Resistance/km/phase = 0.1 ohms. Inductive reactance/km /phase=0.2ohms. Capacitance susceptance /km/phase =0.04 x 10^{-4} siemens. Determine (a) Sending end current (b). Sending end voltage (c).Sending end power factor (d). Transmission efficiency when supplying a balanced load of 10000KW at 66 KV, p.f 0.8 lagging. Use Nominal T method. (16)

19. (a) Derive the formula for string efficiency of suspension insulators having three discs. (16)

Or

(b) (i) Insulator string efficiency can be improved by using long cross arms. Justiy the statement. (8)

(ii) Derive an expression for dielectric stress in a single core cable. (8)

20. (a) (i) Deduce an approximate expression for sag in overhead lines when supports are at equal levels. (10)

(ii) Classify the various types of substations according to service requirements. (6)

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Or

(b) A transmission line has a span of 150m between level supports. The conductor has a cross sectional area of 2 cm^2. The tension in the conductor is 2000 Kg. If the specific gravity of the conductor material is 9.9 gm/cm^3 and wind pressure is 1.5 kg/m length, Calculate the sag. What is the Vertical Sag? (16)

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