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Question Paper Code: 50344

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

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. The main consideration in the design of feeder is

   (a) Current carrying capacity (b) Voltage drop
   (c) Resistance (d) Reactance

2. The major part of investment on secondary distribution is made on

   (a) Distribution transformer (b) Conductors
   (c) Pole fittings (d) Insulators

3. If the length of a transmission line increases, its inductance is

   (a) Increases (b) Decreases
   (c) Remains same (d) Initially increases then decreases

4. If the supply frequency increases, then the skin effect is

   (a) Increases (b) Decreases
   (c) Remains constant (d) Initially decreases then increases

5. The generalized constant A and D of the transmission line have

   (a) No dimension (b) Dimension in ohm
   (c) Dimension in milli ohm (d) Dimension in mho

6. If the power factor of the load decreases, the line losses

(a) Increases (b) Decreases
(c) Remains same (d) Initially increases then decreases

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

(a) Conductor surface (b) Lead sheath
(c) Armoring (d) Bedding

8. A metallic sheath is provided over the insulation to protect the cable from

(a) Damage (b) Moisture
(c) Corrosion (d) Temperature

9. When single line to earth fault occurs on an ungrounded neutral system, the voltages of the healthy phases rise from their normal phase voltages to

(a) Line voltage (b) 2 times line voltage
(c) 3 times line voltage (d) 4 times line voltage

10. If sag in an overhead lines increases, tension in the line

(a) Increases (b) Decreases
(c) Remains same (d) Initially increases then decreases

PART - B (5 x 2 = 10 Marks)

11. State the limitations of high voltage transmission system.

12. Define proximity effect.

13. What is meant by transposition in overhead transmisssion line?

14. Why are insulators used withoverhead lines?

15. What is meant by stringing chart?

PART - C (5 x 16 = 80 Marks)

16. (a) (i) A two wire dc distributor ABCDEA in the form of a ring main is fed at point A at 220 V and is loaded as under: 10A at B: 20A at C : 30A at D and 10A at E. The resistances of various sections (go and return) are: AB = 0.1 ohm: BC = 0.05 ohm: CD = 0.01 ohm: DE = 0.025 ohm and EA = 0.075 ohm. Determine (i) the point of minimum potential (ii) current in each section of distributor. (8)

(ii) Explain the different HVDC links. (8)

Or

(b) (i) Draw and explain the structure of electric power system indicating the voltage level in each transmission levels. (10)

(ii) Explain the different types of FACTS controllers. (6)

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

Or

(b) Explain the concept of self GMD and mutual GMD for evaluating inductance of transmission line. (16)

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 $=0.04 \times 10^{-4}$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. (16)

Or

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

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

Or

(b) (i) Briefly explain the different methods to improve string efficiency of suspension type insulators. (10)

(ii) A string of four insulators has a self-capacitance equal to 5 times pin to earth capacitance. Find (i) the voltage distribution across various units as a percentage of total voltage across the string and (ii) string efficiency. (6)

20. (a) (i) A transmission line has a span of 200 m between level supports. The conductor has a cross-sectional area of 1.29 cm^2 , weighs 1170 kg/km and has a breaking stress of 4218 kg/cm^2. Calculate the sag for a safety factor of 5, allowing a wind pressure of 122 kg per square metre of projected area. What is the vertical sag? (8)

(ii) Write short notes on resistance earthing. (8)

Or

(b) (i) The towers of height 30 m and 90 m respectively support a transmission line conductor at water crossing. The horizontal distance between the towers is 500 m. If the tension in the conductors is 1600 kg. Find the minimum clearance of the conductors and water and clearance mid-way between the supports. Weight of conductors is 1.5 kg/m. Bases of the towers can be considered to be at water level. (10)

(ii) Write short notes on substation equipments. (6)
