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Question Paper Code : X 60504

B.E./B.Tech. DEGREE EXAMINATIONS, NOV./DEC. 2020

Fifth Semester

Electrical and Electronics Engineering

EE 2303/EE 53/10133 EE 506 – TRANSMISSION AND DISTRIBUTION

(Regulations 2008/2010)

(Common to PTEE 2303/10133 EE 506 – Transmission and Distribution for
B.E. (Part-Time) Third Semester – Electrical and Electronics Engineering –
Regulations 2009/2010)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Why HVDC line does not require any reactive power compensation ?
2. What are the factors affecting the sag in a transmission line ?
3. A three phase transmission line has its conductor at the corners of an equilateral triangle with side 3 m. The diameter of each conductor is 1.63 cm. Find the inductance per phase per km of the line.
4. What is meant by Disruptive critical voltage ?
5. What is Ferranti effect ?
6. What is the use of power circle diagram ?
7. Define safety factor of insulator. Why it is desired to have this value be high ?
8. State the limitations of solid type cables. How are these overcome in pressure cables ?
9. Name the factors that should be taken care of while designing and erecting a substation.
10. What do you understand by distribution system ?



PART – B

(5×16=80 Marks)

11. a) i) Draw and explain the structure of electric power system indicating the voltage level in each transmission levels. (10)
- ii) Explain the factors affecting the sag. (6)
- (OR)
- b) i) Advantages EHVAC and HVDC transmission system. (8)
- ii) Deduce an approximate expression for sag in overhead lines when supports are at equal levels. (6)
- iii) List out the objectives of FACTS. (2)
12. a) Determine the capacitance per phase of the double circuit line as shown in fig. 12.1, the diameter is 2.1793 cm. (16)

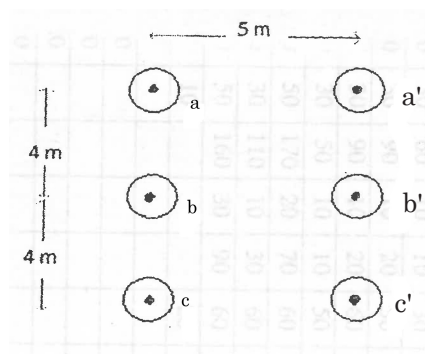


Figure 12.1

(OR)

- b) i) Distinguish between GMD and GMR. (6)
- ii) Explain clearly the skin effect and proximity effects when referred to overhead lines. (10)
13. a) i) With reference to long transmission lines, give the physical interpretation of the following terms :
- 1) characteristic impedance
 - 2) surge impedance
 - 3) surge impedance loading and
 - 4) propagation constant. (8)
- ii) Derive the ABCD constants of a medium transmission line with π -configuration. (8)

(OR)



- b) i) Explain the step-by-step procedure for construction of receiving end power circle diagram. (8)
- ii) Derive the power flow performance equation of a three phase transmission line in the form of sending-end receiving-end complex power and voltages at the two ends of the line. (8)
14. a) i) Define string efficiency of suspension insulator string. List the methods to improve it. (4)
- ii) Each line of a 3-phase system is suspended by a string of 3 identical insulators of self-capacitance 'C'F. The shunt capacitance of connecting metal work of each insulator is 0.2 C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases the capacitance to the line of metal work of the lowest insualtor to 0.3 C. (12)
- (OR)
- b) i) Describe the general construction of a 3-conductor cable with neat sketch. (6)
- ii) A single core cable for 66 kV, 3-phase system has a conductor of 2 cm diameter and sheath of inside diameter 5.3 cm. It is required to have two intersheaths so that the stress varies between the same maximum and minimum values in the three layers of dielectric. Find the positions of intersheaths, maximum and minimum stress and voltages on the intersheaths. Also find the maximum and minimum stress if the intersheath are not used. (10)
15. a) What are the different types of bus bar arrangement used in substations ? Illustrate your answer with suitable diagrams. (16)
- (OR)
- b) i) A 2-wire d.c distributor 200 meters long is uniformly loaded with 2A/meter. Resistance of single wire is 0.3 ohm/km. If the distributor is fed at one end, calculate :
- 1) The voltage drop up to a distance of 150 m from the feeding point
- 2) The maximum voltage drop. (8)
- ii) Write short notes on the following :
- 1) Ring main distributor
- 2) Current distribution in a 3 wire d.c system. (8)
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