

[Total No. of Questions - 9] [Total No. of Printed Pages - 3]
(2125)

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B. Tech 4th Semester Examination
Transmission and Distribution of Electrical Power (OS)
EE-4001

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question each from section A, B, C & D. Section-E is compulsory.

SECTION - A

1. (a) Give the details of the equipments used in substation layout. (10)
- (b) Explain in detail DC distribution with concentrated loads fed on both sides. (10)
2. (a) Explain in detail radial and ring main distributor systems. (12)
- (b) Draw the basic structure of power system. (8)

SECTION - B

3. (a) Derive the expression for inductance of a symmetrical three phase line. (12)
- (b) A 3 phase 50 Hz line consists of 3 conductors each of diameter 21mm. Spacing between conductors is AB = 3m, BC = 5m CA = 3.6m. Find the capacitance and capacitive reactance per km of the line. If line operates at 132kV, find the charging current per km and reactive volt-amperes generated by line per km. (8)

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4. (a) Explain in detail the π model of transmission line. Also draw the phasor diagram. (10)
- (b) Explain synchronous condensers in detail. (10)

SECTION - C

5. (a) Give the effect of ice loading and wind loading in detail on mechanical design of transmission lines. (12)
- (b) What are different factors responsible for insulation failure? (8)
6. (a) What electrical and mechanical characteristic are required for a good insulator for use in transmission lines? Also mention briefly the different types of insulators used. (15)
- (b) Each conductor of a 3 phase overhead transmission line is suspended from a cross arm of steel tower of a string of four suspension insulators. The voltage across the second unit is 15 KV and across 3rd is 27KV. Find the voltage between conductors and string efficiency. (5)

SECTION - D

7. (a) Define dielectric stress. Derive the expression for dielectric stress in a single core cable. (10)
- (b) Define intersheath grading. Also derive the expression for the maximum value of R, where R is the outer most radius. (10)
8. (a) What is corona power loss? Give in detail the factors affecting corona loss. (12)
- (b) A 132 KV line with 2cm diameter conductors is built so that corona takes place, if the line voltage exceeds 210KV(rms). If value of potential gradient at which ionization occurs can be taken as 30000 V/cm, find the spacing between the conductors. (8)

SECTION - E

9. (a) How do bundled conductors reduce corona loss?
(b) Why are cross arms used in transmission lines?
(c) What is the need of armouring used in construction of underground cables?
(d) What is skin effect?
(e) Define string chart used in mechanical design of transmission lines.
(f) How the voltage distribution across the string can be improved?
(g) Give the advantages of corona.
(h) How can the transmission lines be classified based on length?
(i) What is meant by receiving end power circle diagram?
(j) Differentiate between pin type insulator and strain insulator. (2×10=20)