CBCS SCHEME

USN | | | | | | | | | | |

18EE43

Fourth Semester B.E. Degree Examination, June/July 2024
Transmission and Distribution

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. What are the advantages of higher voltage transmission. **(05 Marks)**

b. Write short notes on the following :
i) HVAC ii) EHVAC iii) UHVAC iv) HVDC. **(05 Marks)**

c. Explain the qualities of following conducting materials of transmission lines :
i) ACSR ii) AAAC iii) ATI iv) GTACSR v) GZTACSR. **(10 Marks)**

OR

2 a. Derive expression for sag when supported at unequal level. **(07 Marks)**

b. Derive expression for string efficiency when four discs are connected in series. **(08 Marks)**

c. In a 33KV overhead line, there are three units in the string of insulators. If the capacitance between each insulator Pin and earth is 11% of self capacitance of each insulator. Find :
i) The distribution of voltage over three insulators
ii) String efficiency. **(05 Marks)**

Module-2

3 a. What are the advantages of single circuit and double circuit lines? **(05 Marks)**

b. Derive expression for inductance of composite conductors and also explain the concept of GMR and GMD. **(10 Marks)**

c. Three conductors of a 3-phase line placed at the corners of a triangle of sides 2m, 2.5m and 4.5m. Calculate the inductance per km of the line when the conductors are regularly transposed. The diameter of each conductor is 1.24cm. **(05 Marks)**

OR

4 a. Develop an expression for capacitance of a 3-phase over head line with unsymmetrical spacing, but transposed. **(06 Marks)**

b. Derive an expression for capacitance of double circuit but unsymmetrically spaced and transposed lines, in 3-phase networks. **(09 Marks)**

c. Find the capacitance per km per phase to neutral of a 3-phase line arranged as shown in the diagram. The outside diameter of ACSR conductor is 2.5cm. The line is transposed. Take the effect of ground into consideration. (Refer Fig.Q4(c)).

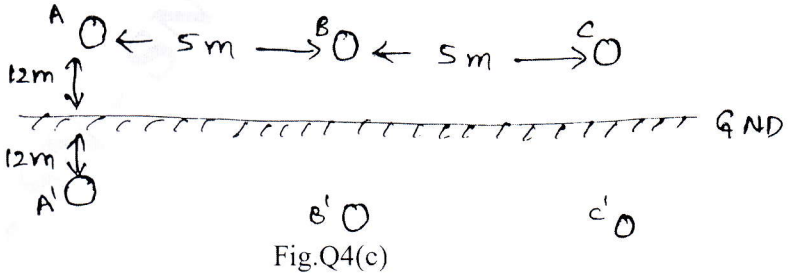

Fig.Q4(c) **(05 Marks)**

Module-3

5 a. Classify the overhead transmission lines and briefly explain each. **(06 Marks)**

b. Show how voltage regulation and transmission efficiency are determined for medium transmission line using nominal π method. Illustrate you answer with suitable vector diagram. **(09 Marks)**

c. A single phase overhead transmission line delivers 1100KW at 33KV at 0.8p.f lagging. The load resistance and inductive reactance of the line are 10 ohm and 15 ohm respectively. determine : i) sending end voltage ii) Sending end power factor iii) Transmission efficiency. **(05 Marks)**

OR

6 a. Write short notes on Ferranti effect. **(05 Marks)**

b. Obtain V_S and I_S expressions using rigorous method of analysis of long transmission line. **(10 Marks)**

c. A 110KV, 50Hz, 3 – ϕ transmission line delivers a load of 40MW at 0.85 lagging p.f at the receiving end. The generalized constants of the transmission line are $A = D = 0.95 < 1.4°$, $B = 96 < 78°$ohm, $C = 0.0015 < 90°$ mho. Find the regulation of the line and charging current using nominal T. method. **(05 Marks)**

Module-4

7 a. What is Corona? What are the advantages and disadvantages of corona? **(06 Marks)**

b. Define grading of cables, analyze capacitance grading. **(08 Marks)**

c. Explain the concept – corona power loss. **(06 Marks)**

OR

8 a. Classify underground cables and briefly explain them. **(06 Marks)**

b. Explain the following terms with respect to corona :
i) Visual critical voltage
ii) Critical disruptive voltage. **(08 Marks)**

c. Write short notes on Dielectric loss. **(06 Marks)**

Module-5

9 a. With a neat diagram, briefly explain the following :
i) Radial feeders
ii) Parallel feeders
iii) Loop feeders
iv) Inter connected network system. **(08 Marks)**

b. Explain the effect of disconnection of neutral in a 3–phase four wire system. **(06 Marks)**

c. A single phase AC distributor XY 200m long is fed from end X and is loaded as under :
i) 50A at 0.8 p.f lagging 100m from point X
ii) 100A at 0.707 p.f lagging 200m from point X
The total resistance and reactance of the distribution is 0.3Ω and 0.5Ω per km. Calculate the total voltage drop in the distributor. The load power factors refer to the voltage at far end. **(06 Marks)**

OR

10 a. Explain the following : i) Reliability ii) Failure. **(04 Marks)**

b. Discuss probability concepts. **(06 Marks)**

c. Discuss six common types of quality problems. **(06 Marks)**

d. What are the limitations of distribution system? **(04 Marks)**

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