CBCS SCHEME

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

15EE43

Fourth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Transmission & Distribution

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Describe the different types of supporting structures used in transmission lines and discuss the advantages of HVDC transmission systems. **(08 Marks)**

b. Define Sag and explain its importance, also derive an expression for sag of a transmission line when supports are at the same level. **(08 Marks)**

OR

2 a. Indicate a string of 3 insulators and derive an expressions for string efficiency of 3 discs. **(08 Marks)**

b. A 3ϕ overhead transmission line is being supported by 3 discs of suspension insulator the potential across the 1st and 2nd insulator are 8 KV and 11 KV respectively, calculate (i) The line voltage (ii) String efficiency. **(08 Marks)**

Module-2

3 a. Determine the inductance of conductor due to internal flux. **(08 Marks)**

b. In a single phase line as shown in Fig.Q3 (b), conductors 'a' and 'a'' in parallel from one conductor while conductors 'b' and 'b'' in parallel from the return path. Calculate the total inductance of the line/km, assuming that current is equally shared by the two parallel conductors. Conductor diameter is 2.0 cm. **(08 Marks)**

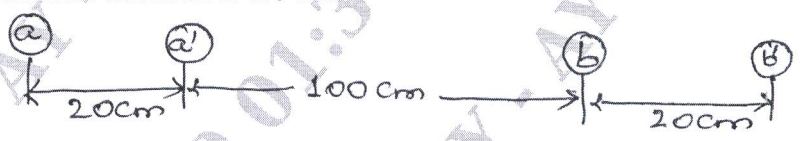

Fig. Q3 (b)

OR

4 a. Derive an expression for capacitance of 1ϕ line. **(08 Marks)**

b. A 3ϕ, 50 Hz, 66 kV overhead line conductors are placed in a horizontal plane as shown in Fig. Q4 (b). The conductor diameter is 1.25 cm. The line length is 100 km. Calculate the capacitance per phase and charging current per phase. Assume complete transposition of the lines. **(08 Marks)**

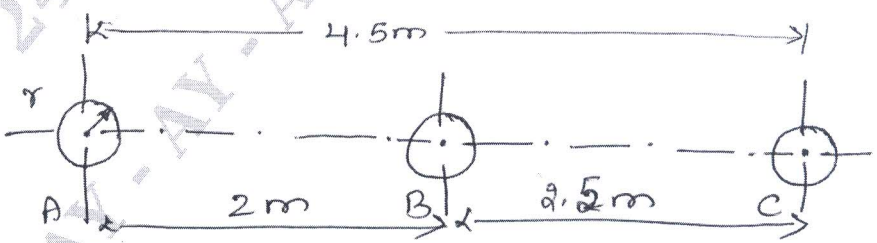

Fig. Q4 (b)

Module-3

5 a. What are generalized circuit constants of a transmission line? Determine the ABCD constants of a medium transmission line using nominal T-model and prove AD-BC = 1. **(08 Marks)**

b. A medium single phase transmission line 100 km long has the following constants:
Resistance /km/ph = 0.15 Ω
Inductive reactance /km/ph = 0.377 Ω
Capacitive reactance /km/ph = 31.87 Ω
Receiving end line voltage = 132 KV
Assuming that the total capacitance of the line is localized at the receiving end alone, determine
(i) Sending end current (ii) Line value of sending end voltage
(iii) Regulation (iv) Sending end p.f.
The line is delivering 72 MW at 0.8 p.f. lagging. **(08 Marks)**

OR

6 a. Write a short notes on classification of transmission lines. Also explain voltage regulation and transmission efficiency with suitable formula. **(08 Marks)**

b. A 3ϕ, 50 Hz, 16 km long overhead line supplies 1000 kW at 11 kV, 0.8 p.f. lagging. The line resistance is 0.03 Ω perphase per km and line inductance is 0.7 mH per phase km. Calculate the sending end voltage, voltage regulation and efficiency of transmission. **(08 Marks)**

Module-4

7 a. What is Corona? State and explain with the expression for disruptive critical voltage and visual critical voltage. **(08 Marks)**

b. Write a note on factors affecting the corona and methods to reduce it. **(08 Marks)**

OR

8 a. Draw the cross sectional view of a single core cable and explain its construction. **(08 Marks)**

b. Derive an expression for insulation resistance of a single core cable. **(08 Marks)**

Module-5

9 a. Explain radial distribution system. State its merits and demerits. **(08 Marks)**

b. A two conductor copper cable is loaded as shown in figure below in Fig. Q9 (b). Both the ends are fed at the same voltage of 250 V DC. Calculate:
(i) The point of minimum potential.
(ii) The current in each section.
(iii) The voltage at load points. The resistance of copper is 0.8 Ω per km for go and return wires put together. **(08 Marks)**

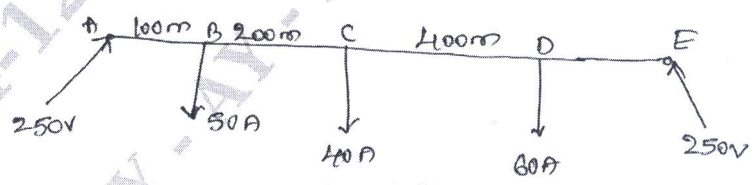

Fig. Q9 (b)

OR

10 a. Write a short note on:
(i) Bath tub curve (ii) Weibull distribution (iii) MTTF and MTBF **(08 Marks)**

b. What are the limitations of distribution system? **(08 Marks)**

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