CBCS Scheme

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15EE43

Fourth Semester B.E. Degree Examination, June/July 2018
Transmission and Distribution

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. What are the advantages of high voltage transmission? Explain. **(06 Marks)**

b. A transmission line has a span of 275m between level supports. The conductor has an effective diameter of 1.96cm and weighs 0.865kg/m. The ultimate strength is 8060 kg. If the conductors has ice coating of radial thickness 1.27cm and is subjected to a wind pressure of 3.9gm/cm^2 of projected area, calculate sag for a safety factor of 2. Weight of 1cc of ice is 0.91gm. **(10 Marks)**

OR

2 a. Draw a schematic diagram and hence briefly describe feeders, distributors and service mains. **(06 Marks)**

b. A 3-phase overhead transmission line is supported by 3 suspension type insulators. The potentials across first and second insulators are 8 KV and 11 KV respectively. Calculate : i) ratio of self to shunt capacitance ii) line voltage iii) string efficiency. **(06 Marks)**

c. Write a short note on vibrations of conductors. **(04 Marks)**

Module-2

3 a. Derive an expression for the inductance of a conductor due to internal and external flux. **(10 Marks)**

b. Calculate inductance of each conductor in a 3-phase 3 wire system. The conductors are arranged as shown in Fig.3(b). The conductors are transposed and have a diameter of 2.5cm. **(06 Marks)**

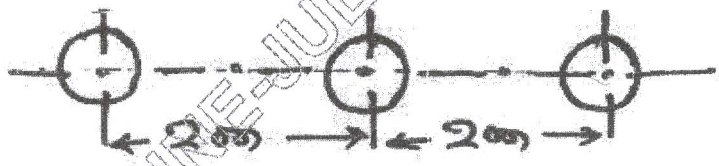

Fig.Q3(b)

OR

4 a. Derive an expression for the line to neutral capacitance for a 3-phase overhead transmission line when the conductors are unsymmetrically spaced. **(10 Marks)**

b. If the double circuit 3-phase line has conductors of diameter 2cm and are separated with 2m in hexagonal spacing arrangement. Calculate phase to neutral capacitance for 100km line. **(06 Marks)**

Module-3

5 a. Explain the nominal π method for obtaining the performance calculations of medium transmission line. Draw the corresponding vector diagram. **(08 Marks)**

b. A 3-phase, 50Hz overhead transmission line of 100km has the following constants. Resistance per km per phase is 0.1Ω, inductive reactance per km per phase is 0.2Ω, capacitive susceptance per km per phase is 0.4×10^{-14}℧. Find :

i) Sending end current
ii) Sending end voltage
iii) Sending end p.f
iv) Transmission efficiency

when supplying a balanced load of 10,000 KW at 66KV with a lagging p.f. of 0.8. Use nominal T–method. **(08 Marks)**

OR

6 a. Derive an expression for ABCD constants of a medium transmission line using nominal T–method. Show that AD – BC = 1. **(10 Marks)**

b. Write a short note on 'Ferranti effect'. **(06 Marks)**

Module-4

7 a. Derive an expression for critical disruptive voltage and visual critical voltage with reference to corona. **(06 Marks)**

b. A 132KV line with 1.956cm dia. conductors is built so that corona takes place if the line voltage exceeds 210KV(rms). If the value of potential gradient at which ionization occurs can be taken as 30 Kv/cm. Find the spacing between the constructors. **(06 Marks)**

c. Explain the factors affecting corona in brief. **(04 Marks)**

OR

8 a. What are the methods of grading of cables? Explain intersheath grading of cable. **(09 Marks)**

b. Derive an expression for the insulation resistance of a single core cable. **(07 Marks)**

Module-5

9 a. Briefly explain radial and ring main distributors. **(07 Marks)**

b. Draw the schematic diagram and hence obtain the expressions for voltages at different tapping points of a DC distributor fed at one end with concentrated loads. **(09 Marks)**

OR

10 a. A two–wire distributor AB, 600m long is loaded as –

Distance from A (mtrs)	150	300	350	450
Loads in Amps	100	200	250	300

The feeding point A is maintained at 440V and that of B at 430V. If each conductor has a resistance of 0.01Ω per 100m, Calculate :

i) The currents supplied from A and B
ii) The power dissipated in the distributor. **(12 Marks)**

b. What are the requirements of good distribution system? **(04 Marks)**

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