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EX - 505

B.E. V Semester

Examination, December 2012

Power System - I

Time : Three Hours

Maximum Marks : 70/100

Note : 1. Attempt one question from each unit.

2. All questions carry equal marks.

3. Assume missing data, if any.

Unit - I

1. a) Explain in detail wind power generation and solar power plant.

   b) Define the term; the load factor and diversity factor and discuss their effect on the cost of generation of electrical energy.

Or

2. a) What are 'load curves' and 'load distribution curves'? Discuss their utility in the economics of generation.

   b) What is a wind power? Discuss various factors on which the power depends.

Unit - II

3. a) Explain clearly the 'skin effect' and 'proximity effect' when referred to overhead lines.

   b) What will be the equivalent radius of a bundle conductor having its part conductors of radius 'r' on the periphery of a circle of dia. 'd' if the number of conductors is 2, 3, 4, 6?

OR

4. a) Determine the self GMD of the following types of conductors in terms of the radius r of an individual strand

i) 

ii) 

b) A 66 kV concentric cable with two inter-sheaths has a core diameter 1.8cm. Dielectric material 3.5mm thick constitutes the three zones of insulation. Determine the maximum stress in each of the three layers if 20kV is maintained across each of the inner two.

Unit - III

5. a) Find the A, B, C, D parameter of a 3-phase, 80 km, 50 Hz transmission line with series impedance of $(0.15 + j\,0.78)$ ohm per km and a shunt admittance of $j\,5.0 \times 10^{-6}$ ohm per km.

b) Explain the classification of lines based on their length of transmission.

OR

6. a) What do you understand by generalized circuit constants of a transmission line? Evaluate generalized circuit constants for medium line with T-model.

b) A three phase 132 kv transmission line is connected to a 50 mw load at a power factor of 0.85 lagging. The line constants of the 80 km line are

$Z = 98 \angle 78^{\circ}\ \Omega$ $Y = 0.001 \angle 90^{\circ}$ S.

Using the nominal T-circuit representation, calculate A, B, C, D constants of the line, sending end voltage sending end current, sending end power factor and the efficiency of transmission.

Unit - IV

7. a) What is a sag template? Explain how this is useful for location of towers and stringing of power conductors.

b) Each conductor of a 33 kv, 3-phase system is suspended by a string of three similar insulators, the capacitance of each disc is nine times the capacitance to ground. Calculate the voltage across each insulator. Determine the string efficiency also.

OR

8. a) What is a string chart? Explain clearly the procedure adopted for stringing the power conductors on the supports.

b) What do you understand by grading of cables? Discuss in brief various methods of grading of cables.

Unit - V

9. a) Discuss briefly various electric distribution systems.

b) Compare a 3-phase 4-wire system of distribution with the single phase systems.

OR

10. a) Discuss various types of substations. Give a single line diagram of i) indoor ii) outdoor iii) pole mounted substation.

b) A d.c. ring main ABCDA is fed from point A from a 230 V supply and the loop resistance of various sections are AB = 0.04 Ω; BC = 0.35 Ω; CD = 0.5 Ω and DA = 0.05 Ω. The main supplies 100 A at B, 150 A at C and 200 A at D. Determine the voltages at each load point. If the point A and C are interconnected through a link of 0.05 Ω. Determine the voltage at the load points.

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