

R09**Code: 9A02502**

B.Tech III Year I Semester (R09) Supplementary Examinations December 2015

TRANSMISSION OF ELECTRIC POWER

(Electrical and Electronics Engineering)

Time: 3 hours

Max Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Write short notes on geometric mean distance and geometric mean radius.
(b) A three-phase overhead transmission line has its conductors arranged at the corners of an equilateral triangle of 2 m side. Calculate the capacitance of each line conductor per km. Given that the diameter of the conductor is 1.25 cm.
- 2 A single-phase overhead short transmission line is transmitting 1200 kW power to a factory at 11 kV and at 0.8 pf lagging. The total resistance and reactance of the line are 3Ω and 4.5Ω respectively. Determine: (i) The voltage at the sending end. (ii) The sending end power factor. (iii) Percentage regulation. (iv) Transmission efficiency.
- 3 (a) Prove the relation $AD-BC = 1$ by considering a two terminal pair network.
(b) A 132 kV, 3- Φ , 50 Hz transmission line 200 km long has the following distributed parameters: $L = 1.3 \times 10^{-3}$ H/km; $C = 9 \times 10^{-9}$ F/km; $r = 0.2 \Omega/\text{km}$; $g = 0$. Find the sending end voltage.
- 4 (a) Write short notes on Bewley's lattice diagram.
(b) An overhead line with surge impedance 400Ω bifurcates into two lines of surge impedance 400Ω and 46Ω respectively. If a surge of 20 kV is incident on the overhead line, determine the magnitudes of voltage and current which enter the bifurcate lines.
- 5 Write short notes on:
(a) Visual disruptive voltage.
(b) Critical disruptive voltage.
(c) Various methods to reduce the corona loss.
- 6 (a) Explain the construction and usage of suspension type insulator with a neat diagram.
(b) A three phase overhead line is suspended by a suspension type insulator, which consists of three units. The potential across top unit and middle unit are 7 kV and 11 kV respectively. Calculate: (i) The ratio of capacitance between pin and earth to the self capacitance of each unit. (ii) The line voltage. (iii) String efficiency.
- 7 (a) Derive the expressions for Sag and Tension when the supports are at equal heights.
(b) An overhead transmission line at a river crossing is supported from two towers at heights of 40 m and 90 m above water level. The horizontal distance between the towers being 400 m. If the maximum allowable tension is 2000 kg, find the clearance between the conductor and water at a point mid-way between the towers. Weight of conductor is 1 kg/m.
- 8 Write short notes on
(a) Intersheath grading
(b) Capacitance grading