

--	--	--	--	--	--	--	--

B. Tech. Degree V Semester Examination November 2015

EE 1503 POWER SYSTEMS I (2012 Scheme)

Time: 3 Hours

Maximum Marks: 100

PART A (Answer ALL questions)

(8 × 5 = 40)

- I. (a) Define the following terms: (i) Demand factor (ii) Diversity factor
(iii) Load factor (iv) Plant capacity factor.
(b) What are the objectives and requirements of a good tariff system?
(c) What are the various causes for the failure of overhead line insulators?
(d) What are the factors which affect sag in overhead line?
(e) State Kelvin's law for obtaining the size of the conductor for transmission.
Discuss its limitations.
(f) List out the main differences between AC distribution and DC distribution.
(g) What are bundled conductors? Explain its advantages.
(h) Derive an expression for ABCD parameters of short transmission lines.

PART B

(4 × 15 = 60)

- II. Explain the working of a nuclear power station with a neat sketch. Discuss the merits and problems associated with nuclear power stations. (15)

OR

- III. (a) A generating station has a maximum demand 100 MW, load factor 65%, plant capacity factor 50% and plant use factor 75%. Find out the following: (10)
(i) Daily energy produced.
(ii) The reserve capacity of the plant.
(iii) The maximum energy that can be produced daily if the plants are running all the time.
(iv) The maximum energy that can be produced daily if the plants are fully loaded
(b) The maximum demand of a power plant is 80 MW. The capacity factor is 0.5 and utilization factor is 0.8. Find the load factor and annual energy production. (5)

- IV. (a) An overhead line is erected across a span of 250 m on level supports. The conductor has a diameter of 1.42 cm and has a dead weight of 1.09 kg/m. The line is subjected to wind pressure of 37.8 kg/m² of the projected area. The radial thickness of the ice is 1.25 cm. Calculate the sag (i) in an inclined direction (ii) in a vertical direction. Assume a maximum working stress 1050 kg/cm². One cubic meter of ice weighs 913.5 kg. (10)
(b) Derive an expression for capacitance of a single core cable. (5)

OR

- V. (a) What is string efficiency? Explain the methods to improve string efficiency for insulators. (10)
(b) What is corona? What are the factors which affect corona? (5)

(P.T.O.)

VI. Discuss the important design considerations in primary and secondary distribution systems. (15)

OR

VII. (a) A two wire DC distributor cable is 2.2 Km long and supplies load of 25 A, 50 A, 75 A at 0.4 Km, 1 Km and 1.6 Km from point A. Each conductor has resistance of $0.05 \Omega/\text{Km}$. Calculate the potential difference at each point if potential difference of 400 V is maintained at point A. (10)

(b) Explain the importance of energy management and power quality in a power system. (5)

VIII. What is long transmission line? Obtain the A, B, C, D parameters of long transmission line by rigorous method. (15)

OR

IX. (a) Derive an expression for capacitance of a 3 phase transmission line with equilateral spacing. (8)

(b) Briefly explain any one method of voltage control in transmission lines. (7)
