

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

***B.Tech. Degree V Semester Special Supplementary Examination
August 2015***

**EE 1503 POWER SYSTEMS I
(2012 Scheme)**

Time : 3 Hours

Maximum Marks : 100

**PART A
(Answer ALL questions)**

(8 × 5 = 40)

- I. (a) What are the different types of Tariff? Explain.
 (b) Explain the terms.
 (i) Load factor (ii) Demand factor (iii) Diversity factor (iv) Plant factor.
 (c) Define string efficiency. Explain methods for improving string efficiency.
 (d) Explain the advantages and disadvantages of high voltage transmission.
 (e) Explain Kelvins Law. Give any two limitations.
 (f) What are the requirements of good distribution systems?
 (g) What are bundled conductors? Give its advantages.
 (h) A single phase line has two parallel conductors 2 meters apart. The diameter of each conductor is 1.2 cm. Calculate the loop inductance per km of the line.

PART B

(4 × 15 = 60)

- II. (a) A 3 phase, 50 Hz, 400V motor develops 100 HP (74.6 kW) the power factor being 0.75 lagging and efficiency is 93%. A bank of capacitors is connected in delta across the supply terminals and the power factor is raised to 0.95 lagging. Each of the capacitor unit is built of 4 similar 100 V capacitors. Determine capacitance of each of the capacitors. (10)
 (b) The maximum demand of a power plant is 80 MW. The capacity factor is 0.5 and utilization factor is 0.8. Find load factor and annual energy production. (5)

OR

- III. Explain the working of a thermal power station, with neat schematic diagram. (15)

- IV. (a) An overhead line has ACSR conductor of 1.95 cm diameter and a span of 244 m. The allowable tension is 3.56×10^4 N. Find (8)
 (i) Sag in still air condition with no ice covering.
 (ii) Vertical sag when there is an ice covering of 0.96 cm thickness and a horizontal wind pressure of 382 N/m² of projected area. Ice weights 8920 N/m². The conductor weight is 0.847 kg/m.
 (b) What do you mean by grading of cables? Explain any one method of grading. (7)

OR

(P.T.O.)

- V. (a) What is corona? What are its advantages and disadvantages? Suggest any two methods to minimize corona loss in transmission line. (8)
- (b) An insulator string consists of three units, each having a safe working voltage of 15 kV. The ratio of self-capacitance to shunt capacitance of each unit is 8:1. Find the maximum safe working voltage of the string. Also find the string efficiency. (7)
- VI. (a) Explain the different systems of A.C. distribution. (8)
- (b) Explain the concept of rising mains in distribution systems. (7)
- OR**
- VII. (a) A two wire DC distributor cable AB is 2.2 Km long and supplies loads of 25A, 50A, 75A, at 0.4 Km, 1 Km, and 1.6 Km from the point A. Each conductor has resistance of $0.05 \Omega/\text{Km}$. Calculate the potential difference at each point if potential difference of 400 volts is maintained at point A. (10)
- (b) What is a ring main system? What are its advantages? (5)
- VIII. Derive the A, B, C, D constants of a long transmission line using rigorous method. (15)
- OR**
- IX. (a) Explain the concept of GMD and GMR. (5)
- (b) Why are transmission lines are transposed? Explain. (5)
- (c) A single phase transmission line has 2 parallel conductors 3 meters apart, radius of each conductor being 1 cm. Calculate the capacitance of line per Km. Given that $\sum_0 = 8.854 \times 10^{-12} \text{ F/m}$. (5)
