Unit-V

a) Explain briefly a distribution system?

b) What are the requirements of a distribution system?

c) Explain Kelvin's law for determination of conductor size.

d) What is a substation? Make a list of the main equipment in a substation. Draw a layout of a substation.

OR

A 440V, 50Hz, 3-phase supply has delta connected load having 50 Ω between R and Y, 159mH between Y and B and 15.9 μF between B and R. Find:

i) The line currents for the sequence RYB.

ii) The value of star-connected balanced resistor for the same power.

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EX - 505

B.E. V Semester

Examination, June 2015

Power System - I

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each questions are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit-I

1. a) Describe in brief the structure of Power System.

b) Enumerate the source of energy.

c) Discuss the problems associated with modem large interconnected power system.

d) A 60 MW power station has an annual peak load of 50MW. The power station supplies load having maximum demands of 20MW, 17MW, 10MW and 9 MW. The annual load factor is 0.45. Find

i) Average load

ii) Energy supplied per year

iii) Diversity factor

iv) Demand factor

OR

A power station has to supply load as follows:

Time (Hours) :	0-6	6-12	12-14	14-18	18-24
Load (MW) :	45	135	90	150	75

i) Draw the load curve
ii) Draw load duration curve
iii) Calculate load factor
iv) Calculate plant capacity factor

Unit-II

2. a) Explain the meaning of self GMD and mutual GMD.
   b) State the factors which govern the capacitance of transmission line.
   c) Explain briefly the skin effect in a transmission line. On factors does it depend?
   d) A 33kV, 3-phase under ground cable, 5km long, uses three single-core cables. Each of the conductors has a diameter of 3 cm and the radius thickness of 0.5 cm. The relative permittivity of the dielectric is 2.5. determine dielectric loss per phase if the power factor of the unloaded cable is 0.02.

OR

Calculate capacitance of a single phase transmission line 35 km long consisting of two parallel wires each 5mm in diameter and 1.8m apart. The height of each conductor above ground is 7.5m.

Unit-III

3. a) How are transmission lines classified?
   b) What are the principal components of an electric supply system?
   c) State the meaning of the term power circle diagram of transmission line. What information can be supplied by this as regards performance of line?

   d) Explain the physical significance of the generalised ABCD constants of a transmission line? Determine these constants for a medium transmission line with nominal T-configuration.

OR

A 220kV, 3-phase, 150km, 50 Hz transmission line delivers a load of 100 MW at 0.85 p.f. logging. the line has per phase a total impedance of z=(40+j125) ohms and a total shunt admittance y = j 0.001 mho. Determine

i) Sending end voltage
ii) Sending end current
iii) Surge impedance loading
iv) Transmission efficiency.

Unit-IV

4. a) What is Sag?
   b) Enumerate the materials used for transmission lines.
   c) Explain what is meant by a string efficiency of a suspension insulator consisting of number of units.
   d) A transmission line conductor crossing a river is supported from two towers at heights of 30m and 80m above the water level. The horizontal distance between the towers is 450 meters. If the tension in the conductor is 1500 kg and weight of the conductor is 1.4 kg/m length, find the minimum clearance of the conductor and water and clearance mid-way between the supports.

OR

A string insulator has three units. The capacitance from each joint to tower is 12.5% of the capacitance of each unit. The voltage across each unit should not exceed 11kV. Find the maximum voltage for the string application.