BTS – V – 11.14 – 0873 Reg. No. | | | | | | | | |

B

B.Tech. Degree V Semester Examination November 2014

EE 1503 POWER SYSTEMS I

(*2012 Scheme*)

Time: 3 Hours Maximum Marks: 100

PART A

(Answer *ALL* questions)

(8 × 5 = 40)

I. (a) Draw the basic schematic of a nuclear power station.

(b) What is meant by (i) load factor and (ii) diversity factor of a power system. What is the significance of these factors on power system operation?

(c) Briefly explain any two methods for equalizing potential over different units in a string insulator.

(d) A single core cable has a conductor diameter of 1cm and internal sheath diameter of 1.8cm. If impregnated paper of relative permittivity 4 is used as the insulation, calculate the capacitance for 1km length of the cable.

(e) Discuss the economic choice of conductor size in feeders.

(f) Write a short note on power quality.

(g) What are the advantages of transposition in transmission lines?

(h) Derive an expression for ABCD parameters of short transmission lines.

PART B

(4 × 15 = 60)

II. Explain the working of a thermal power plant, with a neat schematic diagram. (15)

OR

III. (a) A generating station has a maximum demand of 25M, a load factor of 60% a plant capacity factor of 50% and a plant use factor of 72%. Find (i) the reserve capacity of the plant (ii) the daily energy produced and (iii) maximum energy that could be produced daily if the plant while running as per schedule, were fully loaded. (9)

(b) What are the benefits of power factor improvement? Illustrate any one method of pf improvement. (6)

IV. (a) Briefly explain the important types of insulators used in overhead power transmission. (10)

(b) A transmission line conductor having a cross sectional area of 1.29cm^2, weighs 1170kg per km. The span is 200m between level supports. The line is subjected to a horizontal wind pressure of 122kg/m^2 of projected area. The ultimate strength of the conductor is 4218kg/cm^2. Calculate the maximum sag, if the factor of safety is 5. (5)

OR

V. (a) What is corona? What are the different factors which affect corona? (6)

(b) A 132 kV line with 2cm diameter conductors is built so that corona takes place if the line voltage exceeds 210kV(rms). If the value of the potential gradient at which ionization occurs can be taken as 30,000 volts/cm, find the spacing between the conductors. (9)

(P.T.O.)

VI.	(a)	Briefly explain various A.C distribution systems.	(9)
	(b)	A single phase distributor 2 kilo meters long supplies a load of 120 A at 0.8pf lagging at its far end and a load of 80A at 0.9pf lagging at its mid point. Both pfs are referred to the voltage at the far end. The resistance and reactance per km (go and return) are 0.05 ohm and 0.1 ohm respectively. If the voltage at the far end is maintained at 230V, calculate the voltage at the sending end.	(6)

OR

VII.		Discuss the important design considerations in primary and secondary distribution systems.	(15)
VIII.	(a)	Derive an expression for ABCD constants of a medium transmission line by nominal T method.	(8)
	(b)	Discuss power flow though transmission lines.	(7)

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)

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