GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-V • EXAMINATION – WINTER • 2014

Subject Code: 150801 Date: 28-11-2014 Subject Name: Electrical Power Engineering Time: 10.30 am - 01.00 pm **Total Marks: 70 Instructions:** 1. Attempt all questions. Make suitable assumptions wherever necessary. 2. 3. Figures to the right indicate full marks. Draw and explain the schematic arrangement of nuclear power plant. Also 07 Q.1 **(a)** explain the function of : i) Moderator ii) Fuel rods iii) Control rods Define tariff and explain in detail : 07 **(b)** i) Two-part tariff ii) Power factor tariff iii) Three –part tariff 0.2 07 Each line of a 3-phase system is suspended by a string of 3similar insulators. If (a) the voltage across the line unit is 17.5KV, Calculate the line to neutral voltage. Assume that the shunt capacitance between each insulator and earth is 1/8th of the capacitance of the insulator itself. Also find the string efficiency. i) Advantages of per unit system 05 **(b)** ii)Explain critical disruptive voltage 02 OR **(b)** Draw and explain typical line diagram of A.C power supply scheme. 07 0.3 Explain string efficiency and methods of improving it. 07 (a) An overhead 3-phase transmission line delivers 5000w at 22KV at 0.8pf 07 **(b)** lagging .The resistance and reactance of each conductor is 4 Ω and 6Ω respectively. Determine (1) sending end voltage (2) percentage regulation (3) transmission line efficiency. OR Derive the ABCD parameter for Nominal ∏ medium transmission line. Q.3 07 (a) Explain corona with advantages and disadvantages of it. Also define : 07 **(b)** i) Critical disruptive corona voltage. ii) Visual corona voltage. Write a note on Tap changing transformer(ON load) Q.4 **(a)** 07 Stat and explain different type of tariff 07 **(b)** OR **Explain FACTS devices** 07 **Q.4 (a)** A transmission line has a span of 100m between level supports. The conductor 07 **(b)** has cross section area of 5cm^2 . The tension is the conductor is 2500kg. If specify gravity of conductor material is 9.98m/cm^{3 and} wind pressure is 1.2kg/m. Calculate sag and vertical sag.

- **Q.5** (a) State and explain different methods to improve power factor.
 - (b) What is Corona? Explain its advantages and disadvantages. Also state factors 07 affecting it.

OR

- Q.5 (a) Derive an expression for the inductance of three phase line with conductor 07 having equilateral spacing.
 - (b) Explain the bus impedance matrix method for analysis of unsymmetrical shunt 07 faults.

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