

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-V- EXAMINATION – SUMMER 2016****Subject Code: 150801****Date: 21/05/2016****Subject Name: Electrical Power Engineering****Time: 02:30 PM to 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Draw and explain the schematic arrangement of nuclear power plant. Also explain the functions of: (i) Moderator, (ii) Fuel rods, (iii) Control rods. **07**
- (b) What are the advantages and disadvantages of dc transmission over ac transmission? **07**
- Q.2** (a) Compare the volume of conductor material required in d.c. single phase and three-phase a.c. system. **07**
- (b) What is meant by Corona? What are the various factors which affect corona? How can the corona effect be minimized? **07**
- OR**
- (b) Derive an expression for the voltage drop for a uniformly loaded distributor fed at one end. **07**
- Q.3** (a) Classify the Underground cables. Also describe the general construction of an underground cable with neat sketch. **07**
- (b) Two conductors of a d.c distributor cable AB 1000m long have a total resistance of  $0.1\Omega$ . The ends A and B are fed at 240 V. The cable is uniformly loaded at 0.5 A per meter length and has concentrated loads of 120 A, 60 A, 100 A and 40A at points distant 200 m, 400 m, 700 m and 900 m respectively from the end A. Calculate (i) the point of minimum potential (ii) currents supplied from ends A and B (iii) the value of minimum potential. **07**
- OR**
- Q.3** (a) Explain string efficiency and methods of improving it. **07**
- (b) Discuss the merits and demerits of Underground and Overhead systems. **07**
- Q.4** (a) A three phase transmission line is being supported by three disc insulators. The potentials across top unit (i.e near to the tower) and middle unit are 8kV and 11kV respectively. Calculate (i) the ratio of capacitance between pin and earth to the self capacitance of each unit (ii) the line voltage and (iii) string efficiency. **07**
- (b) State the different methods for power factor improvement. Explain any one in detail. **07**
- OR**
- Q.4** (a) What is medium transmission line? Explain nominal  $\pi$  method of it. **07**
- (b) A three phase 50Hz transmission line 100km long delivers 20 MW at 0.9 p.f. lagging and at 110 kV. The resistance and reactance of the line per phase per

km are  $0.2 \Omega$  and  $0.4 \Omega$  respectively, while capacitance admittance is  $2.5 \times 10^{-6}$  Siemens/km/phase. Calculate: (i) the current and voltage at the sending end (ii) efficiency of transmission. Use nominal T method.

**Q.5 (a)** What is load curve? State the information available from the load curve. **07**

**(b)** Explain importance of voltage control and method to achieve it. **07**

**OR**

**Q.5 (a)** Explain limitation and design aspects of EHV-AC power transmission system. **07**

**(b)** Explain different equipments used in substations with its symbols. **07**

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