

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-Vth Examination December 2010****Subject code: : 150801****Subject Name: Electrical Power Engineering****Date: 16 /12 /2010****Time: 03.00 pm - 05.30 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: **07**
i) Moderator
ii) Fuel rods
iii) Control rods
- (b) A 1 phase motor connected to 400V, 50 Hz supply takes 25A at a p.f. of 0.65 lag. Calculate the capacitance required in parallel with motor to raise p.f. to 0.90 lag. **07**
- Q.2** (a) Define tariff and explain in detail: **07**
i) Two-part tariff
ii) Power factor tariff
iii) Three-part tariff
- (b) A power station has following daily load cycle: **07**

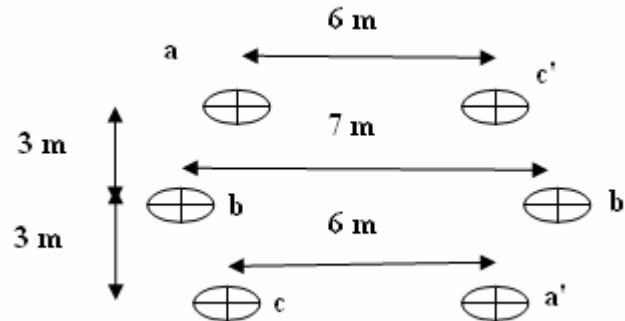
Time(hrs)	0-6	6-10	10-12	12-16	16-20	20-24
Load(MW)	20	30	45	60	40	30

Draw load curve. Also calculate:
i) Average load
ii) Load factor
- OR**
- (b) Calculate volume of conductor material used in **07**
i) Overhead system, with 3 wire dc system
ii) Underground system, with 3 phase 3 wire system
- Q.3** (a) Explain string efficiency and methods of improving it. **07**
- (b) Explain corona with advantages and disadvantages of it. Also define: **07**
i) Critical disruptive corona voltage.
ii) Visual corona voltage.
- OR**
- Q.3** (a) Explain FACTS devices. **07**
(b) Explain different equipments used in substations with its symbols. **07**
- Q.4** (a) Define underground cables, draw and explain internal construction of it. **07**

- (b) A transmission line has a span of 100m between level supports. The conductor has cross-section area of 5cm^2 . The tension in the conductor is 2500 kg. If specific gravity of conductor material is $9.98\text{m}/\text{cm}^3$ and wind pressure is 1.2 kg/m . Calculate sag and vertical sag. 07

OR

- Q.4 (a)** A part of transposition cycle of 3phase double circuit line is shown below. Radius of each conductor is 0.9cm . The conductors are made up of solid copper. Find the inductance/phase/km of the line. 07



- (b) Explain following in respect to medium transmission line. 07
- Nominal T method
 - Nominal π method

- Q.5 (a)** Draw and explain following distribution schemes: 07
- i) Secondary AC distribution system
 - ii) Radial distribution system
 - iii) Ring main distribution system

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

OR

- Q.5 (a)** Differentiate most economical p.f. and most ideal p.f. 02

- (b) Explain: 05

- i) Diversity factor
- ii) Plant capacity factor
- iii) Load factor

- (c) A two conductor street mains AB, 500 m in length is fed from both ends at 250 V. Loads 50 A, 60 A, 40 A and 30 A are tapped at distance of 100 m, 250 m, 350 m, and 400 m from A respectively. If cross section area of the conductors be 1 cm^2 and specific resistance of conductors is $1.7 \times 10^{-8}\ \Omega\text{m}$. Determine minimum consumer voltage. 07
