

# ***B.Tech Degree VI Semester Examination April 2011***

## **EE 601 POWER SYSTEM I (2006 Scheme)**

Time : 3 Hours

Maximum Marks : 100

### **PART - A (Answer ALL questions)**

(8 x 5 = 40)

- I. (a) What is tariff and what are the objectives of tariff?  
(b) Define :  
(i) connected load (ii) load factor  
(iii) demand factor (iv) diversity factor  
(c) Write a short note on Pin type insulators.  
(d) Derive an expression for capacitance of a single core cable.  
(e) Compare overhead and under ground systems.  
(f) State and explain Kelvin's law.  
(g) Write a short note on short transmission line, medium transmission line and long transmission line.  
(h) Derive an expression for ABCD parameter for a short transmission line.

### **PART – B**

(4 x 15 = 60)

- II. With neat diagram explain the working of a thermal power plant. (15)
- OR**
- III. (a) The monthly reading of a consumer's meter are as follows :  
Maximum demand - 50 KW  
Energy consumed - 36,000 KWh  
Reactive energy - 23,400 KVAR  
If the tariff is Rs. 80/KW of maximum demand plus 8 paise per unit plus 0.5 paise per unit of each 1% of power factor below 86%, calculate monthly bill of the consumer? (8)
- (b) Explain power factor improvement by synchronous condenser. What are the advantages and disadvantages of this method? (7)
- IV. (a) Write a short note on line supports. (5)  
(b) An insulator string consists of three units, each having a safe working voltage of 15 KV. The ratio of self capacitance to shunt capacitance of each unit is 8:1. Find the maximum safe working voltage of the string. Also find string efficiency. (10)
- OR**
- V. (a) What are the factors affecting corona? Define :  
(i) Critical disruptive voltage (8)  
(ii) Visual critical voltage. (8)  
(b) What is sag? Derive an expression for sag when supports are at equal levels. (7)

**(P.T.O.)**

- VI. (a) Give the single line diagram of a typical distribution system. (5)  
(b) Derive an expression for the voltage drop for a uniformly loaded distributor fed at one end. (10)
- OR**
- VII. (a) What are the limitations of Kelvin's law? (5)  
(b) A conductor cable 1 Km long is required to supply a constant current of 200 A throughout the year. The cost of cable including installation is Rs.  $(20a + 20)$  per metre where 'a' is the area of cross section of the conductor in  $\text{cm}^2$ . The cost of energy is 5 p per KWh and interest and depreciation charges amount to 10%. Calculate the most economical conductor size. Assume resistivity of conductor material as  $1.73 \mu\Omega \text{ cm}$ . (10)
- VIII. Derive an expression for ABCD parameter of a long transmission line by Rigorous method. (15)
- OR**
- IX. (a) What are the importance of voltage control? (5)  
(b) Give the various locations of voltage control equipment. (3)  
(c) Derive an expression for ABCD constants of a medium transmission line by nominal T method. (7)

\*\*\*