

**FIFTH SEMESTER B.TECH. (ENGINEERING) DEGREE  
EXAMINATION, DECEMBER 2006**

EE 04 504—POWER SYSTEM—I

(2004 admissions)

Time : Three Hours

Maximum : 100 Marks

- I. (a) What are the advantages and disadvantages of non-conventional energy sources ? Compared to conventional energy sources.  
 (b) What is meant by load factor ?  
 (c) Briefly explain the function of Arcing horns in transmission lines.  
 (d) What is meant by corona in transmission lines ?  
 (e) State Kelvin's law.  
 (f) Compare the copper efficiencies of 3-phase 3 wire and 3 phase 4-wire systems.  
 (g) What is meant by transposition of conductors in transmission lines ?  
 (h) What is meant by Ferranti effect in long transmission lines ?

(8 × 5 = 40 marks)

- II. Giving the schematic layout of a steam power station, employing coal, explain the function of each main unit.

*Or*

A Hydroelectric power station has a reservoir of area 2.4 square kilometre and capacity  $5 \times 10^6$  m<sup>3</sup>. The effective head of water is 100 metres. The penstock, turbine and generator efficiencies are 95%, 90% and 85 % respectively. (i) Calculate the total electrical energy that can be generated from the power station ; (ii) If a load of 15,000 kW has been supplied for 3 hours, find the fall in reservoir load.

- III. What is meant by string efficiency of a string of suspension insulators ? What are the method adopted for improving the voltage distribution across the units of string insulator ?

*Or*

What is meant by grading in underground cables ? Explain various methods adopted for grading of cables.

- IV. (a) Enumerate the advantages and disadvantages of ring main distribution system compared to radial distribution systems.

(7 marks)

- (b) A 2 wire d.c. distributor 200 meters long is uniformly loaded with 2A/metre. Resistance of the single wire in 0.3 ohm/km. If the distributor is fed at one end calculate the voltage drop upto a distance of 150 m from the feeding point.

(8 marks)

*Or*

Turn over

A single phase distributor 2 km long supplies a load of 120 A at 0.8 pf lagging at its far end and a load of 80 A at 0.9 p.f. lagging at its midpoint. Both power factors 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 230 V, calculate :

- (i) Voltage at the receiving end.
- (ii) Power factor at the sending end.
- (iii) Power loss in the conductor.

V. Show how regulation and transmission efficiency are determined for medium lines by nominal T-method.

Or

A 132 kV, 50 Hz, 3-phase transmission line delivers a load of 50 MW at 0.8 p.f. lagging at the receiving end. The generalised coefficients of the line are  $A = D = 0.95 \angle 1.4^\circ$ ,  $B = 96 \angle 78^\circ$ ,  $C = 0.0015 \angle 90^\circ$ . Find the regulation of the line.

[4 × 15 = 60 marks]