Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. Electronics Engg. (OE 2012 Onwards) (Sem.–6)

ELEMENTS OF POWER SYSTEMS

Subject Code : BTEEE-OPC

Paper ID : [72840]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Answer briefly :

a. What is Ferranti effect?

b. Why are the conductors for transmission lines stranded?

c. What are the drawbacks of wooden poles?

d. Why effective ac resistance is more than dc resistance of a transmission line?

e. A single core cable has the core diameter of 2.5 cm, thickness of the insulation as 1.25 cm. Calculate the insulation resistance per km assuming the resistivity of insulation as 1.5×10^{14} Ω-cm.

f. What is stringing chart? What is its use?

g. What are the advantages of high voltage transmission?

h. State Kelvin's Law.

i. Why is string efficiency of suspension insulators less than 100%?

j. A 16 km long single-phase transmission line consists of a pair of conductors 1.5 cm diameter spaced 2 m apart. Find the loop inductance.

SECTION-B

2. Describe the various methods of laying underground cables. What are the advantages and disadvantages of each method?

3. What is circle diagram? Explain the steps to calculate sending end voltage and current by using circle diagram if receiving end quantities are known.

4. Derive the expression for ABCD constants for medium transmission lines considering nominal T-configuration.

5. Draw and explain the various types of distribution systems.

6. An overhead line has a span of 150 m between level supports. The conductor diameter is 0.94 cm and weighs 0.62 kg/m. The allowable tension is 580 kg. Calculate the sag if the wind pressure is 39.2 kg/m^2 of a projected area.

SECTION-C

7. A two-conductor single-phase line operates at 50 Hz. The diameter of each conductor is 20 mm and the spacing between the conductors is 3 m. Calculate

   (i) the capacitance of each conductor w.r.t. neutral and line

   (ii) calculate the capacitance of each conductor taking into account the effect of ground if the height of conductors above ground is 6 m.

8. By GMD and OMR approach derive the expression for inductance of 3-phase transposed double circuit line.

9. Write brief note on :

   a. ACSR conductors.

   b. Reactive power compensation.