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

Total No. of Questions : 18

B.Tech. (EE) PT (Sem.–3)

POWER SYSTEM - I (Transmission & Distribution)

Subject Code : BTEE-405

M.Code : 72165

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION 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

Write briefly :

1) Show that Insulation Resistance of a cable is inversely proportional to its length.

2) What is meant by capacitance grading of cables?

3) Compare the cross-sectional areas of conductors for DC two wire system and single phase AC system assuming equal length, equal power and equal losses.

4) What is 'Bundling of conductors'?

5) Explain the terms GMR and self GMD of a conductor.

6) What is the most economical cross-sectional area? Deduce its expression using Kelvin's Law.

7) State the relevance of string efficiency to overhead transmission system.

8) What is a power circle diagram?

9) State Ferranti effect.

10) Enlist the main causes for failure of insulators.

SECTION-B

11) Develop the long line exact equations in hyperbolic terms for sending end voltage and current.

12) A transmission line conductor having a diameter of 19.5 mm weighs 0.85 kg/m. The span is 275m. The wind pressure is 39 kg/m^2 of projected area with ice coating of 13mm. The ultimate strength of the conductor is 8000kg. Calculate the maximum sag if the factor of safety is 2 and ice weighs 910kg/m^3.

13) The cost per km for each of the copper conductor of a section a sq-cm for a transmission line is [Rs.(2800a + 1300)]. The load factor of the load current is 80% and the load factor of the losses is 65%. The rate of interest and depreciation is 10% and the cost of energy is 50 paisa per kWh. Find the most economical current density of the transmission line. Given $\rho = 0.000178\ \Omega$-m.

14) What are Synchronous Phase Modifiers? Explain its use for voltage regulation/line compensation?

15) Explain the various types of Pressure Cables.

SECTION-C

16) a) What is String Efficiency?

b) Each conductor of a 3 phase overhead transmission line is suspended from a cross arm of a steel tower by a string of four suspension insulators. The voltage across the second unit is 15KV and across the third is 27KV. Find the voltage between conductor and String Efficiency.

17) a) Discuss in detail the various methods of laying underground cables.

b) Draw comparison between Over Head Transmission Line System and Underground Transmission System.

18) Write a short note on the following :

a) Voltage regulation and efficiency

b) Proximity effect

c) Arcing horn and grading ring

d) Power factor on Voltage regulation

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.