

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/m² 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/m³.
- 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 paise per kWh. Find the most economical current density of the transmission line. Given $\rho = 0.000178 \Omega\text{-m}$.
- 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.