Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

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B.Tech.(EE/Electrical & Electronics/Electronics & Electrical) (2011 Onwards)/
(Electrical Engineering & Industrial Control) (2012 Onwards)

(Sem.–4)

POWER SYSTEM-I (TRANSMISSION AND DISTRIBUTION)

Subject Code : BTEE-405

M.Code : 57107

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

1. **Answer briefly :**

   a. What is the significance of ABCD parameters?

   b. What is skin effect and methods to reduce skin effect?

   c. Why busbars in EHV substations are hollow bars, what is the reason?

   d. What is ACSR cable and where we use it?

   e. What will happen when power factor is leading in distribution of power?

   f. What are the advantages of transposition of power lines?

   g. What are the limitations of Kelvin's Law?

   h. What are the common causes of failure of underground cable?

   i. What is the purpose of insulator?

   j. What is a belted-cable?

SECTION-B

2. Derive the expression for the capacitance of a single-core cable.

3. Derive and draw the receiving-end power circle diagram in terms of general circuit constants.

4. What is Ferranti effect? Deduce an expression for the voltage rise of an unloaded line.

5. A 500V, 2-core feeder, 0.8km long is required to supply a constant load of 100kW. The cost of the cable including installation charges is Rs. (6a+1.3) per meter, where a is the cross section area of each feeder in cm^2. Interest and depreciation is total 10%. Determine the most economical size. The cost of energy is 12 paise per unit. Specific resistance of copper is 1.75×10^{-6} Ω/cm^2 cross sectional area and 1cm long.

6. What are the advantages and disadvantages of oil filled cables?

SECTION-C

7. Determine the overall diameter of a single-core cable and its most economical diameter when working on a three-phase 275kV system. The maximum permissible stress in the dielectric is not to exceed 15kV/mm.

8. A 15000 kVA is received at 33kV at 0.85 power factor lagging over an 8 km three- phase overhead line. Each line has R = 0.29Ω/km, and X_L = 0.65Ω/km. Calculate

   a. The voltage at the sending end

   b. The power factor at the sending end

   c. The regulation, and

   d. The efficiency of the transmission line.

9. What is the effect of earth on line capacitance? Explain the method of images to calculate the capacitance of

   a. Two-wire single-phase line

   b. Single circuit three phase transposed line.

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.