

Roll No.

--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages : 02

Total No. of Questions : 09

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 $1.75 \times 10^{-6} \Omega/\text{cm}^2$ 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 $R = 0.29\Omega/\text{km}$, and $X_L = 0.65\Omega/\text{km}$. 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.