

**B.Tech. – VIEP – ELECTRICAL ENGINEERING
(BTELVI)**

Term-End Examination

00125

December, 2014

BIEE-003 : POWER SYSTEM – I

Time : 3 hours

Maximum Marks : 70

Note : Solve any *five* questions. All questions carry equal marks.

1. (a) Derive an expression of the capacitance per phase of 3- ϕ with equilateral spacing. 7
- (b) Differentiate between Skin effect and Proximity effect. 7
2. (a) Obtain equivalent- π model of a long transmission line. 7
- (b) Explain Corona phenomena in detail. 7
3. (a) Calculate the value for a string of three insulator units if the capacitance of each unit to earth and line be 20% and 5% of the self-capacitance of the unit. 7
- (b) Describe the different methods of improving string efficiency. 7

4. (a) What are the limitations of Kelvin's law ? 7
(b) Why is capacitance grading required in cables ? How is it done ? 7
5. (a) The maximum and minimum stresses in the dielectric of a single core cable are 30 kV/cm and 15 kV/cm respectively. If the conductor diameter is 2.2 cm, find (i) thickness of insulation (ii) operating voltage. 7
(b) Derive the expression for sag when the conductors are supported at equal heights. 7
6. (a) Derive the expression of vertical sag in situations where the supports are at different levels. Consider the effect of wind and ice also. 7
(b) Derive A, B, C, D constants of a medium length transmission line and hence prove that $AD - BC = 1$. 7
7. (a) What are the main parameters of an overhead transmission line ? 7
(b) Define the following : 7
(i) Use of guard rings
(ii) Shackle insulator
(iii) Method of improving string efficiency
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