| BIEE-003 |

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

00376    **Term-End Examination**

## June, 2016

### BIEE-003 : POWER SYSTEM – I

*Time : 3 hours*                           *Maximum Marks : 70*

*Note :* *Attempt five questions in all. All questions carry equal marks. Use of scientific calculator is allowed.*

1. (a)  Give the comparison between DC and AC systems of transmission and distribution.    7

   (b)  What are the advantages and disadvantages of HVDC transmission as compared to the usual 3-phase AC transmission ?    7

2. (a)  What do you mean by string efficiency ? How can it be improved ?    7

   (b)  What is corona loss ? Explain briefly the factors which affect corona loss.    7

3. (a)  Explain briefly the 'skin effect' in a transmission line. On what factors does it depend ?    7

(b)   Derive the formula of capacitance of a 2-wire line, having radius of conductor 'r' and distance between them as 'D'.          7

4.  (a)   Explain the classification of transmission lines based on their length of transmission. Also explain the Ferranti effect with a phasor diagram.          7

(b)   Explain the various methods of grading of cables.          7

5.  (a)   Discuss how transposition helps in equalising the capacitances in an unsymmetrically spaced 3-phase overhead transmission line.          7

(b)   A single phase, 230 V, 50 Hz, line for street light purposes runs using 7/2·11 conductor over a length of 3·2 km. The conductor spacing is 0·6 km. Determine the resistance, inductance and impedance of the line per km. The resistance per conductor is 1·4 $\Omega$ at 20°C.          7

6.  (a)   In a 3-phase transmission line, the three conductors are placed at the corners of a triangle of sides 1·5 m, 3 m and 2·6 m respectively. If the diameter of each conductor is 1·4 cm and the conductors are regularly transposed, calculate the inductance/phase/km length of the line.          7

(b) Explain the physical significance of the generalised ABCD constants of a transmission line. State the units of these constants. Determine these constants for a medium transmission line with nominal T-configuration. 7

7. Write short notes on any *two* of the following : 2×7=14

(a) Types of insulators used for transmission lines

(b) Variation of sag with load and temperature

(c) Modified Kelvin's law for feeder conductor size