[Total No. of Questions - 9] [Total No. of Printed Pages - 3]

Dec-25-0356

EEPC-512/EEEPC-512 (Power Transmission and Distribution)

B.Tech. 5th (NEP)

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : (i) Attempt five questions in all selecting one question each from section A, B, C and D. Section E is compulsory.

(ii) All parts of a question should be answered at one place.

(iii) Answer should be brief and to-the-point and be supplemented with neat sketches.

SECTION - A

1. With the help of a single line diagram, explain the power system scheme. Locate various sections of it and indicate the typical voltages for generation, transmission, and distribution within each section. (12)

2. What do you understand by overhead and underground transmission systems? Compare these two systems by discussing their advantages and disadvantages. Why is the overhead transmission and distribution system predominantly employed in our country? (12)

SECTION - B

3. (a) Compare AC and PC transmission systems with their advantages and limitations. (6)

(b) Explain the construction, materials, and applications of ACSR, stranded, and bundled conductors. Why is ACSR widely used in overhead transmission lines? Also,

describe the advantages of using bundled conductors, with the help of sketches. (6)

4. (a) The three conductors of a 3-phase transmission line are arranged in a horizontal plane and are 4 meters apart. The diameter of each conductor is 25 mm. Determine the inductance per km of each conductor (line to neutral). Assume a balanced load and R, Y, and B phase sequence. (6)

(b) Derive an expression for the capacitance of three-phase, unsymmetrically spaced, but completely transposed conductors. (6)

SECTION - C

5. (a) Draw the phasor diagram of a short transmission line and derive the expression for voltage regulation. (6)

(b) Define the term corona in an overhead transmission line. What are the factors that affect corona? Describe the method of reducing the corona effect. (6)

6. (a) A balanced three-phase load of 30 MW is supplied at 132kV, 50Hz, and 0.85 p.f. lagging by means of a transmission line. The series impedance of a single conductor is (20+j52) ohms, and the total phase-neutral admittance is 315×10^{-6} Siemens. Using the nominal T method, determine (i) the A, B, C, and D constants of the line, (ii) the sending end voltage, and (iii) the regulation of the line. (6)

(b) Describe the different types of insulators used in overhead transmission lines. (6)

[P.T.O.]

SECTION - D

7. (a) State the classification of cables and illustrate the various parts of a high-voltage cable with a neat labelled diagram. (6)

   (b) Derive an expression for the capacitance of a single-core cable. (6)

8. (a) Explain the radial distribution system. State its merits and demerits. (6)

   (b) Explain the factors that influence the choice between overhead and underground systems for urban and rural areas. (6)

SECTION - E (Compulsory)

9. (a) What is meant by primary and secondary transmission?

   (b) What are the wavelength and velocity of propagation in transmission lines?

   (c) Define surge impedance.

   (d) Define the proximity effect on conductors.

   (e) What is the effect of the leading load power factor on the voltage regulation of a short transmission line?

   (f) What is meant by the grading of cables? (6×2=12)