
$\mathcal{N a t i o n a l}$ Institute of Technology, $\mathcal{H}$ amirpur ( $\mathcal{H P}$ )
Name of the Examination: B. Tech.
$\begin{array}{lll}\text { Branch } & : \text { Electrical } & \text { Semester } \\ \text { Course Name } & : \text { Power System } & \text { Course Co } \\ & & \\ & \text { End Semester Examination: May } 2023\end{array}$
Time: 3 Hours
Maximum Marks: 50
Note : Attempt all questions. Assume any missing data. Each question carries equal marks.

Q1. (a) What are the factors to be considered for the selection of the site for a thermal power plant?
(b) Define the following terms with example in connection to power supply system.
(i) Connected load (ii) Maximum demand (iii) Demand factor (iv) Load Factor (v) Diversity factor

Q2. (a) A 3 phase $132 \mathrm{kV}, 50 \mathrm{~Hz}$ overhead line has ACSR conductors of equivalent copper area $1.5 \mathrm{~cm}^{2}$ and effective diameter 41.8 mm , spaced equilaterally 8 m apart (a) Find line parameters ie. resistance, inductance and capacitance. (b) Find charging current and charging MVA. Taking resistivity as $1.73 * 10^{-6} \mathrm{ohm}-\mathrm{cm}$.
(b) A 400 kV 3 phase bundled conductor line with two sub conductors per phase has a horizontal configuration as shown in Fig. The radius of each sub-conductor is 1.6 cm (a) Find the inductance per phase per km of the line. (b) Compute the inductance of the line with only one conductor per phase having the same cross-sectional area of the conductor of each phase.


Q3. (a )What is per unit system? What are the advantages of per unit system? How are the base quantities selected?
(b) What is a nominal circuit of a transmission line? Find ABCD constants for nominal pi circuit of a transmission line?

Q4 (a) A suspension string has 3 units. Each unit can withstand a maximum voltage of 11 kV . The capacitance of each joint and metal work is 10 percent of the capacitance of each disc. Find
(i) Maximum line voltage for which the string can be used.
(ii) String efficiency
(b) Assuming that the shape of an overhead line can be approximated by a parabola, deduce the expression for calculating sag and conductor length. What will be the effect of ice on the sag and conductor length?

Q5 (a) A single core cable for 66 kV 3 phase system has a conductor of 2 cm diameter and sheath of inside diameter 5.3 cm . It is required to have two intersheaths so that stress varies between the same maximum and minimum values in the three layers of dielectric. Find the positions of intersheaths, maximum and minimum stress and voltages on the intersheaths. Also find the maximum and minimum stress if the intersheaths are not used.
(b) A dc 2 wire distributor $A B$ is 450 meters long is fed at both ends at 240 V . The distributor is loaded as shown in Figure. The resistance of each conductor is 0.05 ohm per km. Find the point of minimum potential and its potential?


