R18 Regulation *Subject code:* 2P6BA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech VI Semester Regular/Supplementary Examinations, June 2022

POWER SYSTEMS-II

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Maximum Marks: 70 Date: 17.06.2022 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10x2M=20 Marks)

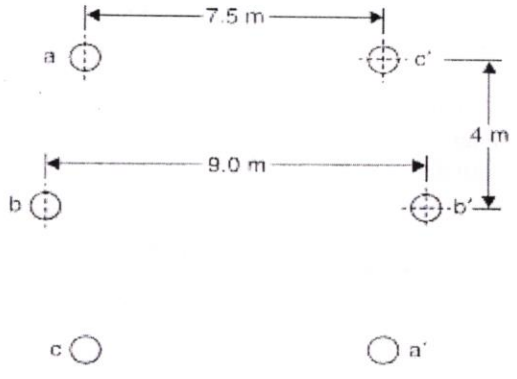
1 Explain the meaning of the term self G.M.D and mutual G.M.D?
2 What is bundled conductor and why it is used?
3 What do you understand by long transmission lines?
4 Draw the phasor diagram for a nominal-π circuit of a transmission line?
5 What is the significance of rigorous solution method in long transmission lines?
6 What is the physical significance of SIL?
7 What is travelling wave?
8 What is Proximity effect?
9 What is sag template?
10 Can string efficiency in an A.C. system be 100%? Explain.

Part-B

Answer All the following questions. (5X10M=50Marks)

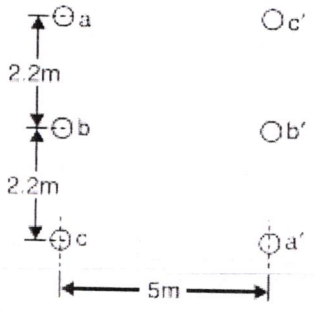
11 A. Discuss the various conductor materials used for overhead lines. What are their relative advantages and disadvantages? [5M]

B. Determine the inductance per km of a transposed double circuit 3-φ line shown in below Figure. Each circuit of the line remains on its own side. The diameter of the conductor is 2.53. [5M]



OR

12 A 3-phase double circuit line is shown in below Figure. The diameter of each conductor is 2 cm. Determine the capacitance and charging current per km length of the line, assume that the line is transposed and the operating voltage 220 kV. [10M]



13 Determine the sending end voltage current, power and power factor for a 160 km section of 3-phase line delivering 50 MVA at 132 kV and p.f. 0.8 lagging. Also find the efficiency and regulation of the line. Resistance per line 0.1557 ohm per km, spacing 3.7 m, 6.475 m, 7.4 m transposed. Evaluate the A, B, C, D parameters also. Diameter 1.956 cm. [10M]

OR

14 Determine the efficiency and regulation of a 3-phase, 100 km, 50 Hz transmission line delivering 20 MW at a p.f. of 0.8 lagging and 66 kV to a balanced load. The conductors are of copper, each having resistance 0.1 ohm per km, 1.5 cm outside diameter, spaced equilaterally 2m between centres. Use (i) nominal-T, and (ii) nominal-π method. [10M]

15 Derive the expression for the ABCD parameters of the long transmission line. [10M]

OR

16 A 200 kV surge travels on a line of 500 Ω surge impedance and reaches a junction where two branch lines of surge impedances 650 Ω and 350 Ω respectively are connected with the transmission line. Determine the surge voltage and current transmitted into each branch line. [10M]

17 A. How do you find reflection and refraction coefficients at a T-junction? [5M]
B. Derive the expression for transmitted and reflected voltages at the capacitive junction due to transients? [5M]

OR

18 A. What is skin effect? Why is it absent in the D.C system? [5M]
B. Discuss briefly about the factors affecting on corona loss? [5M]

19 A. Explain how the effect ice and wind can be included in sag calculations of transmission lines. [5M]
B. An overhead line has a span of 250 m. Find the weight of conductor if the ultimate strength is 5758kg, sag is 1.5 m and factor of safety is 2. [5M]

OR

20 Discuss in detail about the construction features of pin type of insulator with neat sketch? [5M]
A string of 5 insulator units has a self-capacitance equal to 11 times the pin to earth capacitance. Find the string efficiency? [5M]