R20 Regulation *Subject code: 3P5BC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech V Semester Supplementary Examinations, June/July 2023

POWER SYSTEMS-II

(Electrical and Electronics Engineering)

Maximum Marks: 70 Date:01.07.2023 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 Find the GMR of a three-strand conductor in terms of radius of an individual strand.
2 What is the effect of bundled conductors on transmission line inductance?
3 Write an expression for voltage regulation of a short transmission line and draw the vector diagram.
4 What is meant by generalized circuit constants of the transmission line?
5 What do you understand by long transmission lines?
6 What does Velocity of Propagation Mean?
7 What is the reflection and refraction coefficient of current and voltage wave of the transmission line when receiving end is open-circuited?
8 Why Ferranti effect occurs in a transmission line?
9 A 132 kV transmission line has the following data: Wt. of conductor = 680 kg/km; Length of span = 260 m; Ultimate strength = 3100 kg; Safety factor = 2. Calculate the height above the ground at which the conductor should be supported. Ground clearance required is 10 meters.
10 How do you improve string efficiency?

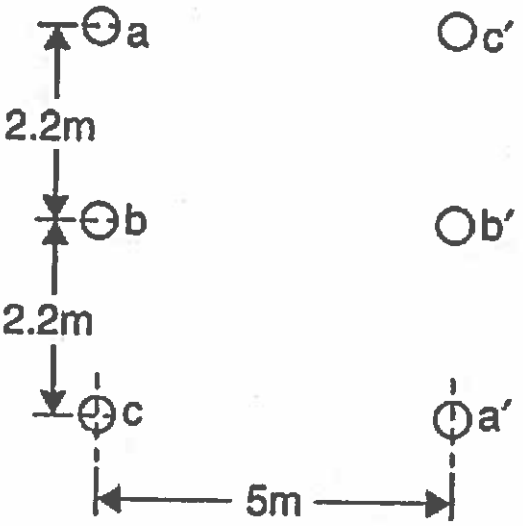
Part-B

Answer All the following questions. (10MX 5=50Marks)

11 What are ACSR conductors? Explain the advantages of ACSR conductors when used for overhead lines. (10M)

OR

12 A. Find the capacitive susceptance per mile of a single-phase line operating at 60 Hz. The conductor is Partridge, and spacing is 20 ft between centres. (5M)
B. A 3-phase double circuit line is shown in Fig. 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 is 220 kV. (5M)



13 A.Analyze a medium transmission line with the nominal T method and draw the phasor diagram. (5M)

B.A three-phase 50Hz transmission line, 100 km long, delivers 25 MW at 100KV at 0.75 power factor lagging. The resistance and reactance of the lines per phase per kilometre are 0.32 ohms and 0.57 ohms respectively, while the admittance is 2.5×10^{-6} mho/ km/ph. Calculate the efficiency of the transmission by using the nominal π method? (5M)

OR

14 A 3φ line delivers 3500 kW at 0.8 p.f lag to a load. The impedance of the line is (2+j5) Ω. If the sending end voltage is 33 kV, determine the receiving end voltage, line current and efficiency of the line. (10M)

15 Analyze the long transmission line by the rigorous solution. (10M)

OR

16 A single-circuit 60-Hz transmission line is 370 km long. The conductors are Rook with flat horizontal spacing and 7.25 m between conductors. The load on the line is 125 MW at 215 kV with 100% power factor. Find the voltage, current, and power at the sending end and the voltage regulation of the line. Also determine the wavelength and velocity of propagation of the line. (10M)

17 Explain in brief about surge impedance loading (SIL) in power systems. (10M)

OR

18 What are the various properties of the corona? Derive the expression for power loss due to corona. (10M)

19 Derive the expression for the sag of a transmission line between two supports of unequal heights. (10M)

OR

20 What is meant by stringing chart? Explain its applications. (10M)