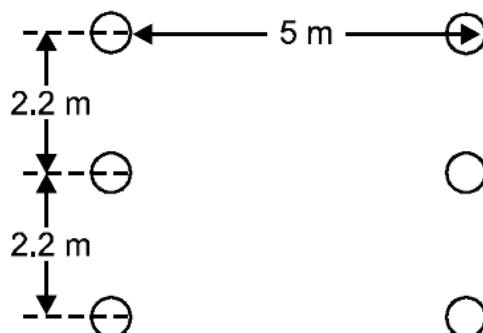


SREE VIDYANIKETHAN ENGINEERING COLLEGE

(An Autonomous Institution, Affiliated to JNTUA, Ananthapuramu)

III B.Tech I Semester (SVEC-16) Regular/Supplementary Examinations February - 2021**TRANSMISSION AND DISTRIBUTION****[Electrical and Electronics Engineering]****Time: 3 hours****Max. Marks: 70****Answer One Question from each Unit****All questions carry equal marks****UNIT-I**

- 1 a) A single phase has two parallel conductors 2 meters apart. The diameter of each conductor is 1.2cm. Calculate the loop inductance per km of the line. CO4 6 Marks
- b) A 3-phase double circuit line is shown below. Radius of each conductor is 1cm. Determine the capacitance and charging current per km assuming the line is transposed and operating voltage is 220kV, 50Hz. CO4 8 Marks

**(OR)**

- 2 a) A 33kV, 50Hz, 3-phase underground cable, 4 km long uses three single core cables. Each of the conductor has a diameter of 2.5cm and the radial thickness of insulation is 0.5cm. Determine:
i) Capacitance of the cable/phase
ii) Charging current/phase
iii) Total charging kVAR. The relative permittivity of insulation is 3. CO4 10 Marks
- b) Explain about Capacitance Grading. CO2 4 Marks

UNIT-II

- 3 a) Explain the classification of lines based on their length of transmission. CO2 4 Marks
- b) A single-phase 50Hz generator supplies an inductive load of 5,000kW at a power factor of 0.707 lagging by means of an overhead transmission line 20km long. The line resistance and inductance are 0.0195Ω and 0.63mH per km. The voltage at the receiving-end is required to be kept constant at 10 KV. Determine:
i) the sending-end voltage and voltage regulation of the line.
ii) the transmission efficiency. CO3 10 Marks

(OR)

- 4 a) Derive the expression for voltage regulation of medium transmission line if the line is represented by nominal- π . CO1 6 Marks
- b) A 50Hz, 3-phase transmission line is 100km long. It has a total series impedance of $35+j140$ ohms and a shunt admittance of $j930 \times 10^{-6}$ S. It delivers 40MW at 220kV, with 90% power factor lagging. Find the losses, efficiency and voltage regulation by nominal-T method. CO3 8 Marks

UNIT-III

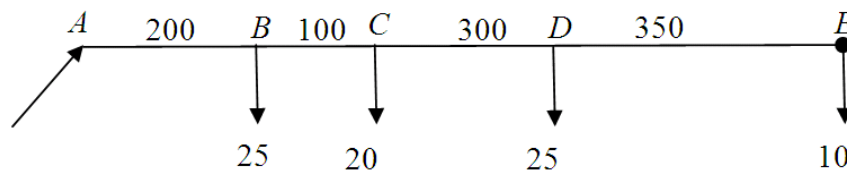
- 5 a) A three phase 220kV, 50Hz transmission line consists of 1.2cm radius conductor spaced 2 meters apart in equilateral triangular formation. Find the disruptive critical voltage between the lines if the temperature is 20°C and atmospheric pressure is 72.2cm. Take $m_0=0.96$. Dielectric strength of air = 21.1kV (rms)/cm. CO4 7 Marks
- b) An overhead line has the following data: CO4 7 Marks
Span length 160m on level supports, conductor diameter 0.95 cm, weight per unit length of the conductor 0.68kg/m, ultimate stress 4250kg/cm², wind pressure 40kg/cm² of projected area, factor of safety 5. Find the sag of the conductor

(OR)

- 6 a) A string of 3 insulators is connected across three phase, 66kV line. If the self capacitance of each unit is equal to 6 times pin to earth capacitance. Calculate the potential difference across each unit and string efficiency. CO4 8 Marks
- b) Briefly describe the methods of reducing corona effect. CO2 6 Marks

UNIT-IV

- 7 a) A 2-wire DC distributor is loaded as shown in figure below. The voltage at the feeding end is 230V. The distance between sections are given in meters. Determine the cross sectional area of the conductor for a minimum consumer voltage of 220V. Assume the resistance of conductor used for a distributor is 1/60Ω for one meter length and 1sq.mm conductor cross section. CO5 9 Marks



- b) Discuss the methods to improve the distributor voltage of an AC distributed system. CO2 5 Marks

(OR)

- 8 a) A DC ring main ABCDA is fed at point A from a 230V supply and the loop resistances of various sections are: AB is 0.04Ω; BC is 0.35Ω; CD is 0.5Ω and DA is 0.05Ω. The main supplies 100 A at B, 150 A at C and 200 A at D. Determine the voltages at each load point. If the points A and C are interconnected through a link of 0.05Ω, determine the voltages at the load points. CO5 7 Marks
- b) A single phase distributor AB has a total impedance of $(0.1+j0.2)\Omega$. At the far end B, a current of 80A at 0.8 p.f. lagging and at mid-point C a current of 100A at 0.6p.f. lagging are tapped. If the voltage of the far end is maintained at 200V, determine: CO5 7 Marks

(i) Supply end voltage V_A . (ii) Phase angle between V_A and V_B

UNIT-V

- 9 a) Describe the various factors that are considered in selecting optimal location of substations. CO1 7 Marks
- b) Explain the main and transfer bus bar system with circuit diagram. CO3 7 Marks
- (OR)
- 10 a) Explain the single bus bar system with sectionalisation and what are its merits and demerits. CO3 8 Marks
- b) Explain various distribution planning models. CO1 6 Marks

