



B.Tech VI Semester Supplementary Examinations, January 2023
POWER SYSTEMS-II

Maximum Marks: 70

(EEE)
07/01/2023

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.
 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)

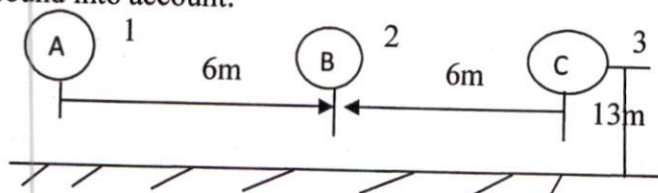
- 1 Write inductance of a conductor due to internal and external flux?
- 2 What is the significance of equivalent symmetrical spacing of a three-phase line?
- 3 Write ABCD constants of short transmission lines?
- 4 Why is leakage conductance negligible in overhead lines?
- 5 A transmission line of surge impedance Z_0 is terminated by (i) an inductance (ii) a capacitance?
- 6 Write components used in overhead lines?
- 7 Can string efficiency in an a.c. system be 100%?
- 8 Write the properties of line supporters?
- 9 Write the types of the line supporters used in electrical systems?
- 10 What is stringing chart?

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 Find the capacitance per km per phase to neutral of a 3-phase line arranged as shown in fig. 10
The outside dia of ACSR conductors is 2.60cm. The line is transposed, take the effect of ground into account.



OR

- 12 Derive the expression for flux linkages established in the composite conductor having 'q' number of sub-strands. 10
- 13 Analyze a medium transmission line with nominal T method of medium transmission line and draw the phasor diagram? 10

OR

- 14 A transmission line has generalized circuit constants are $A = 0.93 + j0.016$ $B = 20 + j140$ 10
The load at the receiving end is 60 MVA, 50Hz, 0.8 power factor lagging. The voltage at the supply end is 132 kV. Calculate the load voltage and voltage regulation, use nominal – π approximation.
- 15 A long transmission line which has resistance = 50 ohm, inductive reactance = 220 ohm and 10
shunt admittance = 0.0025 S. Determine (i) sending end voltage, (ii) sending end current, (iii) sending end power factor and (iv) efficiency when the line is transmitting 40MVA at 0.85 p.f lagging at 220Kv.
- OR
- 16 Derive the mathematical expression for Reflection and Refraction Coefficients – 10
Termination of lines with T-Junction–Lumped Reactive Junctions(Inductance & Capacitance)
- 17 Derive the expression for sag and tension when the supports are at unequal heights 10
OR
- 18 Derive the sag expression for a transmission line with the effect of ice covering and wind 10
pressure.
- 19 A 3-phase, 220 kV, 50 Hz transmission line consists of 1.5 cm radius conductor spaced 2 10
metres apart in equilateral triangular formation. If the temperature is 40°C and atmospheric pressure is 76 cm, calculate the corona loss per km of the line. Take $m_0 = 0.85$.
- OR
- 20 An insulator string consists of three units, each having a safe working voltage of 15 kV. 10
The ratio of self-capacitance to shunt capacitance of each unit is 8 : 1. Find the maximum safe working voltage of the string. Also find the string efficiency.