

**ANURAG Engineering College**

(An Autonomous Institution)

II B.Tech II Semester Supplementary Examinations, December – 2024

**POWER SYSTEMS-II****(ELECTRICAL AND ELECTRONICS ENGINEERING)****Time: 3 Hours****Max. Marks: 75****Section – A (Short Answer type questions)****(25 Marks)****Answer All Questions**

	<b>Course Outcome</b>	<b>B.T Level</b>	<b>Marks</b>
1. Infer the need for transposition of transmission lines?	CO1	L2	2M
2. What is the effect of ground on capacitance?	CO1	L1	3M
3. Sketch the nominal T model of a transmission line.	CO2	L1	2M
4. What is proximity effect?	CO2	L1	3M
5. Define the surge impedance loading.	CO3	L1	2M
6. What are the reflection and refraction coefficients of a short circuited line?	CO3	L1	3M
7. List out the causes for the failure of insulators?	CO4	L2	2M
8. Write the methods for reducing corona effect in transmission lines.	CO4	L2	3M
9. What is the need of grading the cables?	CO5	L1	2M
10. List out the advantages of cables compared to overhead transmission lines?	CO5	L2	3M

**Section B (Essay Questions)****Answer all questions, each question carries equal marks.****(5 X 10M = 50M)**

11. A) (i) Discuss the concept of geometric mean distance. How is this concept used to find the inductance of composite conductor line? (ii) Derive the expression for capacitance of three phase transmission line with asymmetrical spacing.	CO1	L3	5M 5M
<b>OR</b>			
B) Calculate the capacitance per phase of a three phase three wire transposed system when the conductors are arranged at the corners of a triangle having sides of 1.0 m, 1.5 m and 2.0 m. Diameter of each conductor is 1.2 cm.	CO1	L3	10M
12. A) A three phase line delivers 4000 kW at a power factor 0.9 lagging to a load. If the sending end voltage is 66 kV, determine i) receiving end voltage ii) line current iii) transmission efficiency. The resistance and reactance of each conductor is 3.31 $\Omega$ respectively.	CO2	L3	10M
<b>OR</b>			
B) Derive the expression for the ABCD constants for the nominal- $\pi$ & nominal-T circuit of a medium transmission line.	CO2	L3	10M
13. A) (i) Deduce the expression for velocity of propagation of travelling waves. (ii) Discuss briefly on Bewley's Lattice Diagram	CO3	L3 L2	5M 5M
<b>OR</b>			
B) (i) Discuss the propagation of surges in transmission lines. (ii) Explain about termination of line with open circuit for travelling wave.	CO3	L2	5M 5M

14. A) (i) Discuss on the suspension type and strain type insulators with a neat sketch. CO4 L2 5M  
L3 5M  
(ii) In a string of 3 units, the capacitance between each link to pin to earth is 11% of the capacitance of one unit. Calculate the voltage across each unit and string efficiency when the voltage across the string is 33kV.
- OR**
- B) Each of the three insulators forming a string has a self-capacitance of 'C' Farads. The shunting capacitance of the connecting metal work of each insulator is 0.3 C to earth and 0.2 C to the line. A guard ring increases the capacitance to the line of the metal work of the lowest insulator to 0.5 C. Calculate the string efficiency of this arrangement with the guard ring. CO4 L3 10M
15. A) (i) Determine the sag for an overhead line conductor taking into account the effects of wind and ice loading. CO5 L2 5M  
(ii) An overhead transmission line has a span of 220m, the conductor weighing 804 kg/km. Calculate the maximum sag if the ultimate tensile strength of the conductor is 5,758 kg. Assume safety factor 2. L3 5M
- OR**
- B) (i) Discuss about the inter-sheath grading of cables. CO5 L2 5M  
(ii) Explain the construction of underground cable with a neat sketch. 5M