Code No: 125AG

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, August - 2022
POWER SYSTEMS - II
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
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1.a) What is Aluminium Conductor Steel Reinforced conductor (ACSR)? Explain the advantages of ACSR conductors when used for overhead lines.
b) Calculate the capacitance per phase of a three phase, three wire system by considering earth effect, when the conductors are arranged in a horizontal plane with spacing $D_{12}=D_{23}=3.5$m, and $D_{31}=7$m. The conductors are transposed and each has a diameter of 2.0 cm. Assume the transmission line is 4m above the ground level. [6+9]

2.a) Clearly explain what do you understand by Geometrical Mean Distance (GMD) and Geometrical Mean Radius (GMR) of a transmission line?
b) Discuss about the bundled conductors.
c) What do you understand by transposition of lines? [6+4+5]

3.a) Derive the A, B, C and D constants for Nominal-T model.
b) Draw the vector diagrams of nominal-p and nominal-T models of medium transmission line. Derive the expression for voltage regulation of both the models. [6+9]

4.a) An overhead single phase delivers 1.1 MW at 33 kV at 0.9 power factor lagging. The total resistance of the line is 10 Ω and the total inductive reactance is 15 Ω. Determine (i) % voltage regulation (ii) sending end power factor (iii) transmission efficiency.
b) Explain the interpretation of the long line equations. [9+6]

5.a) How the corona forms in power systems and write its disadvantages?
b) A 500 KV surge travels on an overhead line of surge impedance 400 Ω towards its junction with a cable that has a surge impedance of 40 Ω. Find: i) transmitted voltage, ii) reflected voltage, iii) reflected current. [6+9]

6.a) Discuss about the attenuation in transmission lines and causes of it.
b) Explain Ferranti effect in power systems.
c) Derive expression for reflection and refraction coefficients for open circuit and short circuit lines. [4+4+7]

7.a) Explain how sag is determined for an overhead line conductor taking into account the effects of wind and ice loading.
b) Explain about the various methods to improve the string efficiency.
c) With neat sketch, explain about suspension type and strain type insulators. [5+5+5]

8.a) Explain the construction of 3-core belted type cable.
b) Explain about different methods of grading of cables. [6+9]

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