GALGOTIAS UNIVERSITY

ADMISSION NUMBER

School of Engineering

B.TECH Electrical Engineering
Semester End Examination - Jul 2024

Duration : 180 Minutes
Max Marks : 100

Sem IV - G2UB406T - Fundamentals of Power Systems

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1)	Name different methods of grounding.	K1(2)
2)	Explain the concept of mutual geometric mean distance (GMD)and sef GMD.	K2(4)
3)	Explain the insulation resistance of cable , state that how it differs from resistance of overhead conductor.	K2(6)
4)	What are the main elements to make use for electric power transmission at high voltage by 3- phase, 3-wire overhead system. Calculate the volume of conductor material required for a single-phase, 2 wire with one wire earthed system on the basis of equal maximum potential difference between one conductor and compare it with DC two wire with one wire earthed.	K3(9)
5)	A single circuit 50 Hz, 3-phase transmission line has the following transmission lines parameters per km for a medium line T network as shown in Figure : R = 0.2 ohm, L = 1.3 mH and C = 0.01 μF, 120 km. Make use of this data to solve for sending end voltage and efficiency of transmission line.	K3(9)
6)	Determine the capacitance of three phase double circuit transmission line for vertical spacing.	K5(10)
7)	Analyse with the neat diagram the solid/effective grounding systems and ungrounded system.	K4(12)
8)	Determine the expression for sag and tension in overhead lines when supports are at equal levels. An overhead line has the following data: Span length 160 metres, conductor dia 0.95 cm, weight per unit length of the conductor 0.65 kg/metre. Ultimate stress 4250 kg/cm2, wind pressure 40 kg/m2 of projected area. Factor of safety 5. Calculate the sag.	K5(15)
9)	Determine the Potential distribution over a string of 4 insulators. If the ratio of mutual capacitance to self capacitance is 5 and number of string are 5with total operating voltage is 66kV, calculate the string efficiency.	K5(15)
10)	Elaborate Kelvin's law for determining economic size of conductor for overhead lines and discuss its limitations in practice.A daily load cycle of a 3 –phase 33 kv, 10 km long transmission line is as : 2500	K6(18)

kva for 8 hours, 2000 kVA for 9 hours and 1500 kVA for 7hours . The cost of line including towers insulators is Rs. (7500+6000 a) per km, where “a” is area of cross section in sq. cm. Interest & depreciation is 8%.The cost of energy is 15 paisa per unit. The line is in use for 250 working days a year. Determine most economical conductor size. The resistance per km and per square cm is 0.173 ohm.