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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2024 Supplementary Examinations

Programme: B.E. **Semester: V**
Branch: Electrical and Electronics Engineering **Duration: 3 hrs.**
Course Code: 19EE5PCTND **Max Marks: 100**
Course: Transmission and Distribution

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

		UNIT - I	CO	PO	Marks
1	a)	Draw the line diagram of a typical transmission and distribution scheme indicating voltage levels used at different stages.	CO1	PO2	**06**
	b)	An overhead line has a span of 150 m between level supports. The conductor has a cross-sectional area of 2 cm^2. The ultimate strength is 5000 kg/cm^2 and safety factor is 5. The specific gravity of the material is 8.9 gm/cc. The wind pressure is 1.5 kg/m. calculate the height of the conductor above the ground level at which it should be supported if a minimum clearance is 7 m is to be left between the ground and the conductor.	CO1	PO3	**08**
	c)	Justify why string efficiency should be as high as possible. Explain the various methods for improving the string efficiency in detail.	CO1	PO2	**06**
		OR			
2	a)	A overhead line with a span of 300 m in a hilly are with uniform ground slope of 1/20 and having a conductor weight of 0.8 kg/m is supported between two towers of equal height of 30 m above the ground level. Assuming the horizontal tension of the line to be 1500 kg. Find (a) The clearance at the point where the conductor has its lowest elevation (b) The minimum clearance of the conductor line from the ground.	CO1	PO3	**08**
	b)	Discuss the advantages of High voltage Transmission in terms of volume of the conductor material required, transmission efficiency and percentage line drop. also explain the method of protection employed to line vibrations.	CO1	PO2	**06**
	c)	A string of 4 insulators has self-capacitance equal to 5 times the pin to earth capacitance. Calculate: a) voltage distribution across various units as a percentage of total voltage across the string. b) String efficiency.	CO1	PO3	**06**

			UNIT - II			
	3	a)	A single core cable is used on a 66 kV, 3 phase system. The core diameter is 1.2 cm while the insulation thickness is 1.5 cm. if PVC of relative permittivity 4.8 is used as dielectric, calculate the capacitance of cable and its charging current. The supply frequency is 50 Hz. Assume cable length to be 1.5 km.	CO2	PO3	**08**
		b)	Explain the following types of conducting materials used as transmission line in brief (a) ACSR (b) GTACSR (c) GZTACSR (d) ZTAI.	CO2	PO2	**04**
		c)	A 3 core, 3 phase metal sheathed cable on testing for the capacitance gave the following results: i) capacitance between all conductors bunched and sheath = 0.6 µF ii) Capacitance between two conductors bunched with sheath and third conductor = 0.36 µF. with the sheath insulated find, a) Capacitance between any two conductors b) Capacitance to neutral c) Charging current if cable is connected to 11 kV, 3 phase, 50 Hz system.	CO2	PO3	**08**
			UNIT - III			
	4	a)	Determine the inductance per kilometre of 3 phase transmission line using 20 mm diameter conductors when conductors are situated at the corners of a triangle with spacing of 4, 5 and 6 mtr the conductors or regularly transposed.	CO3	PO2	**08**
		b)	What are the advantages and disadvantages of corona. What are the factors affecting the corona loss. Also, List out the methods to reduce corona discharge.	CO3	PO2	**06**
		c)	Derive the expression for line to neutral capacitance for a three phase overhead Line when the conductors are symmetrically spaced.	CO3	PO3	**06**
			OR			
	5	a)	A three phase transmission line has conductor diameter of 1.8 cm each, the conductors are spaced 4cm, 6cm and 9cm apart of a triangle. The loads are balanced and the line is transposed. Find the inductance per phase of 50 km long transmission line.	CO3	PO3	**08**
		b)	A three phase, 50 Hz, 132 kV overhead line has conductors placed in a horizontal plane 4m apart. Conductor diameter is 2cm. if the length of the line is 100 km, calculate the charging current per phase assuming complete transposition. Given $\varepsilon_0=8.854X10^{-12.}$	CO3	PO3	**08**
		c)	Define with respect to corona disruptive critical voltage and visual critical voltage	CO3	PO1	**04**
			UNIT - IV			
	6	a)	A three phase line delivers 3000 kW at a p.f. of 0.8 lagging to a load. If the sending end voltage is 33 kV. Determine i) Receiving end voltage ii) Line current iii) Transmission efficiency. The resistance and reactance of each conductor is 5Ω and 8Ω respectively.	CO4	PO2	**08**

		b)	Deduce and expression for transmission efficiency and regulation for medium transmission line using i) Nominal T method ii) Nominal π method.	CO4	PO3	**06**
		c)	A 110 kV, 50 Hz, 3 phase transmission line delivers a load of 40 MW at 0.85 lagging p.f. at the receiving end. The generalized constants of the transmission line are $A=D=0.95\angle 1.4^0$ $B=96\angle 78^0$ ohm $C=0.0015\angle 90^0$ mho. Find the regulation of the line and charging current. Use nominal T method.	CO4	PO3	**06**
			UNIT - V			
	7	a)	What is radial distribution system? What are its advantages and disadvantages?	CO5		**06**
		b)	A 3 wire DC system takes a current of 50 A on positive side and 45 A on negative side. The resistance of each outer is 0.0004Ω per meter while the cross-section of middle wire is half of that of each outer. If the voltage between each outer and middle wire is maintained at 220V at the feeding end. Calculate the voltage at the distant load end between each outer and middle wire. The 3 wires are of 100 m length.	CO5		**08**
		c)	Write a short notes on resistance grounding. Also list out the advantages of neutral grounding.	CO5		**06**

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