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Question Bank Theory unit wise

Q. No.	Questions	Mark	CO	BL	PO/ PI
UNIT-01: Introduction and Calculation of line and ground parameters					
1	State advantages and disadvantages of high voltage.	04	CO1	1	1.4.1
2	Derive the relation between temperature rise and current carrying capacity of EHVAC line.	06	CO1	3	1.1.1
3	State the properties of bundled conductors in EHVAC lines?	04	CO1	1	1.4.1
4	Explain the effects of bundled conductor on its inductance.	04	CO1	2	1.4.1
5	State the different mechanical considerations in EHV line performance? Explain any one in detail.	04	CO1	2	1.4.1
6	Explain Aeolian Vibration and Galloping Vibration in detail.	04	CO1	2	1.3.1
7	Derive the expression for sequence inductance and capacitance.	06	CO1	3	1.1.1
8	Derive and explain the line parameters of modes of propagation.	06	CO1	3	1.1.1
9	Derive the expressions for resistance and inductance of ground return.	06	CO1	3	1.1.1
10	Illustrate the power handling capacity and line loss of EHVAC lines with various voltage levels for 9000 MW power transmission and 800 km length. Also state which voltage level is suitable for this case?	06	CO1	4	2.1.3
11	A power of 12000 MW is required to be transmitted over a distance of 1000 km. At voltage levels of 750 kV, determine: a) Possible no. of circuits required with equal magnitudes for sending and receiving end voltages with 30° phase difference. b) The currents transmitted; and c) The total line losses Assume the value of x = 0.272 ohm/km & r = 0.0136 ohm/km for 750 kV.	06	CO1	3	2.1.3
UNIT-02: Voltage gradient of conductors and Losses					
1	Derive the expression for distribution of voltage gradient on sub-conductors of bundle.	6	CO2	3	1.1.2
2	Derive the expression for attenuation of travelling waves on transmission line.	6	CO2	3	1.1.1
3	Derive the charge potential relations of multi-conductor lines.	6	CO2	3	1.1.2
4	How the audible noise is generated and what are the characteristics?	4	CO2	1	6.1.1

5	Describe the limits for radio interference.	4	CO2	2	6.2.1
6	Derive the expression $P_C = \frac{1}{2} KC\ (V_m^2 - V_0^2)$ for the energy loss from charge-voltage diagram.	6	CO2	3	1.1.2
7	Explain field of sphere gap.	4	CO2	2	1.4.1
8	What is corona? List out various corona loss formulas in detail.	6	CO2	1	1.4.1
9	Derive equation of surface voltage gradients on conductors in EHVAC	6	CO2	3	1.1.2
UNIT-03: Theory of travelling waves and standing waves					
1	Derive the equations for reflection and refraction of travelling waves.	6	CO3	3	1.1.2
2	What is standing wave? Derive equation for open ended line double exponential response.	6	CO3	3	1.1.2
3	Derive differential equations and solutions for general case in travelling waves.	6	CO3	3	1.1.2
4	Derive equation for line energization with trapped charge voltage.	6	CO3	3	1.1.2
UNIT-04: Over voltage in EHV system covered by switching operations					
1	Explain sinusoidal excitation lumped parameter circuit.	6	CO4	2	1..4.1
2	Explain ferro-resonance over voltages.	4	CO4	1	1.4.1
3	Explain the methods used for reduction of switching surge over voltages in EHV systems.	6	CO4	2	1.4.1
4	State the sources/causes of over voltages.	4	CO4	1	1.4.1
5	Explain recovery voltage and circuits breakers and its impact on over voltages.	4	CO4	2	1.4.1
UNIT-05: Power frequency voltage control and over voltages					
1	Explain the term power circle diagram and its use.	4	CO5	2	1.4.1
2	Describe static reactive compensating system.	4	CO5	2	1.4.1
3	Derive the expressions for generalized constants.	6	CO5	3	1.1.2
4	Explain sub-synchronous resonance problem and counter measures.	6	CO5	2	1.4.1
5	A 100 MVA 230kV 50 Hz transformer has x_t = 12% and is connected to a line 200 km long which has an inductance of 1 mH/km. The filter, connected to the LV 33 kV side of the transformer, is required to suppress the 5^{th} harmonic generated by the TCR to 1% of I_n. Calculate the value of filter capacitor if the filter inductance used is 2mH.	6	CO5	3	2.1.3
6	Explain sub-synchronous resonance in series capacitors compensated lines.	4	CO5	2	1.4.1

UNIT-06: Design of EHV-AC lines					
1	Explain the factors under steady state in design of EHV lines?	4	CO6	2	3.1.1
2	Explain line insulation design based upon transient overvoltages in detail.	6	CO6	2	3.1.6
3	Describe conductor-tower, conductor-ground and conductor-conductor clearances.	4	CO6	2	3.1.4
4	Explain air gap clearance for power frequency and lightning.	6	CO6	2	3.1.4
5	A power of 12000 MW is to be transmitted from a super thermal power station in Central India over 800 km to Delhi. Design the EHVAC system for 400 kV and 750 kV voltage level. Also state the important and useful conclusions for preliminary understanding.	6	CO6	5	4.3.4