

# Question Bank

## Extra High Voltage AC Transmission System

Unit 01: Introduction and Calculation of line and ground parameters			
Q.No.	Question	Marks	Paper
1	Write a short note on Aeolian Vibration.	5	May-2016 Dec-2016
2	State the effect of bundled conductors on its inductance.	5	May-2016
3	Derive the expressions for resistance and inductance of ground return.	10	Dec-2015 May-2016
4	Explain in detail advantages and disadvantages of high voltage	5	Dec-2015 May-2016 Dec-2016 May-2017 Dec-2019
5	Describe the line parameters of modes of propagation.	10	May-2016 Dec-2016
6	Write a short note on Galloping Vibration.	5	Dec-2016
7	Explain in detail the sequence inductance and capacitance.	10	Dec-2016 May-2017
8	What are the different mechanical considerations in EHV line performance?	5	May-2017
9	What are the properties of bundled conductors in EHVAC lines?	5	May-2017
10	Explain the relation between temperature rise and current carrying capacity of EHVAC line.	5 10	Dec-2015 May-2017 Dec-2019
11	A power of 12000 MW is required to be transmitted over a distance of 1000 km. At voltage levels of 400 kV, 750 kV, 1000 kV and 1200 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 $x = 0.327, 0.272, 0.231, 0.231$ ohm/km for 400, 750, 1000, 1200 kV respectively.	10	Dec-2015 Dec-2019
12	Derive the equation for inductance in EHVAC transmission system.		
13	Derive the equation for capacitance in EHVAC transmission system.		
14	Compare various EHVAC transmission lines on the basis of power handling capacity and losses for different voltages		

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Unit 02: Voltage gradient of conductors and Losses			
Q.No.	Question	Marks	Paper
1	Write short notes on distribution of voltage gradient on sub-conductors of bundle.	5	May-2016
2	Write a short note on attenuation of travelling waves on transmission line.	5	Dec-2015 May-2016
3	Explain the charge potential relations of multi-conductor lines.	5 10	Dec-2015 May-2016 Dec-2016 May-2017 Dec-2019
4	How the audible noise is generated and what are the characteristics?	10	May-2016 Dec-2019
5	Write a short note on limits for radio interference.	5	Dec-2015 Dec-2016 Dec-2019
6	Derive the expression $P_C = \frac{1}{2} KC (V_m^2 - V_0^2)$ for the energy loss from charge-voltage diagram.	10	Dec-2015 Dec-2016
7	Explain field of sphere gap.	5	Dec-2015
8	What is corona? Explain corona loss formulas in detail.		
9	Derive equation of surface voltage gradients on conductors in EHVAC		

Unit 03: Theory of travelling waves and standing waves			
Q.No.	Question	Marks	Paper
1	Explain reflection and refraction of travelling waves.	5	Dec-2015 May-2016 Dec-2016 May-2017 Dec-2019
2	What is standing wave? Derive equation for open ended line double exponential response.	10	Dec-2015 May-2016
3	Derive differential equations and solutions for general case in travelling waves.		Dec-2019
4	Derive equation for open ended line response to sinusoidal excitation.		
5	Derive equation for line energization with trapped charge voltage.		Dec-2019

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Unit 04: Over voltage in EHV system covered by switching operations			
Q.No.	Question	Marks	Paper
1	Write a short note on sinusoidal excitation lumped parameter circuit.	10 5 10	Dec-2015 May-2016 May-2017 Dec-2019
2	Write a short note on ferro-resonance over voltages.	5	Dec-2015 May-2016 Dec-2016 May-2017 Dec-2019
3	Write a short note on reduction of switching surge over voltages in EHV systems.	5	Dec-2015 May-2016 Dec-2016 May-2017
4	Write down the sources/causes of over voltages.	5	May-2016 Dec-2016 May-2017 Dec-2019
5	Explain recovery voltage and circuits breakers and its impact on over voltages.		
6	Write a short note on calculation of switching surges single phase equivalents.		

Unit 05: Power frequency voltage control and over voltages			
Q.No.	Question	Marks	Paper
1	Explain the term power circle diagram and its use.	5	May-2016 Dec-2016 May-2017 Dec-2019
2	Write a short note on static reactive compensating system.	5	May-2016 May-2017 Dec-2019
3	Derive the expressions for generalized constants.	5 10 5	Dec-2015 May-2016 Dec-2016 May-2017 Dec-2019
4	Explain sub-synchronous resonance problem and counter measures.	10	May-2016
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 <sup>th</sup> harmonic generated by the TCR to 1% of $I_n$ . Calculate the value of filter capacitor if the filter inductance used is 2mH.	10	May-2016 Dec-2016
6	Write a short note on sub-synchronous resonance in series capacitors compensated lines.	5 10	Dec-2016 May-2017
7	Explain voltage control using synchronous condenser.		

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Unit 06 : Design of EHV-AC lines			
Q.No.	Question	Marks	Paper
1	What are the factors under steady state in design of EHV lines?	10 5 10 10	Dec-2015 May-2016 Dec-2016 May-2017 Dec-2019
2	Explain line insulation design based upon transient overvoltages in detail.		Dec-2019
3	Write a short note on conductor-tower, conductor-ground and conductor-conductor clearances.		Dec-2019
4	Write a short note on air gap clearance for power frequency and lightning.		