Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, May 2020

Course: Advanced Power Transmission Systems, PSEG405 **Semester: VIII**
Programme: B.tech. – Electrical **Time: 03 hrs.**
Instructions: All questions are compulsory **Max. Marks: 100**

SECTION A (MCQ)

S. No.		Marks	CO
Q 1	The break-even distance is the distance beyond which (a) DC transmission is economical (b) AC transmission is economical (c) Cost of both system are the same (d) Both (b) and (c)	5	CO1
Q.2	Short circuit ratio of an HVDC grid is (a) DC power flow/kVA (b) AC MVA/DC MW (c) voltage/current at the short circuit point (d) Short circuit MVA at converter bus rated DC power MW	5	CO2
Q.3	12-Pulse converters are used in modern converters because of (a) Reduced current (b) Reduced ripple (c) Increased voltage and reduced harmonics (d) Both (b) and (c)	5	CO4
Q.4	Equivalent resistance of a converter with source reactance X_s/phase for a 6-pulse converter bridge is (a) 3 X_s (b) 3 X_s/pi (c) X_s/pi (d) (3 X_s)pi	5	CO3
Q.5	With increase in delay angle α (a) Active power transmitted decreases (b) Reactive kVAR needed increases (c) DC output voltage decreases (d) All of above (a), (b) and (c)	5	CO4

Q.6	Choose the correct answer to estimate the steady state stability of 1-phase AC line with sending end and receiving end voltages maintained 132 kV by a synchronous modifier, and when the sending end voltage is loading by 90^0 electrical degrees, given the reactance of the line is 10 ohm. (a) 1650 MW (b) 1714.4 MW (c) 1742.4 MW (d) 1654.2 MW	**5**	**CO1**
SECTION B			
Q.7	Mention various methods of controlling the output voltage of a converter.	**10**	**CO4**
Q.8	Define the following terms (i) Two terminal HVDC system (ii) HVDC pole (iii) Multiterminal system (iv) Converter substation	**10**	**CO3**
Q.9	Compute the current ratio of HVDC link for a bipolar line of 400 kV, transmitting a power of 1000 MW, when power factor on the AC side voltage of the converter transformer is 0.9, assuming that the insulation levels are same. Also compute current on AC and DC side.	**10**	**CO3**
Q.10	State the advantages of HVDC transmission over EHVAC transmission for bulk power transmission.	**10**	**CO1,2**
Q.11	Explain your understanding on surge impedance loading and its importance. How a voltage profile of AC line is governed by load and length of the line.	**10**	**CO2**
SECTION-C			
Q.12	An HVDC bipolar link using 6-pulse converter is supplying 1000 MW at 400 kV. The rectifier station is working at a delay angle of alpha = 10^0. Estimate (a) No-load DC voltage (b) AC voltage on the converter side of the transformer (c) Current on the secondary side of the transformer (d) Peak to peak ripple. **OR** What are the limitations of DC line? How have these limitations been surmounted in modern HVDC lines?	**20**	**CO4**