ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END-SEMESTER EXAMINATION : MAY 2021** (Academic Session: 2020 – 21)		
Name of the Program:	B,Tech	**Semester:**	VIII
Paper Title :	ELECTIVE-VII (HIGH VOLTAGE DC TRANSMISSION)	**Paper Code:**	EEE44118
Maximum Marks :	**40**	**Time duration:**	3 Hours
Total No of questions:	8	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)			

Answer all the Groups

Group A

Answer all the questions of the following $5 \times 1 = 5$

1.

a) What kind of DC cable use in HVDC system?
b) What is advantage of HVDC?
c) Which pulse converter are preferable for Modern HVDC systems and why?
d) What are the various sources of Harmonics?
e) What are the different filter use in AC side of HVDC system?

GROUP –B

Answer *any three* of the following $3 \times 5 = 15$

2. What is an HVDC-VSC system? Give the single line diagram of the system**. (3+2)**

3. What is advantage of voltage source controlled IGBT HVDC schemes? Estimate the steady state stability of a 1-phase AC line with sending end and receiving end voltage maintained at 132 kV when the sending end voltage is loading by 90^0 electrical degree given the reactance of the line is10Ω. (2+3)

4. Why are filter not needed on DC side with HVDC voltage source converter?

5. What are the order of harmonics present on AC side of the VSC converter DC system?

GROUP –C

Answer *any two* of the following $2 \times 10 = 20$

6. Determine the cost of 5^{th} harmonics filter for a bipolar 4-bridge 12-pulse converter rated 1000A. 300 kV. The filter is connected to 400 kV, 3-ph, 50 Hz supply. Filter is to be designed for operation with one bridge out of service.

Cost capacitor 20 lakhs/ MVAR

Inductance 45 lakhs/ MVAR

Take $\alpha=15^0$ p.f.= 0.866 and network impedance angle limited to 75^0 .

7. Calculate the secondary line voltage of the transformer for 3 phase bridge rectifier to provide a DC voltage of 120 kV. Assume $\alpha= 30^0$ $\mu= 15^0$ What is the effective reactance X_L if the rectifier gives 800 A of DC output current?

8. Give the schematic diagram of an HVDC link. What are the important components?
