Hall Ticket Number:

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VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (EEE) IV Year I-Semester Supplementary Examinations, May-2019

High Voltage DC Transmission

Time: **3** hours Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. State the disadvantages in DC transmission.
2. Draw the cost versus distance curve for HVDC and HVAC transmission
3. What are the assumptions made to simplify the analysis of Gratez circuit?
4. Define commutation margin angle
5. What are the limitations of manual control in HVDC link?
6. How power reversal can be done in HVDC link?
7. Briefly explain about Arc-back.
8. What is DC circuit breaker? How will it be useful?
9. Identify the drawbacks of voltage limiting control in Multi Terminal Direct Current (MTDC) system.
10. Categorize the merits and demerits of series and parallel Multi Terminal Direct Current (MTDC) systems.

Part-B (5 × 10 = 50 Marks)

11.a) Compare HVAC and HVDC transmission systems stating their relative advantages and disadvantages [5]

b) Explain in detail about the various HVDC links [5]

12.a) Draw the 6 pulse Greatz converter and analyze the circuit without overlap angle for a firing angle of 30° [6]

b) Explain the operation of three-phase 6 pulse converter with source inductance. [4]

13.a) State any four important reasons, why the current control is desirable in the rectifier station under normal operating conditions? [6]

b) What are the draw backs of constant current control? Explain. [4]

14. Discuss various protection schemes for protection against over current and over voltages in converter station. [10]

15.a) Explain in detail current margin method for control of Multi Terminal Direct Current (MTDC) systems. [4]

b) Explain the decentralization current reference balancing control method of Multi Terminal Direct Current (MTDC) systems. [6]

16.a) Briefly explain about the applications of HVDC transmission [4]

b) Derive the expression for output DC average voltage for converter as rectifier [6]

17. Answer any *two* of the following:

a) Explain about the combined characteristics of rectifier and inverter of an HVDC link [5]

b) Discuss about commutation failure in inverters. [5]

c) How current order control is done in Multi Terminal Direct Current (MTDC) system? Explain. [5]