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Code No.: 41223 S

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

[6]

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

$Part-A (10 \times 2 = 20 Marks)$

- 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 $(5 \times 10 = 50 \text{ Marks})$

- 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 [6] firing angle of 30°
 - 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?
 - 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 [10] in converter station.
- 15.a) Explain in detail current margin method for control of Multi Terminal Direct Current [4] (MTDC) systems.
- b) Explain the decentralization current reference balancing control method of Multi [6] Terminal Direct Current (MTDC) systems.
- 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? [5] Explain.