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B.Tech.(Electronics & Electrical) (2011 Onwards E-II)
B.Tech.(Electrical & Electronics) (2013 & Onwards E-II) (Sem.-7,8)
HIGH VOLTAGE DIRECT CURRENT TRANSMISSION

Subject Code: BTEEE-804B M.Code: 71964

Time: 3 Hrs. Max. Marks: 60

## **INSTRUCTIONS TO CANDIDATES:**

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
- 3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

#### **SECTION-A**

# 1. Write briefly:

- a. What is bi-polar HVDC system?
- b. What is earth electrode in an HVDC system?
- c. Why reversal of power flow is necessary in HVDC lines?
- d. Define converter arm in HVDC line.
- e. Define phase control in HVDC converter.
- f. Why is voltage regulation better in case of dc transmission?
- g. Why HVDC lines do not require any reactive power compensation?
- h. Why iron and graphite cannot be employed as material for earth electrode?
- i. Why dc transmission is economical and preferable over ac transmission for large distances only?
- j. What is most modern method of triggering of thyristors in HVDC system?



## **SECTION-B**

- 2. State the merits of HVDC as compared to EHV AC transmission lines for long high-power lines.
- 3. Sketch a schematic diagram of a 2-terminal bipolar HVDC transmission system and explain its operation.
- 4. Explain the operation of a 6-pulse bridge converter in HVDC system.
- 5. Explain the terms delay angle and its significance in rectifier control.
- 6. Narrate the function of a smoothing reactor in a HVDC system.

## **SECTION-C**

- 7. Derive expression for power at sending end and receiving end of an HVDC pole in terms of sending end voltage, receiving end voltage and line resistance.
- 8. Explain converter control characteristics in HVDC system with suitable diagram showing all the essential components.
- 9. Sketch and explain the configuration of a 12-pulse bridge converter indicating the connections of two numbers of 3-phase transformer. In this context explain the terms 12-pulse converter and smoothing reactor.

NOTE: Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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