

WORK SHEET

UNIT I

Basic Concepts and Necessity of HVDC Transmission Systems

1. What is the main necessity of an HVDC transmission system ()

- A) To increase frequency
- B) To reduce transmission losses over long distances
- C) To decrease transformer size
- D) To eliminate substations

Answer: B

2. HVDC transmission is most economical for:

- A) Short-distance low-power transmission
- B) Medium-distance distribution systems
- C) Long-distance bulk power transmission
- D) Domestic wiring

Answer: C

3. Which of the following is a major component of an HVDC terminal station?

- A) Synchronous condenser
- B) Rectifier/Inverter converter
- C) Distribution transformer only
- D) Circuit recloser

Answer: B

4. In an HVDC system, the converter station at the sending end acts as:

- A) Inverter
- B) Rectifier
- C) Amplifier
- D) Oscillator

Answer: B

5. Which HVDC link uses only one conductor and earth return?

- A) Bipolar link
- B) Homopolar link
- C) Monopolar link
- D) Back-to-back link

Answer: C

6. A bipolar HVDC link generally operates with:

- A) One conductor only
- B) Two conductors of opposite polarity
- C) Three conductors
- D) Four conductors

Answer: B

7. Which HVDC link is mainly used to connect two AC systems operating asynchronously?

- A) Bipolar link
- B) Monopolar link
- C) Back-to-back HVDC link
- D) Homopolar link

Answer: C

8. Compared to AC transmission, HVDC transmission requires:

- A) More conductors
- B) Higher reactive power compensation along the line
- C) Less right-of-way for the same power transfer
- D) More corona loss always

Answer: C

9. One important advantage of HVDC transmission is:

- A) High charging current
- B) Better stability control
- C) Skin effect increases
- D) Frequency synchronization is compulsory

Answer: B

10. Which apparatus is essential in HVDC converter stations?

- A) Cycloconverter
- B) Converter transformer
- C) Induction regulator
- D) Shunt reactor only

Answer: B

11. Modern HVDC systems commonly use:

- A) Mercury arc valves
- B) Vacuum tubes
- C) Thyristor valves
- D) Carbon arc converters

Answer: C

12. The Graetz circuit in HVDC systems is mainly used for:

- A) Frequency conversion
- B) Rectification
- C) Voltage regulation
- D) Harmonic elimination only

Answer: B

13. A 6-pulse converter produces ripple frequency equal to:

- A) $2f$
- B) $3f$
- C) $6f$
- D) $12f$

Answer: C

14. A 12-pulse converter is preferred over a 6-pulse converter because it:

- A) Increases harmonics
- B) Reduces harmonics
- C) Requires no transformer
- D) Uses fewer valves

Answer: B

15. The 12-pulse converter is generally formed by combining:

- A) Two 3-pulse converters
- B) Two 6-pulse converters
- C) Four 3-pulse converters
- D) Three 6-pulse converters

Answer: B

16. In HVDC systems, harmonic filters are mainly used to:

- A) Increase voltage
- B) Reduce harmonics generated by converters
- C) Improve insulation
- D) Reduce conductor size

Answer: B

17. Which of the following is NOT an advantage of HVDC transmission?

- A) Asynchronous interconnection
- B) Lower transmission losses over long distances
- C) Easy voltage transformation along the line
- D) Better controllability of power flow

Answer: C

18. In a Graetz bridge converter, the number of valves used in a 6-pulse converter is:

- A) 2
- B) 4
- C) 6
- D) 12

Answer: C

19. In Y/Y mode operation of two 3-phase converters, the phase shift between converter outputs is:

- A) 0°
- B) 15°
- C) 30°
- D) 60°

Answer: A

20. One major modern trend in DC transmission is the development of:

- A) Low-frequency AC systems
- B) Flexible AC transmission only
- C) Voltage Source Converter (VSC) based HVDC
- D) Mechanical rectifiers

Answer: C