WORK SHEET

UNIT-IV
Converter Faults and Protection

1. Converter faults in HVDC systems mainly occur due to:
   A) Excessive rainfall only
   B) Electrical and commutation disturbances
   C) Mechanical vibration only
   D) Transformer painting defects

   Answer: B

2. Overcurrent in HVDC converter stations can damage:
   A) Valves and converter equipment
   B) Transmission towers only
   C) Insulators only
   D) Ground wires only

   Answer: A

3. Protection against overcurrent is commonly provided by:
   A) Fuses and breakers
   B) Capacitors only
   C) Bus bars only
   D) Wave traps

   Answer: A

4. Overvoltage in HVDC systems is mainly controlled using:
   A) Smoothing reactors
   B) Surge arresters
   C) Earth electrodes only
   D) Circuit isolators only

   Answer: B

5. Surge arresters are used to protect equipment from:
   A) Low voltage
   B) High temperature
   C) Transient overvoltages
   D) Frequency variations

   Answer: C

6. A smoothing reactor in an HVDC system is connected:
   A) In parallel with AC filters
   B) In series with the DC line
   C) Across the transformer
   D) Across the circuit breaker

   Answer: B

7. The primary function of a smoothing reactor is to:
   A) Increase harmonics
   B) Reduce ripple in DC current
   C) Increase AC voltage
   D) Eliminate insulation

   Answer: B

8. DC breakers are mainly used to:
   A) Increase line voltage
   B) Interrupt DC fault currents
   C) Generate reactive power
   D) Reduce corona loss only

   Answer: B

9. Breaking DC current is more difficult than AC current because DC current:
   A) Has higher frequency
   B) Has no natural current zero
   C) Is always sinusoidal
   D) Has lower magnitude

   Answer: B

10. Audible noise in HVDC lines is mainly caused by:
    A) Transformer vibration only
    B) Corona discharge around conductors
    C) Tower oscillations
    D) Wind velocity only

    Answer: B

11. Space charge field in HVDC transmission is produced due to:
    A) Electron accumulation around conductors
    B) Transformer saturation
    C) Earth resistance
    D) Reactive power compensation

    Answer: A

12. Corona effects in DC transmission lines are influenced by:
    A) Conductor surface condition
    B) Atmospheric conditions
    C) Line voltage
    D) All of the above

    Answer: D

13. One major disadvantage of corona in HVDC lines is:
    A) Reduced insulation requirement
    B) Power loss and radio interference
    C) Increased conductor strength
    D) Improved voltage regulation

    Answer: B

14. Radio interference in HVDC systems is mainly due to:
    A) Converter cooling systems
    B) Corona discharge
    C) Tower footing resistance
    D) Transformer oil leakage

    Answer: B

15. Which device protects converter valves from lightning surges?
    A) Smoothing reactor
    B) Surge arrester
    C) Shunt capacitor
    D) DC filter only

    Answer: B

16. Commutation failure in converters may result in:
    A) Normal operation
    B) Excessive current and converter faults
    C) Frequency stabilization
    D) Reduced harmonics only

    Answer: B

17. Smoothing reactors also help in:
    A) Increasing ripple content
    B) Limiting fault currents
    C) Increasing frequency
    D) Reducing conductor size

    Answer: B

18. Corona loss in HVDC lines increases with:
    A) Decrease in voltage
    B) Increase in conductor diameter only
    C) Increase in transmission voltage
    D) Decrease in atmospheric pressure only

    Answer: C

19. Which of the following reduces corona effects?
    A) Rough conductor surface
    B) Bundled conductors
    C) Smaller conductor diameter
    D) Higher voltage gradient

    Answer: B

20. The main purpose of protection systems in HVDC stations is to:
    A) Increase power factor only
    B) Ensure safe and reliable operation
    C) Reduce conductor sag
    D) Increase transmission frequency

    Answer: B