WORK SHEET

UNIT-III:

Power Flow Analysis in AC/DC Systems

1. In AC/DC power systems, DC link modelling is necessary for:

A) Transformer design only
B) Accurate power flow analysis
C) Protection coordination only
D) Frequency measurement

Answer: B

2. The main purpose of power flow analysis is to determine:

A) Mechanical strength of conductors
B) Voltage, current, and power in the system
C) Insulation thickness
D) Generator efficiency only

Answer: B

3. In HVDC systems, the DC network mainly consists of:

A) AC buses only B) Converters and DC transmission lines
C) Transformers only D) Alternators only

Answer: B

4. The converter equations in AC/DC systems relate:

A) Mechanical power and torque
B) AC quantities and DC quantities
C) Voltage and frequency only
D) Current and resistance only

Answer: B

5. In a DC load flow solution, the major controlled variable is:

A) Frequency B) Reactive power only
C) DC current or DC voltage D) Rotor angle

Answer: C

6. The per unit (P.U.) system is mainly used in power systems to:

A) Increase system voltage
B) Simplify calculations
C) Reduce transmission losses
D) Eliminate harmonics

Answer: B

7. In the P.U. system, quantities are expressed as:

A) Absolute values
B) Percentage values only
C) Ratios of actual values to base values
D) RMS values only

Answer: C

8. Which base quantities are generally selected in the per unit system?

A) Voltage and power
B) Current and resistance
C) Frequency and impedance
D) Torque and speed

Answer: A

9. The simultaneous method in AC-DC power flow solves:

A) Only AC equations
B) Only DC equations
C) AC and DC equations together
D) Converter equations separately

Answer: C

10. The sequential method in AC-DC load flow analysis involves:

A) Solving AC and DC systems independently in sequence
B) Solving only DC equations
C) Ignoring converter equations
D) Solving all equations simultaneously

Answer: A

11. Which method generally requires less computer memory?

A) Simultaneous method
B) Sequential method
C) Newton-Raphson only
D) Gauss elimination only

Answer: B

12. The simultaneous method provides:

A) Lower accuracy
B) Better coordination between AC and DC solutions
C) No convergence
D) Simplified converter modelling only

Answer: B

13. Converter control equations are essential because they determine:

A) Generator speed
B) Converter operating conditions
C) Conductor sag
D) Insulator design

Answer: B

14. In HVDC load flow analysis, the converter firing angle mainly affects:

A) Mechanical torque
B) DC voltage output
C) AC frequency
D) Transformer rating only

Answer: B

15. Which of the following is commonly used for AC power flow analysis?

A) Newton-Raphson method
B) Runge-Kutta method
C) Euler method
D) Bisection method

Answer: A

16. In AC/DC systems, converters act as:

A) Passive loads only
B) Interface between AC and DC networks
C) Frequency stabilizers only
D) Pure resistive elements

Answer: B

17. The sequential method alternates between:

A) Voltage and current calculations only
B) AC and DC load flow solutions
C) Transformer and generator calculations
D) Harmonic and transient analysis

Answer: B

18. Which quantity is common to both AC and DC sides of a converter?

A) Frequency
B) Reactive power only
C) Active power
D) Rotor speed

Answer: C

19. One advantage of the per unit system is:

A) Elimination of converters
B) Easier comparison of equipment ratings
C) Reduction in transmission cost
D) Increase in frequency stability

Answer: B

20. In AC-DC power flow studies, convergence problems may arise due to:

A) Improper converter modelling
B) High conductor resistance only
C) Low transformer oil level
D) Mechanical vibrations

Answer: A