1. Which diagram is commonly used to illustrate the thermodynamic cycle of a vapor compression system?
a) T-S diagram
b) P-V diagram
c) H-S diagram
d) P-H diagram

Answer: d) P-H diagram
Explanation: The Pressure-Enthalpy (P-H) diagram is widely used to represent the vapor compression cycle due to its ability to show the state of the refrigerant at different points in the cycle in terms of pressure and enthalpy.

2. What is the purpose of sub-cooling in a vapor compression refrigeration system?
a) To increase compressor efficiency
b) To reduce the risk of liquid entering the compressor
c) To decrease condenser efficiency
d) To increase the coefficient of performance (COP)

Answer: b) To reduce the risk of liquid entering the compressor
Explanation: Sub-cooling ensures that the refrigerant leaving the condenser is in the liquid state, minimizing the possibility of liquid entering the compressor, which could damage it.

3. How do deviations from the theoretical vapor compression cycle affect system performance?
a) They increase COP
b) They decrease COP
c) They have no effect on COP

d) They increase compressor efficiency

Answer: b) They decrease COP
Explanation: Deviations from the theoretical cycle, such as irreversibilities and losses, result in decreased efficiency, thus reducing the Coefficient of Performance (COP) of the system.

4. In a multi-pressure refrigeration system, what is the purpose of flash gas removal?
a) To increase compressor efficiency
b) To increase evaporator pressure
c) To decrease compressor work
d) To reduce refrigerant losses

Answer: c) To decrease compressor work
Explanation: Flash gas removal reduces the amount of work required by the compressor by separating the high-pressure liquid and vapor phases before entering the compressor, resulting in improved efficiency.

5. What is the primary function of the condenser in a refrigeration system?
a) To reduce the temperature of the refrigerant vapor
b) To increase the temperature of the refrigerant vapor
c) To remove moisture from the refrigerant
d) To store excess refrigerant

Answer: a) To reduce the temperature of the refrigerant vapor
Explanation: The condenser transfers heat from the refrigerant vapor to the surroundings, causing it to condense into a liquid state by reducing its temperature.

6. In a cascade refrigeration system, what is used as the refrigerant in the low-temperature

stage?
a) Ammonia
b) Carbon dioxide
c) R-134a
d) Propane

Answer: a) Ammonia
Explanation: Ammonia is commonly used as the refrigerant in the low-temperature stage of a cascade refrigeration system due to its excellent thermodynamic properties at low temperatures.

7. How is dry ice produced?
a) By compressing and cooling carbon dioxide gas
b) By heating liquid nitrogen
c) By sublimating liquid helium
d) By freezing water vapor

Answer: a) By compressing and cooling carbon dioxide gas
Explanation: Dry ice is produced by compressing and cooling carbon dioxide gas until it liquefies, then allowing it to expand rapidly, causing it to solidify into dry ice.

8. What is the purpose of superheating in a refrigeration system?
a) To increase the refrigerant’s enthalpy
b) To increase the refrigerant’s temperature
c) To decrease the refrigerant’s pressure
d) To decrease the refrigerant’s enthalpy

Answer: a) To increase the refrigerant’s enthalpy
Explanation: Superheating increases the enthalpy of the refrigerant vapor exiting the evaporator, ensuring that only vapor enters the compressor, preventing liquid from causing damage.

9. What effect does decreasing the evaporator pressure have on the COP of a refrigeration system?
a) Increases COP
b) Decreases COP
c) No effect on COP
d) Increases compressor work

Answer: a) Increases COP
Explanation: Decreasing the evaporator pressure increases the temperature difference between the evaporator and the surroundings, improving system efficiency and increasing the Coefficient of Performance (COP).

10. What is the primary purpose of an air liquefaction system?
a) To produce liquid nitrogen
b) To produce liquid oxygen
c) To produce liquid helium
d) To produce liquid hydrogen

Answer: b) To produce liquid oxygen
Explanation: Air liquefaction systems are primarily used to produce liquid oxygen by cooling and compressing air until it liquefies, then separating the components by fractional distillation.

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