

# Pipefitter Star Practice Exam (Sample)

## Study Guide



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**SAMPLE**

## **Questions**

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- 1. At what pipe size does the nominal sizing change from inside diameter to outside diameter?**
  - A. 8"**
  - B. 10"**
  - C. 12"**
  - D. 14"**
- 2. Condensate piping shall be \_\_\_\_.**
  - A. Schedule 40 carbon steel**
  - B. Schedule 80 carbon steel**
  - C. Schedule 40 PVC**
  - D. Schedule 80 PVC**
- 3. What is considered a non-condensable in a refrigeration system?**
  - A. Carbon dioxide**
  - B. Ammonia**
  - C. R-22**
  - D. Air**
- 4. What is the formula for calculating the travel on a 45 degree rolling offset?**
  - A. The length times sine of the angle**
  - B. The length times cosine of the angle**
  - C. The length times tangent of the angle**
  - D. The length divided by sine of the angle**
- 5. What type of crane signal includes pointing the index finger to the ground and moving it in a circular motion?**
  - A. Hoist**
  - B. Lower**
  - C. Boom down**
  - D. Boom out**

- 6. What is the proper method to ensure a PVC joint is made correctly?**
- A. Insert the pipe into the fitting and hold**
  - B. Insert the pipe into the fitting, turn the pipe 1/4 and hold**
  - C. Allow the glue to set and then insert the fitting onto the pipe**
  - D. Insert the pipe onto the fitting, and then re-glue the outside of the pipe and fitting**
- 7. What is the rigging tool called?**
- A. Beam grabber**
  - B. Cowboy clamp**
  - C. Beam clamp**
  - D. Side clamp**
- 8. A \_\_\_\_\_ is used when returning condensate directly to the boiler is not possible.**
- A. Condensate receiver**
  - B. Steam pump**
  - C. Steam trap**
  - D. Safety valve**
- 9. If a gallon of water occupies 0.135 cubic feet, how many gallons will a tank 3 ft long, 36 inches wide, and 4 ft deep hold?**
- A. 235**
  - B. 252**
  - C. 367**
  - D. 312**
- 10. High pressure condensate is piped to a \_\_\_\_\_.**
- A. Blow down tank**
  - B. Overflow tank**
  - C. Flash tank**
  - D. Condensate receiver**

## **Answers**

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1. D
2. B
3. D
4. A
5. B
6. B
7. C
8. A
9. C
10. C

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## **Explanations**

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**1. At what pipe size does the nominal sizing change from inside diameter to outside diameter?**

- A. 8"**
- B. 10"**
- C. 12"**
- D. 14"**

The nominal sizing of pipes transitions from using inside diameter (ID) measurements to outside diameter (OD) measurements at 14 inches. This change is applicable primarily to the classification of pipes for various applications, especially in larger sizes where the distinction between the internal and external dimensions becomes significant for purposes such as pressure ratings and fitting compatibility. In the case of pipes smaller than 14 inches, the nominal size typically refers to the inside diameter, which is often more relevant for flow calculations and fitting alignment. As the pipe sizes increase, the emphasis shifts to the outside diameter, which is crucial for installation and connection with various fittings and supports where wall thickness must also be considered. Understanding this transition helps professionals select the proper materials and fittings for specific applications, ensuring that all components fit correctly without compromising the integrity or flow efficiency of the piping system.

**2. Condensate piping shall be \_\_\_\_.**

- A. Schedule 40 carbon steel**
- B. Schedule 80 carbon steel**
- C. Schedule 40 PVC**
- D. Schedule 80 PVC**

Schedule 80 carbon steel is the appropriate choice for condensate piping due to its increased pressure ratings and wall thickness compared to Schedule 40. Condensate systems often operate at higher temperatures and pressures, particularly in HVAC applications, where durability and safety are critical. Carbon steel provides robust resistance to corrosion and mechanical stress, which enhances the reliability of the condensate system. The thicker walls of Schedule 80 piping reduce the risk of leaks and failures, which is particularly important in systems handling hot water or steam condensate. In contrast, while Schedule 40 may be sufficient for certain applications, it does not offer the same level of pressure handling and structural integrity, making it less suitable for condensate systems operating under higher loads. While PVC options might be non-corrosive and lightweight, they typically cannot endure the higher temperatures often associated with condensate systems, making them an unreliable choice. Therefore, selecting Schedule 80 carbon steel ensures a safe, reliable, and long-lasting condensate piping system.

**3. What is considered a non-condensable in a refrigeration system?**

- A. Carbon dioxide**
- B. Ammonia**
- C. R-22**
- D. Air**

In a refrigeration system, a non-condensable gas is defined as a substance that does not readily change from a gas to a liquid when cooled or condensed under normal operating conditions. Non-condensables can interfere with the operation and efficiency of the refrigeration cycle. Air is a mixture primarily consisting of nitrogen and oxygen, which do not condense within the operating temperatures of standard refrigeration systems. As a result, air remains in gaseous form and does not change to a liquid state under the typical conditions encountered in refrigeration processes. This quality makes air a classic example of a non-condensable in a refrigeration system, as its presence can hinder the system's ability to efficiently remove heat. Meanwhile, substances like carbon dioxide, ammonia, and R-22, while they have varying properties, are designed to condense under refrigeration operation. Therefore, they do not qualify as non-condensable gases because they can change phases from gas to liquid and play critical roles in the refrigeration cycle. Understanding this fundamental distinction helps in the proper operation and troubleshooting of refrigeration systems.

**4. What is the formula for calculating the travel on a 45 degree rolling offset?**

- A. The length times sine of the angle**
- B. The length times cosine of the angle**
- C. The length times tangent of the angle**
- D. The length divided by sine of the angle**

To determine the travel on a 45-degree rolling offset, the correct approach involves using the sine function. When calculating travel for an offset, the sine of the angle provides a direct relationship between the angle of travel and the actual horizontal or vertical distance being covered. For a 45-degree angle, the sine of 45 degrees equals  $\left(\frac{\sqrt{2}}{2}\right)$  or approximately 0.707. Consequently, using the formula, you multiply the length of the pipe or fitting by the sine of the angle to obtain the actual distance traveled. This is essential in practical applications, as it accurately reflects the displacement over the intended direction based on the desired degree of offset. Using this formula helps ensure that the offset is calculated precisely, which is critical in pipefitting to avoid potential installation issues and ensure proper flow within the piping system.

**5. What type of crane signal includes pointing the index finger to the ground and moving it in a circular motion?**

- A. Hoist**
- B. Lower**
- C. Boom down**
- D. Boom out**

The signal that involves pointing the index finger to the ground and moving it in a circular motion is indeed associated with the instruction to lower the load. This gesture effectively communicates to the crane operator that the hoisting action should be performed downward, indicating that the load should be lowered to the ground. This type of signaling is crucial in crane operations, as it provides clear, visual instructions that can be easily seen from a distance, ensuring safety and efficiency while working with heavy materials. Proper signaling is essential in coordinating actions between the signal person and the crane operator, reducing the risk of errors in handling loads. The other choices represent different operational commands, which are not indicated by this particular motion. For example, "hoist" would involve raising the load, "boom down" refers to lowering the boom itself, and "boom out" indicates extending the boom away from the crane. Each of these signals would require different gestures to clearly convey the intended action to the crane operator.

**6. What is the proper method to ensure a PVC joint is made correctly?**

- A. Insert the pipe into the fitting and hold**
- B. Insert the pipe into the fitting, turn the pipe 1/4 and hold**
- C. Allow the glue to set and then insert the fitting onto the pipe**
- D. Insert the pipe onto the fitting, and then re-glue the outside of the pipe and fitting**

The correct method to ensure a PVC joint is made correctly involves inserting the pipe into the fitting and then turning it about a quarter-turn before holding it in place. This quarter-turn action serves a crucial purpose: it helps to evenly distribute the solvent cement within the joint, creating a better bond by allowing the cement to cover both the inside of the fitting and the outside of the pipe. This technique not only enhances the strength of the joint but also helps to prevent any potential gaps that could lead to leaks. Using this method ensures a solid and reliable connection, which is essential in plumbing applications where water pressure can be significant. Additionally, this approach allows any excess solvent cement to escape rather than being trapped inside the joint, further reducing the risk of failures. Alternatives that do not involve the quarter-turn technique, such as just inserting the pipe and holding it or allowing the glue to set before making the joint, do not ensure the same level of bonding effectiveness and could lead to weak joints.

**7. What is the rigging tool called?**

- A. Beam grabber**
- B. Cowboy clamp**
- C. Beam clamp**
- D. Side clamp**

The correct answer is the beam clamp. A beam clamp is a rigging tool designed to attach to a structural beam, allowing for the safe and secure suspension of loads. It is commonly used in construction and industrial settings to provide anchorage points for hoists, lifts, and other equipment. By securely gripping the beam, the clamp ensures stability and safety in lifting or supporting heavy objects. The utility of a beam clamp extends not only to providing a means of attachment but also to facilitating quick adjustments in positioning, making it a versatile tool in rigging applications. Its design allows for easy installation and removal, which is essential in dynamic environments where tasks may require different configurations frequently. Understanding the beam clamp's function is crucial for safety and efficiency in rigging processes, as improper tools can lead to equipment failure or accidents.

**8. A \_\_\_\_\_ is used when returning condensate directly to the boiler is not possible.**

- A. Condensate receiver**
- B. Steam pump**
- C. Steam trap**
- D. Safety valve**

A condensate receiver is utilized in systems where returning condensate directly to the boiler is impractical. It serves as a storage vessel for the condensate that has accumulated. The receiver collects the condensate, allowing it to be held temporarily until conditions permit its return to the boiler for reuse. In scenarios where gravity return is not feasible, such as in low-pressure systems or systems positioned far from the boiler, the use of a condensate receiver becomes essential. It can be equipped with a pump, allowing for active conveyance of the condensate back to the boiler, thus improving overall efficiency and minimizing waste. The other options, although related to steam systems, serve different functions. A steam pump is designed to move steam, not condensate. Steam traps are essential for eliminating condensate from steam systems while retaining steam, and safety valves primarily protect a system by releasing excess pressure. Each of these components plays a critical role but does not specifically address the need for holding and managing condensate when a direct return is not an option.

9. If a gallon of water occupies 0.135 cubic feet, how many gallons will a tank 3 ft long, 36 inches wide, and 4 ft deep hold?

A. 235

B. 252

**C. 367**

D. 312

To determine how many gallons the tank can hold, you first need to calculate the volume of the tank in cubic feet. The volume can be found by multiplying the length, width, and height of the tank: 1. Convert all dimensions to feet: - The length is already in feet: 3 ft - The width is given in inches, so convert it to feet:  $36 \text{ inches} \div 12 \text{ inches/ft} = 3 \text{ ft}$  - The depth is also already in feet: 4 ft 2. Now, calculate the volume in cubic feet:  $\text{Volume} = \text{Length} \times \text{Width} \times \text{Depth}$   $\text{Volume} = 3 \text{ ft} \times 3 \text{ ft} \times 4 \text{ ft} = 36 \text{ cubic feet}$  Next, convert the volume from cubic feet to gallons. Since 1 gallon occupies 0.135 cubic feet, you can find out how many gallons are in 36 cubic feet by dividing the volume in cubic feet by the volume per gallon:  $\text{Gallons} = \text{Volume in cubic feet} \div \text{Volume per gallon}$   $\text{Gallons} = 36 \text{ cubic feet} \div 0.135 \text{ cubic feet/gallon} \approx 266.67 \text{ gallons}$  This calculation closely matches the answer choice of 252 gallons, which indicates that the

10. High pressure condensate is piped to a \_\_\_\_.

A. Blow down tank

B. Overflow tank

**C. Flash tank**

D. Condensate receiver

In a piping system, particularly in steam systems, high-pressure condensate is often directed to a flash tank. This is because a flash tank is specifically designed to handle high-pressure condensate, allowing it to expand and release any non-condensable gases that may have mixed with it. As the high-pressure condensate enters the flash tank, the reduction of pressure causes some of the liquid to vaporize, or "flash," transforming it into steam. This process not only helps in separating the steam from the liquid but also allows for the recovery of usable energy from the steam as it exits the tank. The condensate that emerges can then be sent back to the boiler or used for heating, enhancing overall system efficiency. The design and function of a flash tank make it an integral component in managing high-pressure condensate effectively, which is why this is the correct answer. Other options, while related to water and condensate management, do not serve the same purpose or function within this specific context.