

SAIT 2nd Year Plumbing Practice Exam (Sample)

Study Guide



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Questions

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- 1. What does installing a check valve near the house shutoff valve create?**
 - A. An open water system**
 - B. A closed water system**
 - C. A pressure system**
 - D. A drainage system**
- 2. What should be considered when designing a plumbing system for a building?**
 - A. Seasonal weather patterns**
 - B. Maximum water usage**
 - C. Materials available**
 - D. Design aesthetics**
- 3. What is the purpose of a backflow preventer?**
 - A. To increase water flow**
 - B. To prevent water leakage**
 - C. To prevent contaminated water from flowing back into the potable water supply**
 - D. To enhance water pressure**
- 4. When is a Pressure Reducing Valve (PRV) required?**
 - A. When the pressure exceeds 500kpa**
 - B. When the pressure exceeds 450kpa**
 - C. When the pressure exceeds 550 kpa (80 psi)**
 - D. When the pressure is below 400kpa**
- 5. Which fitting is required when connecting pipes in a dual vent system?**
 - A. Coupling**
 - B. Reducer**
 - C. Short sweep**
 - D. Adapter**

- 6. In drainage systems, what is the term for water that is not immediately discharged?**
- A. Sewer water**
 - B. Retained water or standing water**
 - C. Backflow water**
 - D. Excess water**
- 7. How often should backflow prevention devices be tested?**
- A. Monthly**
 - B. Annually**
 - C. Every five years**
 - D. Every two years**
- 8. What is the maximum fixture load on a 3" pipe?**
- A. 15 FU's**
 - B. 27 FU's**
 - C. 35 FU's**
 - D. 40 FU's**
- 9. When connecting weeping tile to the sanitary building drain, what must be installed?**
- A. Clean out**
 - B. Backwater valve and trap**
 - C. Expansion tank**
 - D. Access panel**
- 10. What typically causes water to rise in a tank when heated?**
- A. Evaporation**
 - B. Convection**
 - C. Thermal expansion**
 - D. Condensation**

Answers

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

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Explanations

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1. What does installing a check valve near the house shutoff valve create?

- A. An open water system**
- B. A closed water system**
- C. A pressure system**
- D. A drainage system**

Installing a check valve near the house shutoff valve creates a closed water system. The primary function of a check valve is to allow fluid to flow in one direction only, preventing backflow. By placing the check valve at this strategic location, it ensures that any water that has already entered the piping system remains trapped within it and cannot flow back out when the water supply is stopped or reduced. This setup is essential for maintaining consistent pressure within the plumbing system, which is important for efficient operation of fixtures and appliances within the house. It also aids in preventing contamination of the potable water supply, as it stops any stagnant water that could potentially backflow from external sources. In contrast, an open water system would allow for free movement of water both in and out of the supply lines, leading to potential contamination and pressure issues. A pressure system specifically refers to the conditions within the closed system but doesn't fully capture the primary function of a check valve. A drainage system, on the other hand, pertains to the removal of waste water rather than management of incoming water supply. Thus, the installation of a check valve effectively establishes a closed water system, preserving the integrity and safety of the plumbing network.

2. What should be considered when designing a plumbing system for a building?

- A. Seasonal weather patterns**
- B. Maximum water usage**
- C. Materials available**
- D. Design aesthetics**

When designing a plumbing system for a building, it is essential to consider maximum water usage. This factor directly impacts the sizing of pipes, the selection of appropriate fixtures, and the type of water supply system needed. Understanding peak water demands allows for the effective design of systems that can handle the maximum flow without experiencing decreased pressure or inadequate supply. For instance, in a commercial building with multiple bathrooms and kitchens, knowing the expected maximum usage during busy hours ensures that the plumbing can accommodate those needs without failure. This includes anticipating the number of fixtures in use at the same time and the overall water needs of the occupants. Other factors, while important, focus more on specific aspects that may not affect the overall functionality of the plumbing system as significantly. Seasonal weather patterns can influence the choice of materials or insulation methods but aren't as critical to the operational capacity of the system. The materials available play a role in construction and durability but they must ultimately be suitable for the intended maximum usage. Design aesthetics, while relevant to the overall building design, are secondary to ensuring that the plumbing system can efficiently manage water flow and usage.

3. What is the purpose of a backflow preventer?

- A. To increase water flow
- B. To prevent water leakage
- C. To prevent contaminated water from flowing back into the potable water supply**
- D. To enhance water pressure

The primary purpose of a backflow preventer is to prevent contaminated water from flowing back into the potable water supply. Backflow can occur when there is a change in pressure in the plumbing system, which can cause non-potable water to flow backward into clean water lines. This is particularly critical in preventing health hazards, as contaminants from various sources such as irrigation systems, industrial processes, or even sewage systems can enter drinking water supplies, potentially leading to serious health issues for consumers. Backflow preventers are designed to create a barrier against this reverse flow, ensuring that the drinking water remains safe and uncontaminated. They typically consist of valves that only allow water to flow in one direction, and they are an essential component of plumbing systems, especially where there is a risk of cross-contamination. The other choices do not accurately reflect the core function of a backflow preventer. For instance, while increasing water flow or enhancing water pressure may improve system efficiency, these are not related to the prevention of backflow. Similarly, while preventing water leakage is important in plumbing, it is not the primary function of a backflow preventer, which focuses specifically on the protection of potable water quality.

4. When is a Pressure Reducing Valve (PRV) required?

- A. When the pressure exceeds 500kpa
- B. When the pressure exceeds 450kpa
- C. When the pressure exceeds 550 kpa (80 psi)**
- D. When the pressure is below 400kpa

A Pressure Reducing Valve (PRV) is specifically designed to ensure that the water pressure delivered to fixtures and appliances does not exceed a certain safe limit, protecting the plumbing system from potential damage. The correct answer, which states that a PRV is required when the pressure exceeds 550 kPa (80 psi), is based on common plumbing code requirements that dictate safe operating pressures for residential and commercial systems. When water pressure exceeds this threshold, it can lead to issues such as burst pipes, leaking fixtures, and excessive wear on appliances. By installing a PRV, the incoming high pressure is effectively reduced to a safe operating level, which typically is around 350 to 450 kPa (or 50 to 65 psi) for most residential systems. Understanding these pressure limits is crucial for maintaining the integrity of the plumbing system and ensuring the longevity and functionality of fixtures and appliances. The establishment of this required threshold at 550 kPa (80 psi) serves as a guideline for installing PRVs, supporting optimal performance and safety within the plumbing infrastructure.

5. Which fitting is required when connecting pipes in a dual vent system?

- A. Coupling**
- B. Reducer**
- C. Short sweep**
- D. Adapter**

In a dual vent system, a short sweep fitting is essential for connections between horizontal and vertical pipes. The design of the short sweep allows for smoother transitions, minimizing resistance and turbulence in the airflow. This is particularly important in vent systems to ensure that gases can exhaust efficiently, preventing any potential buildup or blockage that could lead to issues such as drainage backup or wastewater odors escaping into the building. Short sweeps are specifically shaped to facilitate quick changes in direction while maintaining a larger radius than standard fittings, enhancing the system's overall performance. This feature is crucial in venting applications where airflow is critical. While other fittings like couplings, reducers, and adapters serve various important functions in plumbing, they do not provide the required performance characteristics necessary for dual vent systems. Couplings are meant to join two pipes of the same diameter, reducers change the diameter of the pipe for connecting different sizes, and adapters are utilized to transition between different types of fittings or pipe materials. None of these alternatives can effectively address the specific requirements for minimizing airflow resistance in a dual vent configuration like a short sweep can.

6. In drainage systems, what is the term for water that is not immediately discharged?

- A. Sewer water**
- B. Retained water or standing water**
- C. Backflow water**
- D. Excess water**

The term for water that is not immediately discharged in drainage systems is retained water or standing water. This type of water accumulates in pipes or in other areas of the drainage system where it does not flow or move towards the intended disposal point. Standing water can become a concern, as it may lead to stagnation, create an environment conducive to bacteria growth, and even result in blockages or overflows if not properly managed. In drainage systems, effective water management is crucial to ensure that the flow is uninterrupted and that all waste and excess water are properly transported away from buildings and other structures. Understanding this concept is essential for maintaining proper drainage practices and ensuring that all aspects of a plumbing system function effectively.

7. How often should backflow prevention devices be tested?

- A. Monthly
- B. Annually**
- C. Every five years
- D. Every two years

Backflow prevention devices should be tested annually to ensure they are functioning properly and effectively preventing contamination of the potable water supply. This requirement is crucial as backflow devices play a vital role in safeguarding public health by preventing the reverse flow of potentially contaminated water back into clean water systems. Regular testing helps to identify any malfunctions or wear and tear, allowing for timely maintenance or replacement. Adhering to the annual testing schedule also complies with most local plumbing codes and regulations, which aim to ensure the safety and reliability of water systems.

8. What is the maximum fixture load on a 3" pipe?

- A. 15 FU's
- B. 27 FU's**
- C. 35 FU's
- D. 40 FU's

The maximum fixture load on a 3" pipe is determined based on the plumbing code's specifications for the drainage system design. In the context of waste and vent systems, fixtures are assigned a Drainage Fixture Unit (DFU) value, which helps to calculate the capacity of the piping. For a 3" pipe, the maximum allowable load is typically established to ensure that the pipe can handle the expected volume of wastewater and that it can maintain proper flow without causing backpressure or blockages. According to various plumbing codes, a 3" pipe supports a maximum fixture load of 27 fixture units. This indicates that the pipe can adequately accommodate the discharge from multiple fixtures simultaneously, providing efficient drainage and ensuring compliance with safety and plumbing standards. The other values mentioned do not align with the standards for a 3" drain. Values such as 15, 35, and 40 fixture units exceed the capacity of a 3" pipe and would likely result in inadequate drainage performance or an increased risk of system failure. Thus, adhering to the maximum value of 27 fixture units is essential for effective plumbing design and operation.

9. When connecting weeping tile to the sanitary building drain, what must be installed?

- A. Clean out**
- B. Backwater valve and trap**
- C. Expansion tank**
- D. Access panel**

When connecting weeping tile to the sanitary building drain, it is essential to install a backwater valve and trap. The backwater valve serves a critical function in preventing sewer backup into the weeping tile system, which could occur during periods of high rainfall or flooding. This scenario can result in the sanitary sewer overflowing and potentially allowing sewage to flow back into the weeping tile drainage system. Incorporating a trap is equally important, as it helps to maintain a water seal that prevents gases from the sanitary sewer from entering the building. This is crucial for health and safety reasons, as sewer gases can be harmful if allowed to seep into interior spaces. The other choices, while useful components in different contexts, do not specifically address the functionality and necessity of safeguarding the building from backflow and maintaining sanitary conditions when tying in drainage systems. Thus, the combination of a backwater valve and a trap is the appropriate solution for this plumbing scenario.

10. What typically causes water to rise in a tank when heated?

- A. Evaporation**
- B. Convection**
- C. Thermal expansion**
- D. Condensation**

The phenomenon that causes water to rise in a tank when heated is primarily due to thermal expansion. As water is heated, its temperature increases, leading to an increase in energy among the water molecules. This extra energy causes the molecules to move faster and spread apart, resulting in an increase in the water's volume. Therefore, the water occupies more space and causes the water level in the tank to rise. Convection, on the other hand, refers to the movement of water as warmer, less dense water rises while cooler, denser water sinks. While convection currents are present in heated water and assist in the even distribution of temperature, the initial cause of water rising in a tank is thermal expansion, not simply the movement of water from convection. Evaporation involves the transformation of water into vapor and does not directly contribute to the water level rising in a tank. Similarly, condensation relates to the process of vapor turning back into liquid, which would have the opposite effect on the water level. Thus, thermal expansion is the correct reason for the rise in water level when heated.