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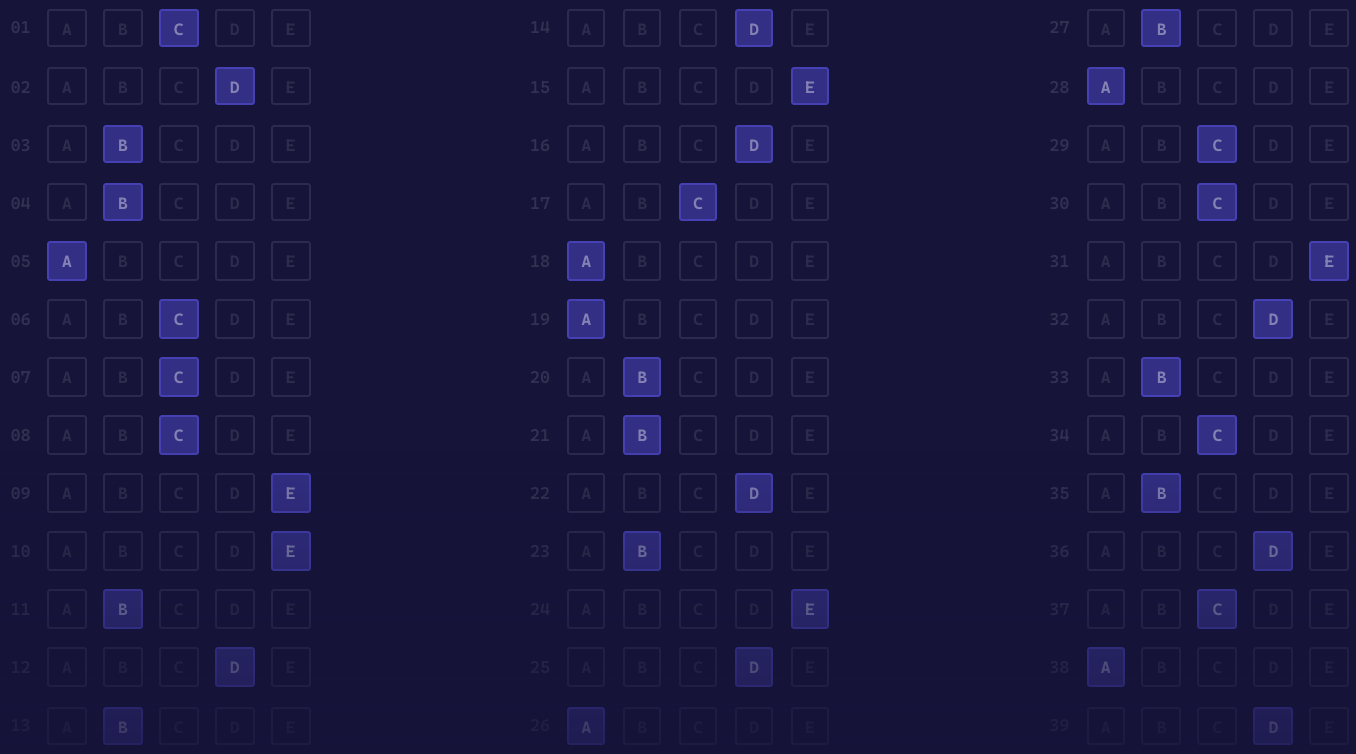


PRACTICE QUESTIONS

## Association of Boards of Certification

# BMY5N32J

WPI Physical/Chemical Wastewater Treatment Class 1-OIT

| EDITION | QUESTIONS | FORMAT |
| --- | --- | --- |
| Demo | 9 | Limited Edition PDF |

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# Before you begin

## What this is

9 practice questions for Association of Boards of Certification `BMY5N32J`, each with its answer key and an explanation. Answer a question before you read its key — the explanation is worth more once you have committed.

## If something looks wrong

Send us three things and we will check it:

- the exam code, `BMY5N32J`
- the question number
- the email address on your order

Write to **support@mometrix.net**. We reply within one business day.

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**QUESTION 1** SINGLE CHOICE

In a conventional activated sludge wastewater treatment plant, what is the primary purpose of the secondary clarifier?

A To remove grit and large debris from the influent

**B To settle out biological solids produced in the aeration tank and produce a clarified effluent**

C To add chlorine for disinfection of the treated wastewater

D To equalize flow variations between shifts

**ANSWER B**

**WHY** The secondary clarifier follows the aeration basin in an activated sludge system. Its primary function is to settle the mixed liquor suspended solids (MLSS) so that biological floc is separated from the treated water, producing a clarified effluent and a concentrated return activated sludge (RAS) stream. Grit removal occurs at the headworks, disinfection is a downstream step, and flow equalization is typically done in separate equalization basins.

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**QUESTION 2** SINGLE CHOICE

An operator performs a 30-minute settleability test on a sample of mixed liquor from the aeration basin. After 30 minutes, the settled sludge volume reads 250 mL/L and the mixed liquor suspended solids (MLSS) concentration is 2,500 mg/L. What does this indicate about the activated sludge?

A The sludge has excellent settling characteristics and a healthy, well-formed floc

B The sludge volume index (SVI) is 100, indicating ideal settling

**C The sludge is bulking or has poor settling, because a 30-minute settled volume of 250 mL/L is well above the typical 100–150 mL/L expected for a healthy activated sludge**

D The mixed liquor is too dilute and indicates a low food-to-microorganism ratio

**ANSWER** C

**WHY** A 30-minute settled sludge volume of 250 mL/L is much higher than the typical 100–150 mL/L expected from a well-settling activated sludge, indicating poor compaction. The sludge volume index (SVI) calculated here would be (250 mL/L × 1,000) / 2,500 mg/L = 100, but the high settled volume itself signals bulking or poor settling rather than healthy sludge. The MLSS of 2,500 mg/L is within a normal operating range, so dilution is not the issue.

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**QUESTION 3** MULTIPLE CHOICE

An operator is preparing to feed ferric chloride (FeCl3) into a wastewater treatment process. Which of the following are valid reasons for adding ferric chloride to wastewater? (Choose two.)

**A** **To enhance removal of suspended solids and phosphorus through coagulation and chemical precipitation**

B To increase dissolved oxygen in the aeration basin

C To raise the pH of an acidic wastewater stream

**D** **To control odors by reacting with hydrogen sulfide**

**ANSWER** **A · D**

**WHY** Ferric chloride is a common coagulant used to enhance removal of suspended solids and to precipitate phosphorus as ferric phosphate. It also reacts with hydrogen sulfide to form insoluble iron sulfide, which is why it is widely used for odor control in wastewater collection and treatment systems. Ferric chloride does not raise dissolved oxygen, and because it hydrolyzes to form acidic ferric hydroxide, it actually lowers pH rather than raises it.

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**QUESTION 4** SINGLE CHOICE

An operator notices that the dissolved oxygen (DO) probe reading in the aeration basin suddenly drops to near zero and the surface of the basin appears dark with clumps of black sludge rising to the top. What is the most likely condition occurring?

A Nitrification is occurring at an accelerated rate

B The aeration basin is undergoing denitrification in the anoxic zone

C The sludge is rising due to denitrification in the secondary clarifier, not the aeration basin

**D The activated sludge has lost its settleability, the system is septic, and sludge is rising in the aeration basin from gas production and poor floc formation**

**ANSWER D**

**WHY** A sudden DO crash to near zero combined with dark, rising sludge clumps in the aeration basin indicates a septic, oxygen-starved condition where the biological floc has deteriorated. Anaerobic conditions in the floc produce gases (nitrogen, hydrogen sulfide, methane) that buoy sludge particles to the surface. Nitrification consumes DO gradually, not suddenly to zero, and the question describes the aeration basin, not the secondary clarifier. This condition signals a serious process upset requiring immediate attention to aeration and sludge management.

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**QUESTION 5** SINGLE CHOICE

In a preliminary wastewater treatment process, which piece of equipment is specifically designed to remove inorganic grit and sand particles based on the principle that heavier particles settle out while organic solids remain in suspension?

A Bar screen

B Comminutor

**C Grit chamber**

D Primary clarifier

**ANSWER C**

**WHY** A grit chamber is specifically designed to remove inorganic grit, sand, and other heavy particles by exploiting their higher settling velocity compared to organic solids. The flow velocity is controlled so that grit settles out while lighter organic material remains suspended and passes downstream. Bar screens remove large debris, comminutors shred solids, and primary clarifiers remove settleable organic solids—not specifically grit separation.

**QUESTION 6** SINGLE CHOICE

Which chemical is most commonly used as a source of alkalinity to buffer pH in nitrifying activated sludge systems where alkalinity is being consumed?

A Sodium hypochlorite

**B Sodium hydroxide**

C Ferric chloride

D Aluminum sulfate

**ANSWER B**

**WHY** Sodium hydroxide (caustic soda) is widely used to supplement alkalinity in nitrifying systems because nitrification consumes roughly 7.1 mg/L of alkalinity (as $CaCO_3$) per mg/L of ammonia-nitrogen oxidized. Adding sodium hydroxide restores buffering capacity and helps maintain the pH in the optimal range for nitrifying bacteria. Sodium hypochlorite is a disinfectant/oxidant, and both ferric chloride and aluminum sulfate hydrolyze to form acids and would actually lower pH and alkalinity.

**QUESTION 7** MULTIPLE CHOICE

Which of the following operational parameters are typically measured and recorded as part of routine wastewater treatment plant monitoring? (Choose two.)

**A** **Dissolved oxygen in the aeration basin**

**B** **Mixed liquor suspended solids (MLSS) concentration**

C The resale value of treated biosolids

D The personal income of plant management

**ANSWER** **A** · **B**

**WHY** Routine wastewater process monitoring includes operational parameters that directly reflect biological and physical treatment performance, such as dissolved oxygen (DO) in the aeration basin and the mixed liquor suspended solids (MLSS) concentration. These are essential for controlling aeration, sludge wasting, and overall process stability. Resale value of biosolids and personal income of plant management are administrative or economic matters, not process control measurements required of an operator.

**QUESTION 8** SINGLE CHOICE

In the activated sludge process, what is the function of the return activated sludge (RAS) line that pumps settled sludge from the secondary clarifier back to the aeration basin?

A To discharge excess sludge from the system for disposal

**B** **To maintain a sufficient concentration of active microorganisms in the aeration basin**

C To recycle treated effluent back for additional polishing

D To remove scum and floating material from the clarifier surface

**ANSWER** **B**

**WHY** The return activated sludge (RAS) line recycles settled biomass from the secondary clarifier back to the aeration basin to maintain an adequate concentration of active microorganisms (MLSS) for biological treatment. Typical RAS return rates are 25–100 percent of the influent flow depending on the process variant. Wasting of excess sludge is performed through a separate waste activated sludge (WAS) line, not the RAS line.

**QUESTION 9** SINGLE CHOICE

What is the main purpose of disinfection in a wastewater treatment plant?

A To remove suspended solids from the secondary effluent

**B To destroy or inactivate pathogenic microorganisms before the treated wastewater is discharged or reused**

C To break down organic matter remaining after biological treatment

D To neutralize the pH of the treated effluent

**ANSWER B**

**WHY** Disinfection is the final treatment step designed to destroy or inactivate pathogenic bacteria, viruses, and protozoa in the treated effluent before it is discharged to the receiving water or reused. Common disinfection methods include chlorination, ultraviolet (UV) light, and ozonation. Suspended solids removal, organic matter breakdown, and pH neutralization are accomplished by other treatment steps, not disinfection.

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