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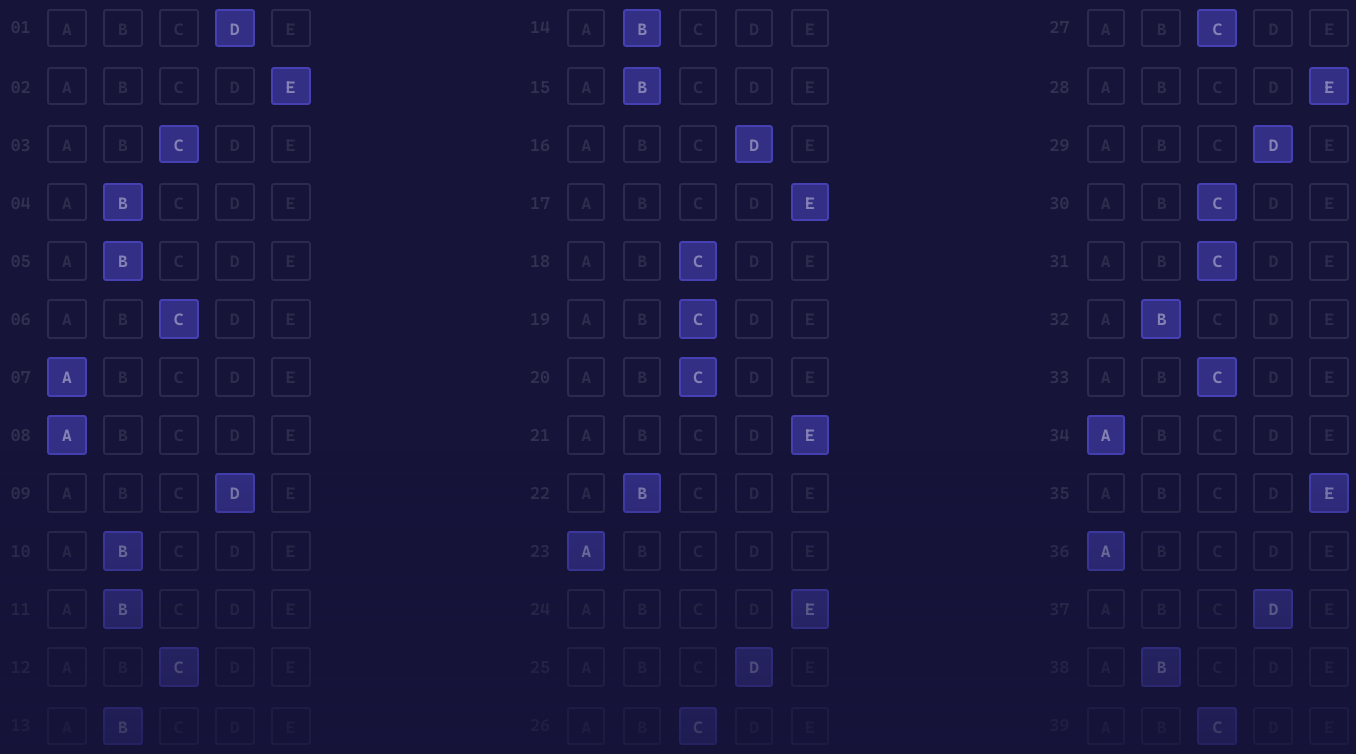

PRACTICE QUESTIONS

ABC-MO: Missouri Department of Natural Resources

KGNRTRX3

Wastewater Treatment Level A (WW-A)

EDITION	QUESTIONS	FORMAT
Demo	9	Limited Edition PDF

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Before you begin

What this is

9 practice questions for ABC-MO: Missouri Department of Natural Resources `KGNRTRX3`, 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, `KGNRTRX3`
- 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 MULTIPLE CHOICE

In the activated sludge process, which groups of microorganisms are primarily responsible for the conversion of organic matter into flocculent biomass and clear effluent? (Choose two.)

A **Saprophytic bacteria that metabolize dissolved and suspended organic substrates**

B Nitrifying bacteria that oxidize ammonia to nitrite and nitrate

C **Rotifers that graze on dispersed bacteria and improve effluent clarity**

D Photosynthetic algae that produce oxygen in the aeration tank

ANSWER **A · C**

WHY Saprophytic (heterotrophic) bacteria are the principal organisms that break down organic substrates and form floc, while higher life forms such as rotifers graze on free-swimming bacteria and contribute to a clearer, more stable effluent. Nitrifying bacteria perform nitrification rather than bulk organic removal, and algae are not significant in a properly operated aeration tank because of low light and continuous mixing.

QUESTION 2 MULTIPLE CHOICE

Which of the following unit operations are typically classified as part of secondary treatment at a conventional activated sludge facility? (Choose two.)

A **Aeration tank with diffused aeration**

B Bar screen at the headworks

C G: Primary clarifier for settling raw solids

D **Chlorine contact basin for disinfection**

ANSWER **A · D**

WHY Secondary treatment follows primary settling and includes biological processes such as activated-sludge aeration tanks and final clarifiers, along with post-biological steps such as disinfection (chlorine contact basin) used to meet effluent coliform limits. Bar screening and primary clarifiers are part of preliminary and primary treatment, not secondary treatment.

QUESTION 3 SINGLE CHOICE

What is the primary purpose of installing bar screens at the headworks of a wastewater treatment plant?

A To remove dissolved organic matter before biological treatment

B **To remove large debris such as rags, sticks, and plastics that could damage downstream equipment**

C To settle out inorganic grit and sand from the wastewater

D To disinfect the wastewater before it enters the aeration basin

ANSWER **B**

WHY Bar screens are the first step at the headworks and are designed to capture large floating and suspended debris (rags, sticks, plastics, etc.) that could damage or clog pumps, bars, and other downstream equipment. Dissolved organics are not removed by screening, grit removal is performed by separate grit chambers, and disinfection occurs much later in the process train.

QUESTION 4 SINGLE CHOICE

In the activated sludge process, dissolved oxygen (DO) in the aeration tank is typically maintained in which range to support aerobic biological activity?

A 0.0 to 0.5 mg/L

B **1.0 to 3.0 mg/L**

C 4.0 to 6.0 mg/L

D 8.0 to 10.0 mg/L

ANSWER **B**

WHY Standard practice is to maintain DO between 1.0 and 3.0 mg/L (often targeted around 2.0 mg/L) in conventional activated sludge aeration tanks. Below this range, the mixed liquor becomes anoxic or anaerobic, leading to poor BOD removal and bulking. Above this range, energy is wasted and floc can break apart due to excessive turbulence. The other ranges listed are either anoxic, oxygen-limited, or impractically high for activated sludge.

QUESTION 5 SINGLE CHOICE

Which mixed liquor suspended solids (MLSS) parameter is most commonly used to express the concentration of active biomass in an aeration tank?

A **Mixed Liquor Volatile Suspended Solids (MLVSS)**

B Total Suspended Solids (TSS)

C Total Dissolved Solids (TDS)

D Fixed Suspended Solids (FSS)

ANSWER A

WHY Mixed Liquor Volatile Suspended Solids (MLVSS) is the fraction of MLSS that is volatilized at 550 °C, and is widely used as an estimate of the active (organic, biological) biomass in the aeration tank. Total Suspended Solids includes both volatile and fixed (inert) fractions, TDS measures material that passes a filter, and Fixed Suspended Solids is the inert remainder after ignition.

QUESTION 6 SINGLE CHOICE

The food-to-microorganism ratio (F/M) is calculated using which two measurements?

A Influent BOD and effluent TSS

B **Influent BOD (or COD) loading and the pounds of MLVSS in the aeration tank**

C Return activated sludge flow rate and waste activated sludge flow rate

D Dissolved oxygen concentration and temperature in the aeration tank

ANSWER B

WHY The F/M ratio is the pounds (or kilograms) of biodegradable organic load (typically BOD or COD) applied per day divided by the pounds of MLVSS held in the aeration system. It is used to control whether the biomass is underloaded or overloaded. Effluent TSS, recycle ratios, and DO/temperature are important process variables but are not used to calculate F/M.

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QUESTION 7 SINGLE CHOICE

Which sludge treatment process uses anaerobic microorganisms to convert a significant portion of volatile solids into biogas (mostly methane and carbon dioxide)?

A Gravity belt thickening

B Aerobic digestion

C Anaerobic digestion

D Centrifuge dewatering

ANSWER C

WHY Anaerobic digestion relies on anaerobic bacteria in a sealed tank to break down volatile solids, producing biogas (approximately 60–70% methane and 30–40% carbon dioxide) along with a stabilized biosolids product. Aerobic digestion uses air and produces CO2 and water rather than methane, while thickening and dewatering are physical processes that do not generate biogas.

QUESTION 8 SINGLE CHOICE

Which of the following is the most widely used chemical for disinfection of municipal wastewater effluents in the United States?

A Ozone

B Chlorine (typically as chlorine gas or sodium hypochlorite)

C Ultraviolet light

D Peracetic acid

ANSWER B

WHY Chlorination, using chlorine gas, sodium hypochlorite, or calcium hypochlorite, remains the most widely used disinfection method for municipal wastewater effluents because of its effectiveness, cost, and the ease of providing a measurable residual. UV and ozone are used but are less common overall, and peracetic acid is used only at a small number of facilities.

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QUESTION 9 SINGLE CHOICE

An operator observes a brown, foamy scum on the surface of the aeration tank and poor settling in the secondary clarifier with high effluent suspended solids. These observations are most consistent with which condition?

A Nitrification

B **Bulking sludge caused by filamentous organisms**

C Denitrification in the clarifier

D Pin floc (stragglers)

ANSWER **B**

WHY Brown, foamy scum floating on the aeration tank along with poor settling and high effluent TSS is a classic indicator of bulking sludge, in which excessive growth of filamentous organisms interferes with floc settling and compaction. Nitrification would not by itself produce foam, denitrification in the clarifier causes rising sludge clumps rather than surface scum, and pin floc produces a very clear supernatant with tiny pin-point floc rather than foam.

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