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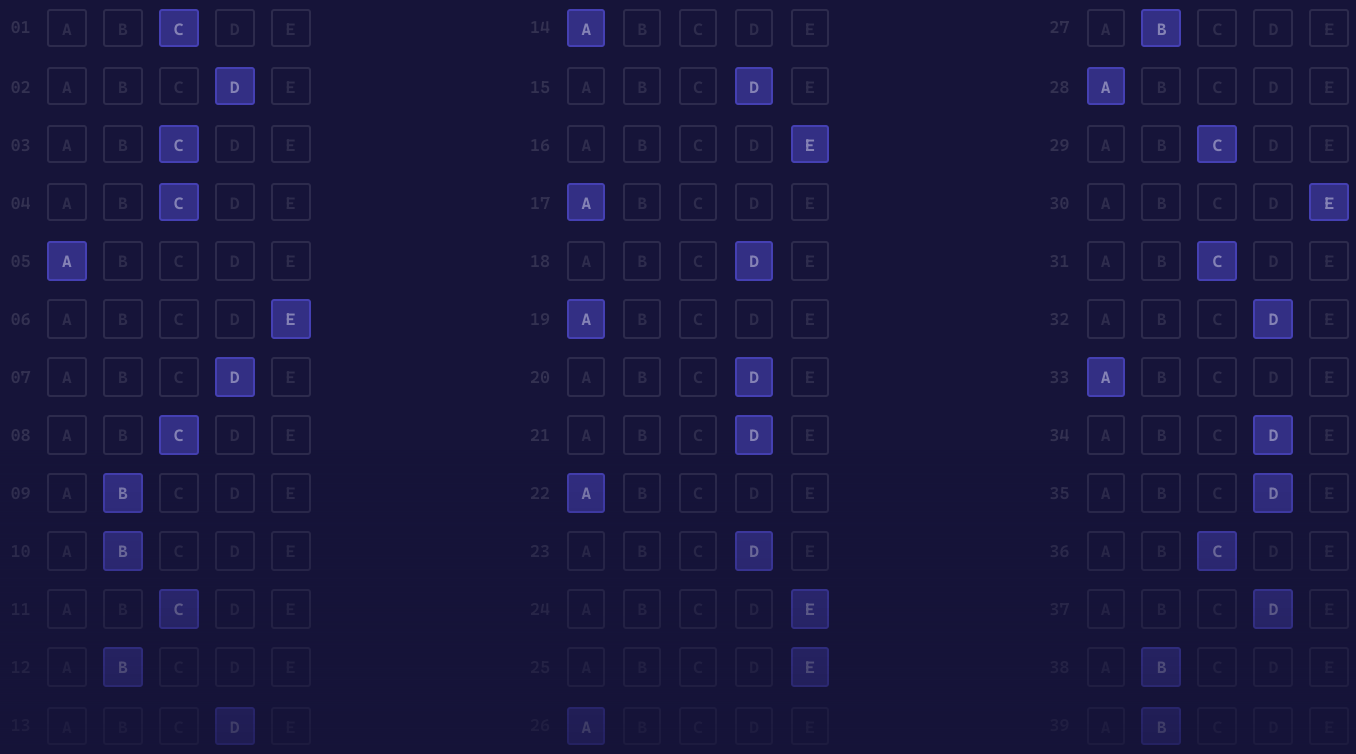

PRACTICE QUESTIONS

Connecticut - Dept of Energy and Environmental Protection

UKNE2L8W

Connecticut Wastewater Treatment Operator Class 4

EDITION	QUESTIONS	FORMAT
Demo	9	Limited Edition PDF

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Before you begin

What this is

9 practice questions for Connecticut - Dept of Energy and Environmental Protection `UKNE2L8W`, 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, `UKNE2L8W`
- 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

An operator at a Class 4 activated sludge facility notices that the mixed liquor suspended solids (MLSS) concentration has risen from 2,500 mg/L to 4,200 mg/L over several days while the F/M ratio has dropped from 0.3 to 0.15. Which operational adjustment is most appropriate?

A Increase the return activated sludge (RAS) flow rate to build up a higher MLSS concentration.

B Waste activated sludge (WAS) to reduce the MLSS concentration and bring the F/M ratio back into the typical operating range.

C Decrease the aeration basin dissolved oxygen setpoint to reduce endogenous decay.

D Reduce the wasting rate to allow solids to build further and improve settling.

ANSWER B

WHY The F/M ratio has dropped because the MLSS concentration has increased significantly. Wasting activated sludge reduces the biomass inventory, lowering MLSS and raising the F/M ratio back toward a target range (commonly 0.2–0.5 lb BOD/lb MLVSS-day for conventional activated sludge). Increasing RAS would worsen the condition, and reducing aeration or cutting wasting would compound the imbalance.

QUESTION 2 SINGLE CHOICE

During a routine check of the secondary clarifier, the operator observes a thick blanket of sludge forming near the surface and a cloudy, billowing effluent over the weirs. The SVI is 180 mL/g. These observations most strongly suggest which condition?

A Pin floc caused by high effluent turbidity

B Sludge bulking from filamentous organisms

C Denitrification in the clarifier producing rising sludge

D Stragger floc from excessive polymer addition

ANSWER B

WHY An SVI above approximately 150 mL/g is a classic indicator of bulking sludge, generally caused by filamentous organism overgrowth. Bulking sludge does not compact well, producing a high sludge blanket, cloudy effluent, and solids carryover at the weirs. Denitrification typically causes rising sludge with bubbles rather than high SVI, and pin/stragger floc produce different visual signatures with normal SVI.

QUESTION 3 SINGLE CHOICE

A Class 4 facility disinfects its effluent with chlorine gas and must meet a permit limit of 200 fecal coliform colony-forming units per 100 mL. Which residual and contact time combination is most consistent with CT requirements typically used to achieve this level of disinfection?

A A total chlorine residual of 0.2 mg/L after a minimum contact time of 5 minutes at peak flow.

B A total chlorine residual of 1.0 mg/L after a minimum contact time of 30 minutes at peak flow.

C A free chlorine residual of 5.0 mg/L after a minimum contact time of 1 minute at peak flow.

D A total chlorine residual of 0.05 mg/L after a minimum contact time of 60 minutes at peak flow.

ANSWER B

WHY To meet a fecal coliform limit of 200 CFU/100 mL using chlorination, CT disinfection requirements typically demand a measurable total chlorine residual combined with adequate contact time (commonly around 30 minutes at peak hourly flow). A residual of 0.2 mg/L with only 5 minutes of contact time, or 0.05 mg/L with 60 minutes, is generally insufficient for reliable inactivation, and 5.0 mg/L for 1 minute is excessive and impractical.

QUESTION 4 SINGLE CHOICE

Which parameter is most directly monitored to determine when an anaerobic digester has completed active digestion and the sludge is ready for dewatering?

A The volatile acids to alkalinity (VA/Alk) ratio of the digester contents.

B The dissolved oxygen concentration in the digester supernatant.

C The pH of the supernatant measured continuously at the digester overflow.

D The mixed liquor suspended solids concentration in the digester.

ANSWER A

WHY The volatile acids to alkalinity ratio is the standard operational indicator of digester stability. A VA/Alk ratio below about 0.2 generally indicates that active (acid-forming) digestion has ended and the digester contents are stable enough to be sent to dewatering or storage. Anaerobic digesters do not contain meaningful dissolved oxygen, and MLSS in the digester is not a reliable endpoint indicator.

QUESTION 5 SINGLE CHOICE

The facility's influent BOD_5 increases from 180 mg/L to 320 mg/L for a sustained period, but the aeration basin MLSS and airflow have not been adjusted. What is the most likely consequence?

A **The F/M ratio will rise, the aeration demand will increase, and dissolved oxygen may drop below setpoint unless supplemental air is supplied.**

B The F/M ratio will fall significantly, causing the biomass to starve and settle poorly in the secondary clarifier.

C The aeration basin will become anaerobic almost immediately because nitrification will consume all of the dissolved oxygen.

D The process will naturally absorb the additional load without operational changes because of the high MLSS concentration.

ANSWER **A**

WHY A higher influent BOD_5 at constant MLSS raises the food-to-microorganism ratio and increases oxygen demand. Without additional airflow, DO will sag below setpoint, and the biomass will experience a higher loading that may affect settling. The F/M ratio rises (not falls) under these conditions, and nitrification is not the immediate concern for a sudden BOD increase.

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QUESTION 6 SINGLE CHOICE

A primary clarifier exhibits poor settling and significant solids carryover during a heavy storm event with significant inflow and infiltration. The clarifier's surface overflow rate is currently exceeding the design value. Which operational response is most appropriate?

A Reduce the influent flow into the primary tank to keep it within design hydraulic loading.

B **Increase the sludge withdrawal pumping rate to keep the sludge blanket well below the effluent weirs.**

C Reduce the polymer dose in any upstream coagulant addition to lower solids loading.

D Increase the weir loading by lowering the effluent weirs to improve solids capture.

ANSWER **B**

WHY When hydraulic loading exceeds the design surface overflow rate, the operator must manage the sludge blanket to prevent solids from being carried over the weirs. Increasing the sludge withdrawal rate keeps the blanket low and preserves capture. Reducing flow into the primary tank is generally not feasible during wet weather because all flow must be treated, lowering weirs worsens carryover, and reducing polymer is unrelated to blanket management.

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QUESTION 7 SINGLE CHOICE

A worker enters a confined space (a wet well) at the headworks. The space has been isolated, ventilated, and tested. According to standard confined space entry practice, which of the following must be in place for the worker to enter the space?

A **An attendant stationed outside the space in continuous visual or communication contact with the entrant.**

B A signed written variance allowing solo entry without rescue services on site.

C A requirement that the entrant wear only a half-mask air-purifying respirator regardless of the measured atmosphere.

D An assurance that if monitoring is performed before entry, no additional monitoring is needed during the entry.

ANSWER **A**

WHY Standard confined space entry practice (per OSHA 1910.146) requires an attendant outside the space maintaining communication with the entrant at all times, continuous or periodic atmospheric monitoring as needed, and rescue provisions. Solo entry without an attendant is not permitted, respirator selection must be based on the actual hazard, and atmospheric testing must be repeated during the work because conditions can change.

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QUESTION 8 SINGLE CHOICE

A Class 4 facility uses biological nutrient removal (BNR). The operator observes that nitrates in the anoxic zone effluent are very low but effluent total nitrogen remains high. Which operational change is most likely to improve total nitrogen removal?

A Reduce the mixed liquor recycle from the aeration basin back to the anoxic zone.

B **Increase the internal mixed liquor (MLR) recycle rate to send more nitrate-rich mixed liquor to the anoxic zone for denitrification.**

C Eliminate the aerobic zone to prevent nitrification from occurring.

D Lower the dissolved oxygen setpoint in the aeration basin to suppress nitrification entirely.

ANSWER **B**

WHY Low nitrate in the anoxic zone indicates that denitrification is occurring but not enough nitrate is being delivered to the anoxic zone. Increasing the mixed liquor recycle (MLR) brings more nitrate-laden mixed liquor from the aerobic zone back to the anoxic zone, giving denitrifiers more substrate and improving total nitrogen removal. Reducing MLR, eliminating aeration, or suppressing nitrification would all worsen nitrogen removal.

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QUESTION 9 MULTIPLE CHOICE

An operator is evaluating possible causes of poor secondary clarifier performance. Which of the following are recognized causes of poor settling and solids carryover in a secondary clarifier? (Choose two.)

A **Filamentous sludge bulking with an SVI greater than 150 mL/g.**

B **A sludge blanket that has been allowed to rise near or above the effluent weirs.**

C Use of a center-feed clarifier with a properly designed Stamford baffle.

D Operating the RAS pumps at a flow rate that keeps the blanket well below the weirs.

E Maintaining a steady diurnal flow pattern within the design hydraulic capacity of the tank.

ANSWER **A** · **B**

WHY Filamentous sludge bulking (SVI > 150 mL/g) causes poor compaction and solids loss over the weirs. Letting the sludge blanket rise to the level of the effluent weirs allows solids to be carried directly over with the clarified effluent. A properly designed Stamford baffle, an adequate RAS flow that keeps the blanket low, and steady flows within design capacity all promote good settling rather than hinder it.

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