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39	A	B	C	D	E

PRACTICE QUESTIONS

Technical Standards and Safety Authority (TSSA)

1B-2

OE 1st Class B2

EDITION

Demo

QUESTIONS

9

FORMAT

Limited Edition PDF

Before you begin

What this is

9 practice questions for Technical Standards and Safety Authority (TSSA) 1B-2 , 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, 1B-2
- the question number
- the email address on your order

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

QUESTION 1

SINGLE CHOICE

In a steam boiler system, the water level in the gauge glass is observed to be lower than the actual water level inside the shell. Which condition is the most likely cause of this discrepancy?

- ☒ **A** The gauge glass try-cocks are partially plugged with sediment.
- ☐ **B** The boiler water is foaming due to high alkalinity and carryover of solids.
- ☐ **C** The gauge glass shut-off valves are leaking past the seat.
- ☐ **D** The steam drum internals are flooded due to an excessively high firing rate.

ANSWER A

WHY Plugged try-cocks at the lower connection restrict water entry into the gauge glass, causing the glass to read lower than the true shell water level. Foaming (B) tends to make the glass read higher because foam enters the glass, not lower. Leaking valves (C) would allow water/steam mixing and an erratic, not consistently low, reading. Flooded internals (D) is unrelated to gauge glass accuracy.

QUESTION 2

SINGLE CHOICE

A natural gas-fired boiler is producing heavy soot accumulation on the fire-side surfaces and elevated carbon monoxide in the flue gas. Which burner adjustment is the most appropriate first corrective action?

- ☐ **A** Reduce the combustion air supply to lower excess air and improve flame stability.
- ☒ **B** Increase the combustion air supply to raise excess air and complete the combustion of hydrocarbons.
- ☐ **C** Close the gas train block valves and reset the burner controller.
- ☐ **D** Reduce the firing rate to the minimum input to decrease flame temperature.

ANSWER B

WHY Heavy soot and elevated CO are classic indicators of insufficient combustion air leading to incomplete (fuel-rich) combustion. Increasing excess air supplies additional oxygen to complete oxidation of hydrocarbons and reduce soot formation. Reducing air (A) would worsen the condition. Resetting the burner (C) does not address the air-fuel ratio. Reducing input (D) lowers flame temperature further and can aggravate incomplete combustion.

QUESTION 3

SINGLE CHOICE

Before hydrostatically testing a boiler, the operator must verify that all safety valves are removed or securely held off their seats. What is the primary reason for this requirement?

- ☐ A To prevent the safety valves from leaking test water into the boiler room during the test.
- ☒ B To prevent the test pressure from being limited or relieved by the set pressure of the valves.
- ☐ C To allow the inspector to inspect the valve seats while the boiler is empty.
- ☐ D To reduce the amount of water required to fill the boiler for the hydrostatic test.

ANSWER B

WHY Hydrostatic tests are performed at pressures above the MAWP and above the set pressures of the safety valves. If the valves remain installed, they will lift and relieve pressure as soon as the test pressure approaches their set pressure, preventing the boiler from reaching the required test pressure. Removing or gagging the valves (with the additional restraining gag required when the valves are gagged open) ensures the full test pressure can be reached and held.

QUESTION 4

SINGLE CHOICE

Which of the following conditions, if observed during routine boiler water testing, is the strongest indicator of carryover from the boiler shell into the steam line?

- ☒ A A sharp rise in conductivity of the condensate return.
- ☐ B A sudden drop in the boiler water pH reading.
- ☐ C An increase in the hydrazine residual at the deaerator outlet.
- ☐ D A decrease in the dissolved oxygen reading at the condensate receiver.

ANSWER A

WHY Carryover is the entrainment of boiler water solids into the steam. When dissolved solids carry over with the steam, they end up in the condensate system and cause a measurable rise in condensate conductivity. The other options reflect changes in treatment chemistry or pre-boiler conditions, not carryover from the boiler shell.

QUESTION 5

SINGLE CHOICE

An oil-fired burner fails to ignite on a call for heat and the ignition trial ends with no flame signal. The most likely cause on a properly maintained burner is a failure of which component?

- ☐ A The barometric damper in the flue connection.
- ☒ B The flame scanner / flame rod detecting the pilot or main flame.
- ☐ C The feedwater pump check valve.
- ☐ D The stack temperature indicator.

ANSWER B

WHY The flame safeguard system requires a confirmed flame signal from the flame scanner (photo-cell, UV scanner, or flame rod) to allow the main fuel valve to remain open. If no flame signal is established during the trial-for-ignition period, the burner control locks out. The barometric damper (A) and stack temperature indicator (D) are not part of the flame detection circuit, and the feedwater pump check valve (C) is unrelated to burner ignition.

QUESTION 6

SINGLE CHOICE

During an internal inspection of a fire-tube boiler, the inspector identifies heavy-scale formation along the lower portions of the tubes and shell. The most probable operational cause of this condition is:

- ☐ A Excessive carryover from the steam drum.
- ☐ B Return of large quantities of cold condensate without warm-up.
- ☒ C Inadequate blowdown and untreated feedwater hardness.
- ☐ D Firing the burner with excess combustion air.

ANSWER C

WHY Heavy scale formation in a fire-tube boiler is most often caused by hardness in the feedwater depositing on hot heat-transfer surfaces when blowdown is insufficient and internal treatment is inadequate. Carryover (A) deposits in downstream equipment, not on lower tubes. Cold condensate (B) causes thermal shock, not scale. Excess air (D) is a combustion-side issue, not a water-side scaling issue.

QUESTION 7

MULTIPLE CHOICE

Which of the following are required operating safety devices on a low-pressure heating boiler as referenced in TSSA operational requirements? (Choose two.)

- ☒ **A** A pressure gauge connected to the boiler or steam header.
- ☐ **B** A main steam stop valve on every steam outlet.
- ☒ **C** A low-water fuel cut-off that interrupts the burner circuit.
- ☐ **D** An audible alarm wired to the boiler room exit door.
- ☐ **E** A continuously recording chart of stack temperature.

ANSWER A - C

WHY A pressure gauge (A) is required so the operator can verify the boiler pressure and confirm it is within the safe operating range. A low-water fuel cut-off (C) is a mandatory safety device that shuts off the burner if water level falls below a safe minimum, protecting the boiler from overheating. Main steam stop valves (B) are part of the piping but not classified as operating safety devices on the boiler itself. Audible alarms to exits (D) and stack temperature charts (E) are not mandated boiler operating safety devices.

QUESTION 8

MULTIPLE CHOICE

An operator notices that the boiler water level gauge glass consistently reads higher than the water column remote indicator on the control panel. Which two conditions could plausibly cause this condition? (Choose two.)

- ☐ **A** The gauge glass lower shut-off valve is partially plugged, restricting water entry.
- ☐ **B** The water column drain valve is leaking, allowing water to escape.
- ☐ **C** The gauge glass is over-pressurized relative to the water column.
- ☒ **D** Foaming and priming are forcing water into the gauge glass.
- ☒ **E** The remote indicator transmitter is calibrated at a different elevation reference.

ANSWER D - E

WHY Foaming and priming (D) cause water and solids to be carried into the gauge glass, making it read higher than the true shell level. A transmitter calibrated to a different elevation reference (E) will give a reading offset from the gauge glass. A plugged lower valve (A) makes the glass read lower, not higher. A leaking drain valve (B) and over-pressurization of the glass (C) are implausible because the gauge glass and water column are connected to the same water space and equalize in pressure.

QUESTION 9

SINGLE CHOICE

Which form of boiler corrosion is most directly prevented by the use of an oxygen scavenger, such as sodium sulphite or hydrazine, in the feedwater?

- ☐ A Caustic gouging at the tube ends and rolled joints.
- ☒ B Generalized pitting caused by dissolved oxygen at the economizer inlet.
- ☐ C Acid corrosion of the condensate return lines caused by dissolved CO₂.
- ☐ D Dew-point corrosion of the air preheater on the flue-gas side.

ANSWER B

WHY Oxygen scavengers react with residual dissolved oxygen in the feedwater to prevent oxygen pitting corrosion, particularly in the economizer and feedwater piping where cooler temperatures favor oxygen attack. Caustic gouging (A) is controlled by limiting free alkalinity. CO₂-driven condensate-line corrosion (C) is addressed by neutralizing amines. Dew-point corrosion (D) is a flue-gas-side issue, not a feedwater issue.