

01	☐ A	☐ B	☐ C	☐ D	☐ E
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36	☐ A	☐ B	☐ C	☒ D	☐ E
37	☐ A	☒ B	☐ C	☐ D	☐ E
38	☐ A	☒ B	☐ C	☐ D	☐ E
39	☐ A	☐ B	☐ C	☐ D	☒ E

PRACTICE QUESTIONS

Saudi Commission for Health Specialties (SCFHS)

NUMT

Nuclear Medicine Technologist

EDITION

Demo

QUESTIONS

9

FORMAT

Limited Edition PDF

Before you begin

What this is

9 practice questions for Saudi Commission for Health Specialties (SCFHS) NUMT , 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, NUMT
- the question number
- the email address on your order

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

QUESTION 1

MULTIPLE CHOICE

A nuclear medicine technologist is preparing to administer 370 MBq of Tc-99m MDP to a patient. Which of the following actions are consistent with the ALARA principle for occupational radiation protection? (Choose two.)

- ☒ **A** Using an acrylic (Plexiglas) syringe shield during injection of the radiopharmaceutical
- ☒ **B** Drawing up the radiopharmaceutical behind a lead-glass L-block bench shield
- ☐ **C** Increasing the time spent near the patient immediately after injection to confirm comfort
- ☐ **D** Carrying the unshielded syringe from the radiopharmacy to the injection room in the shortest practical time
- ☐ **E** Placing the radiopharmaceutical vial directly on the countertop during dose calibration

ANSWER A - B

WHY ALARA relies on the three principles of time, distance, and shielding. Acrylic syringe shields (A) and the lead-glass L-block (B) provide effective shielding during handling. Option C violates ALARA by increasing exposure time. Option D, while it minimizes time, fails because the syringe must still be shielded during transport, making it incorrect as stated. Option E violates shielding by leaving the unshielded vial on the bench.

QUESTION 2

MULTIPLE CHOICE

During morning quality control of a NaI(Tl) gamma camera, the technologist performs an extrinsic flood uniformity test using a Co-57 sheet source. Which findings would require the camera to be taken out of clinical service for corrective action before patient imaging? (Choose two.)

- ☐ **A** Uniformity index within the manufacturer's specified limits on both UFOV and CFOV
- ☒ **B** A single 2 cm cold spot visible on the flood image corresponding to a known photomultiplier tube
- ☐ **C** Sensitivity variation between daily and baseline floods exceeding the manufacturer-defined action limit
- ☐ **D** Center of rotation (COR) offset within ± 0.5 pixel of the baseline value
- ☒ **E** Multiple new non-uniform regions not present on the baseline flood image

ANSWER B - E

WHY A persistent cold spot corresponding to a failing PMT (B) and new non-uniform regions not present on the baseline (E) indicate hardware or detector problems that would degrade diagnostic image quality; the camera should be removed from service. Option A describes a passing QC test. Option D (COR within ± 0.5 pixel) is within acceptable limits. Option C is incorrect because acceptable sensitivity variation must remain within manufacturer limits, not exceed them.

QUESTION 3

SINGLE CHOICE

A Mo-99/Tc-99m generator is eluted 24 hours after the previous elution. The technologist notes that the eluate has a noticeable yellowish discoloration. What is the most likely explanation?

- ☒ **A** Aluminum ion breakthrough from the generator column
- ☐ **B** Presence of Mo-99 breakthrough above acceptable limits
- ☐ **C** Oxidation of pertechnetate to Tc-99m in a higher valence state
- ☐ **D** Microbial contamination of the eluate vial

ANSWER A

WHY Aluminum ion breakthrough typically presents as a yellowish discoloration of the Tc-99m pertechnetate eluate and can cause aggregation if not detected. Mo-99 breakthrough (B) is detected by counting the eluate in a dose calibrator with a lead shield and produces falsely high readings, not discoloration. Tc-99m valence issues (C) and microbial contamination (D) do not typically cause this yellow appearance in a 24-hour eluate.

QUESTION 4

SINGLE CHOICE

Shortly after the intravenous administration of 740 MBq of Tc-99m MDP, a patient develops urticaria, mild wheezing, and facial flushing. What is the most appropriate first action by the nuclear medicine technologist?

- ☐ **A** Continue the examination and document the reaction at completion
- ☒ **B** Immediately notify the supervising nuclear medicine physician and initiate facility emergency response
- ☐ **C** Administer a pre-approved dose of epinephrine without further consultation
- ☐ **D** Slow the infusion rate and observe for further symptoms

ANSWER B

WHY Urticaria with wheezing and flushing after radiopharmaceutical administration represents a likely anaphylactoid reaction. The technologist must stop the injection, call for the supervising physician, and activate the facility emergency response. Continuing imaging (A) ignores an evolving reaction. Technologists administer emergency medications only under direct physician order; giving epinephrine independently (C) is outside the technologist's scope. Slowing an infusion (D) is inappropriate when systemic symptoms are present.

QUESTION 5

SINGLE CHOICE

For a three-phase bone scan of the lower extremities, what is the correct sequence of image acquisitions following injection of Tc-99m MDP?

- ☐ A Whole-body sweep first, then blood-pool images of the lower extremities, then delayed whole-body
- ☒ B Angiographic (flow) phase, immediately followed by blood-pool images, then delayed whole-body and spot images at 2–4 hours
- ☐ C Delayed whole-body images only, beginning 2 hours post-injection
- ☐ D SPECT/CT of the area of interest first, followed by delayed planar whole-body images

ANSWER B

WHY A three-phase bone study consists of (1) the angiographic or perfusion flow phase obtained immediately after injection, (2) the blood-pool or tissue phase obtained within minutes, and (3) the delayed skeletal phase at 2–4 hours. Option A inverts the order. Option C omits the early phases. Option D is incorrect because SPECT/CT is performed after, not before, the standard delayed planar images in this protocol.

QUESTION 6

SINGLE CHOICE

Which instruction provides the greatest reduction in radiation dose to the bladder wall following administration of a Tc-99m-labeled radiopharmaceutical?

- ☐ A Having the patient fast for 4 hours before the study
- ☒ B Drinking water and voiding frequently after injection
- ☐ C Applying a local lead apron over the lower abdomen
- ☐ D Placing the patient prone during image acquisition

ANSWER B

WHY Hydration and frequent voiding accelerate renal clearance of Tc-99m radiopharmaceuticals and reduce the residence time of activity in the bladder, lowering bladder wall dose. Fasting (A) is unrelated. A lead apron over the patient (C) is not used in nuclear medicine and provides no internal dose reduction. Patient positioning (D) does not affect bladder dose.

QUESTION 7 SINGLE CHOICE

A dose calibrator constancy test using a long-lived sealed source (e.g., Cs-137) today yields a reading that differs from the established baseline value by 9 percent. According to standard QC criteria, what action should the technologist take?

- ☐ A Record the value and continue using the calibrator; a 9 percent variation is acceptable
- ☒ B Repeat the test; if the reading remains outside the ± 5 percent action limit, remove the calibrator from clinical use and contact service
- ☐ C Recalibrate the calibrator using the manufacturer's Cs-137 reference value and resume use immediately
- ☐ D Discard the result and repeat the constancy test only at the next scheduled QC session

ANSWER B

WHY Dose calibrator constancy must be within ± 5 percent of the baseline. A 9 percent deviation exceeds this limit. The test should be repeated; if still out of limits, the calibrator must be removed from clinical service and the service engineer contacted. Option A accepts an unacceptable reading. Option C is not a field-technologist action, and resuming use before verification is unsafe. Option D ignores the failed QC result.

QUESTION 8 SINGLE CHOICE

Which statement best characterizes the deterministic (non-stochastic) effects of ionizing radiation?

- ☐ A They have no threshold dose and their probability increases with dose
- ☐ B They occur only after acute whole-body doses exceeding 5 Sv
- ☒ C They have a threshold dose, and their severity increases with dose
- ☐ D They are limited to genetic effects observed in offspring of exposed individuals

ANSWER C

WHY Deterministic effects (such as skin erythema, cataract formation, and radiation-induced nausea) have a threshold below which the effect is not seen, and above which severity increases with dose. Options A and D describe stochastic effects. Option B is incorrect because deterministic effects can occur at much lower doses for specific organs (e.g., lens of the eye, skin).

QUESTION 9

SINGLE CHOICE

Tc-99m HMPAO (exametazime) is being prepared from a commercial kit. Which step is essential to ensure adequate cerebral perfusion tracer uptake in a subsequent brain SPECT study?

- ☐ A Adding pertechnetate to the kit vial and allowing it to incubate for 30 minutes at room temperature before injection
- ☐ B Adding pertechnetate to the kit vial and immediately injecting the preparation
- ☒ C Adding pertechnetate to the kit vial and incubating for 10 minutes before injection, with quality control confirming >80 percent lipophilic complex
- ☐ D Reconstituting the kit with saline and freezing the product for later use

ANSWER C

WHY HMPAO must be incubated with Tc-99m pertechnetate for approximately 10 minutes, and QC (e.g., chloroform extraction or thin-layer chromatography) must confirm that at least 80 percent of the activity is in the lipophilic complex needed to cross the blood-brain barrier. Long incubation at room temperature (A) leads to degradation of the lipophilic complex. Immediate injection (B) does not allow adequate complex formation. Freezing (D) is not an approved storage method.