VCE VET Laboratory Skills

Sample Questions

Written Examination – End of Year

Section A – Multiple-choice questions

Question 1

What would be the most likely source of cross-contamination when transferring samples of nucleic acids?

A. using the wrong buffer

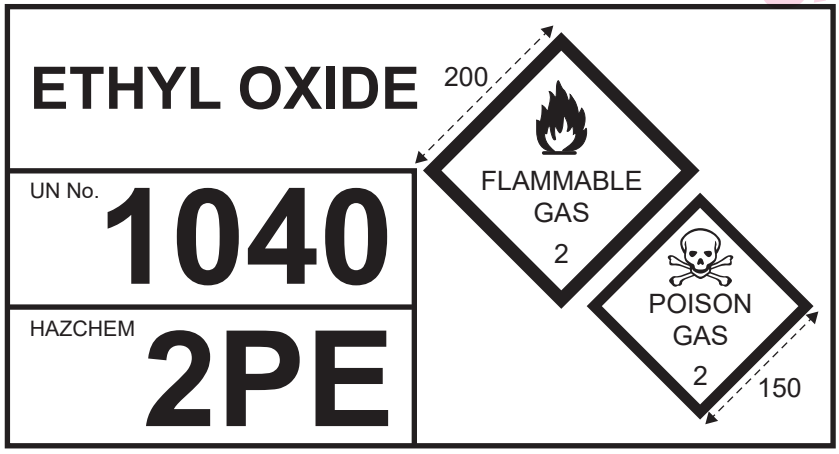
B. reusing the same pipette tip

C. adding too much enzyme to a tube

D. opening tubes near the Bunsen burner

Question 2

Ethylene oxide is a dangerous gas used in healthcare laboratories for sterilising critical items, such as nasal swabs that are moisture- or heat-sensitive. This ensures that items used to take samples from patients are sterile.



PLACARD FOR ETHYLENE OXIDE STORAGE AREA

Source: www.safeworkaustralia.gov.au

What controls would best protect the technicians when using this chemical to sterilise samples?

A. Sterilisation is conducted where all other combustibles are kept.

B. It is used in a separate confined area away from flammables.

C. A chemical fume cupboard is used, and sources of ignition removed.

D. Open flames are avoided.

June 2024

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY
VICTORIA State Government

Question 3

Which one of the following would provide protection against cross-contamination of bacterial cultures and protect the operator from infection?

A. biohazard cabinet

B. balance enclosure

C. chemical fume cupboard

D. PCR laminar flow cabinet

Question 4

The best method for the disposal of a large veterinary specimen after the storage period has expired would be to

A. place the specimen in the general waste bin.

B. autoclave the specimen.

C. place the specimen in a biohazardous waste bin.

D. place the specimen in the recycling/compost bin.

Section B

Question 1 (9 marks)

A laboratory technician works in an independent laboratory and receives a sample of UHT milk from a dairy company with suspected bacterial contamination that would indicate the presence of pathogens in the milk. A selective agar has already been prepared to isolate any coliforms.

a. Assuming all correct personal protective equipment (PPE) has been put on, what is the first thing the technician needs to do to the outer sample packaging when the sample enters the lab? Explain your answer. 2 marks

b. What technique would the technician use to identify the presence of coliforms in the milk sample? 1 mark

c. Compare how sterile practices and aseptic techniques are applied in the laboratory. 3 marks

d. The technician is concerned about work health and safety risks during the processing of a confirmation test for coliform bacteria.

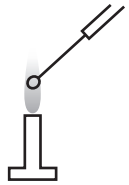
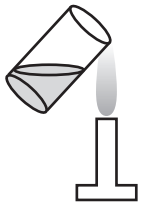
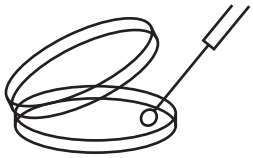
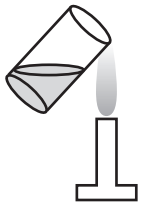
Describe **two** techniques that would reduce these risks. 2 marks

e. After the results have been completed, suggest how the technician should dispose of any remaining samples to ensure the health and safety of their co-workers. 1 mark

Question 2 (3 marks)

When performing an aseptic transfer, a laboratory technician makes a streak plate. The technician ensures that correct PPE is worn, the work surface is swabbed with 70% ethanol and all the required equipment has been collected.

They conduct the process as shown in Figures 1–6 in the table below using a red-hot flame and wire loop.

	Figure	Technique
1		
2		flaming mouth of sample vessel
3		obtaining sample with sterile loop
4		streaking plate with sample
5		flaming mouth of sample vessel
6		

a. Identify the technique shown in Figure 6. 1 mark

b. Explain, with reference to sterile practices, why the wire is heated before the loop. 2 marks

Question 3 (10 marks)

A new laboratory technician in a research laboratory has received a sample swab to be analysed using molecular techniques.

a. Identify a common molecular analysis technique that might be routinely used in the research laboratory. 1 mark

b. One of the most common ways that samples are contaminated is through DNA from the technician. List **two** other ways samples required for molecular analysis can be compromised before analysis is conducted. 2 marks

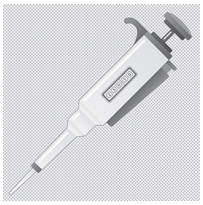
c. The laboratory technician is concerned about contaminating the sample with their DNA.

What **three** steps can they take to reduce the risk of contamination? 3 marks

d. Describe **one** example of how the specimen can be stored during post-sample processing to prevent degradation. 2 marks

e. In the table below are two items used when conducting molecular analysis in the microbiology research laboratory.

Outline how each item would be managed correctly immediately after use. 2 marks

Item	Correct management process after use
used micropipette 	
used Eppendorf tubes 	

Sources: Shannon Chocolate/Shutterstock.com; chromatos/Shutterstock.com

Question 4 (9 marks)

A pathology technician in specimen reception has found that the top of a cytology specimen jar was not tightened correctly and the contents have leaked slightly into the specimen bag.

The leak is contained in the specimen bag, the label is readable, and the test request form is not affected. The SOP below lists the steps a technician should take if a spill occurs.

1. Report spill to supervisor.
2. Cover all cuts, abrasions, etc.
3. Put on required PPE (gloves, apron and safety glasses).
4. Absorb the spilled contents in the bag using inert material such as a paper towel.
5. Place the used paper towel into a suitable container for disposal in line with SOP.
6. Wipe specimen jar gently, ensuring label is not affected.
7. Place cleaned/dry specimen jar in new bag with the original test request form.
8. Clean the bench with a suitable disinfectant.
9. Remove gloves and discard in hazardous waste.
10. Note leak clean-up procedure in daily log.

a. Suggest **two** other steps that might be required. Give an explanation for each suggestion. 6 marks

Step 1 _____

_____

Reason _____

_____

_____

_____

Step 2 _____

_____

Reason _____

_____

_____

_____

_____

b. What should the technician do if the label is unreadable? 2 marks

_____

_____

_____

_____

c. What is an appropriate disinfectant to clean the bench? 1 mark

_____

Question 5 (9 marks)

a. List **three** preventative techniques and/or items of equipment that may be required to prevent cross-contamination during transfer in **each type of media** listed below. 6 marks

Specimen 1: bacterial cultures on agar plates

Technique 1 _____

Technique 2 _____

Technique 3 _____

Specimen 2: sterile liquid media

Technique 1 _____

Technique 2 _____

Technique 3 _____

b. In what document would you find information regarding replacement of specific laboratory equipment consumables? 1 mark

_____

c. Name **two** documents that would ensure that these techniques meet Work Health and Safety (WHS) laboratory processing requirements. 2 marks

_____

_____

_____

_____

Answers to multiple-choice questions

Section A

Question	Answer
1	B
2	C
3	A
4	C