

## VCE VET Laboratory Skills GA 2: Written examination

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### GENERAL COMMENTS

Students who analysed the information given before providing concise, succinct answers that related to laboratory experience best handled short answer questions. Students who performed best demonstrated underpinning knowledge coupled with a clear understanding of regulatory and standard practices operating in working laboratories.

### SPECIFIC INFORMATION

#### Section 1

(Average mark 8.19/Available mark 10)

Question	Correct responses
1	C
2	A
3	D
4	C
5	A
6	B
7	D
8	B
9	D
10	A

#### Question 11 (1.46/2)

Any TWO of:

- turn off lights/use low energy globes.
- turn off equipment that doesn't require continuous electrical supply
- reduce heating/cooling
- bulk operations, e.g. autoclaving
- batch-up tests.

#### Question 12 (0.73/4)

**a.**

11.00 am.

**bi.**

12.00–18.00 hrs.

**bii.**

Seven consecutive readings on increase

**biii.**

Precision check – three samples within standard error

Re-calibrate

Few students were able to maximise marks by correctly interpreting the control chart.

#### Question 13 (1.38/2)

Any TWO of the following:

- clarify the message/information (share all group information)
- observe body language
- understand views of others (listen to others)
- notice others feelings (be approachable)
- involve yourself in the process (creative ideas)
- comprehend (understand) the message/issue
- actively listen (listen to others viewpoints)
- talk with clear intent/openly
- examine the real message of others
- negotiation skills.

**Question 14 (1.38/2)**

Any TWO of the following:

- frank expression of ideas (make helpful suggestions/input from all)
- restating/summarising ideas and feelings to clarify (focus ideas)
- empathy
- disclosure of relevant past experience
- supporting team members (resolution options/compromise if required)
- taking on responsibility
- inviting self examination of behaviour by individuals (take criticism)
- drawing on past experience
- illustrating points with examples.

**Question 15 (2.96/5)**

It is important that students working in any laboratory setting can correctly read and interpret data from a table or graph.

**a.**

Performance of an instrument (or test) checked against a standard with a known value

**bi.**

Thermometer

**bii.**

12 July (12/7)

**biii.**

5

**Question 16 (3.53/5)**

**ai–ii.**

Any TWO of:

- switch on
- clean if necessary
- level (ensure it is empty)
- ensure in safe position
- check log book records on previous use
- balance bucket with tube of equal volume.

(Might add or take off whole buckets depending on type of machine.)

**b.**

Any ONE of:

- damage equipment (cause recalibration of instrument)
- inaccurate results (not work properly)
- danger to user or facilities.

**ci–ii.**

Any TWO of:

- clean all surfaces
- brush
- wipe with damp cloth
- re zero
- switch off power
- cover with dust cover
- close door.

## Section 2

### Elective 1

(Average mark 8.73/Available marks 10)

Question	Correct responses
1	A
2	B
3	A
4	C
5	B
6	A
7	B
8	C
9	B
10	C

#### Question 11 (3.73/5)

a.

Any ONE of:

- measure a range of temperatures, e.g. 100C freezing point of alcohol to 360C boiling point of mercury
- use thermometer to suit the test to be performed.
- different melting and boiling points.

b.

Any TWO of:

- check method of mercury disposal
- care with broken glass.

c.

Any ONE of:

- Thermocouple
- Rototherm
- Dial thermometer
- Pyrometer
- Electronic thermometer (digital).

#### Question 12

a. (1.8/2)

Any TWO of:

- accepted 'reject' or compromised samples, i.e. unlabeled and/or opened and spilt
- labelled an unknown
- put samples in food fridge
- tests unknown/spilt or compromised samples
- gives unreliable results to supervisor
- did not report compromised sample
- did not enter receipt of samples in log
- did not clean up spill.

b. (1.57/2)

Any ONE of the following corresponding to answer order in **ai-ii** above:

- rejected compromised samples
- rejected unknown
- put them in storage fridge – refer standard operations procedure (SOP)
- rejected the samples and tested only uncompromised ones
- should only have tested un-compromised samples and advised supervisor (or recorded) of rejected samples
- report compromised sample to supervisor and client
- enter in log so other staff can identify contents/source/ongoing requirements
- clean and dispose of correctly.

c.

Thickness

**Question 13 (2.11/3)**

**a.**

SOP

**b.**

Contaminants, e.g. mineral ions or micro organisms

**c.**

Any ONE of:

- damage plastic pipes
- react with something already in sink/pipes
- danger to future uses if residue left in sink
- danger to plumber if in pipes
- react with water in pipes.

**Question 14 (6.73/8)**

**ai.**

Balance of solution of ions, of known pH, against which the instrument can be calibrated.

OR

Solution of known pH that resists change in pH when acid or base is added.

**aii.**

Any TWO of:

- SOP for calibration
- distilled water
- waste beaker
- beakers for buffer samples
- pipette
- tissues.

**b.**

Any FOUR in order of:

- Calibrate the pH meter
- rinse probe in distilled water/check buffers
- place sample in cup/beaker
- wash pH electrode with distilled water
- immerse electrode in sample cup and swirl sample cup gently
- record reading once pH display is steady
- rinse probe.

**Elective 2**

**(Average mark 8/Available marks 10)**

<b>Question</b>	<b>Correct Responses</b>
<b>1</b>	C
<b>2</b>	B
<b>3</b>	B
<b>4</b>	A
<b>5</b>	B
<b>6</b>	B
<b>7</b>	C
<b>8</b>	A
<b>9</b>	C
<b>10</b>	A

**Question 11 (0/2)**

A supernatant

B pellet

**Question 12 (1/2)**

Any TWO of:

- enhance contrast
- allow internal cellular contents to be distinguished
- identify different cell types
- differentiate between tissue structures, eg. myelin.

**Question 13 (2/3)**

TWO correctly labelled for 1 mark:

- A Ocular (eyepiece)
- B Low power objective
- C High power objective
- D Iris diaphragm (accept condenser)
- E Light source (lamp)
- F Coarse adjustment

**Question 14 (4/5)**

**a.**

Any THREE of:

- inhalation
- absorption
- ingestion
- wounds (cuts, injection).

**bi-ii.**

Any TWO of:

- wash thoroughly
- remove gloves
- remove lab coat
- store materials in fridge or incubate
- clean benches
- dispose of waste.

**Question 15**

**a. (0/2)**

TWO correctly named for 1 mark:

- Crystal Violet (the primary stain)
- Iodine solution (the mordant)
- Decolouriser (ethanol sometimes acetone)
- Carbol Fuchsin or Neutral Red or Safranin (the counterstain).

**b-c. (1/6)**

**b.**

At least SIX steps in correct order:

- heat-fix slide by warming over Bunsen flame
- flood slide with Crystal Violet for 30 secs
- rinse with tap water
- flood with Iodine for 30 secs
- rinse with tap water
- decolourise with ethanol
- flood with Carbol Fuchsin or Safranin for 30 secs
- rinse with tap water.

Diagrams that would gain a mark in addition to minimum six correct steps

- slide over (not in) Bunsen flame for heat fixing
- tap water wash at correct stage
- pipette (disposable OK) to add stains
- ethanol decolourisation from squirter bottle.

ci.  
Gram+  
purple/blue

cii.  
Gram-  
pink/red

## Section 2

### Elective 3

(Average mark 7.41/Available marks 10)

Question	Correct Responses
1	A
2	B
3	B
4	C
5	C
6	A
7	C
8	A
9	C
10	B

#### Question 11 (1.16/2)

i.  
Bubbles

ii.  
Smell/odour

#### Question 12 (0/2)

*1% lead*  
*→10ml in 100ml*  
*→10ml in 100ml*  
*→10ml in 100ml*  
*→10ml in 100ml*

Final concentration = 0.0001% lead

OR

= 1ppm

OR

=  $10^{-4}$

The calculations for preparation of a working solution of extremely low concentration from a standard are a fundamental skill in preparation of working solutions.

#### Question 13 (3.08/4)

a.

$$\% (W/V) = (14g / 200mL) \times 100/1$$

$$\% (W/V) = 7 \%$$

Calculations required; answer only was insufficient to gain full marks.

b.

$$M = (0.3g / 176) / 1L$$

$$M = .0017$$

Solution = .002M or  $1.7 \times 10^{-3}M$

OR

Solution =  $2 \times 10^{-3} M$  vitamin C

Calculations required; the answer only was insufficient to gain full marks.

#### Question 14 (2.95/4)

i.  
Conical flask

ii.  
Volumetric flask

**iii.**

Burette

**iv.**

Graduated pipette

**Question 15**

**a–c. (3.79/6)**

**a.**

Any FOUR of the following showing comprehension of the sequence of steps:

- PPE/SOP/MSDS's
- rinse burette with fill solution, flask with aliquot
- overfill burette with fill solution
- check for air bubbles
- wipe burette tip
- remove funnel
- re wipe tip
- zero burette (or record initial volume)
- add few drops of indicator to burette.

**b.**

Indicates, by colour change, the point of equivalence of  $H^+$  and  $OH^-$  ions.

OR

Indicates by colour change, the end point of a titration.

**c.**

- open burette and allow slow, steady flow
- swirl beaker gently when adding fill
- note first permanent colour change
- repeat by 'dropping' to more accurately determine 'end point'
- repeat 'dropping' titration twice more to determine end point within say 0.1mL

If not already listed in Part a

- zero burette (or record initial volume)
- add few drops of indicator to burette.

**di–dii. (1.25/2)**

**di.**

$$\begin{aligned}H_2SO_4 &= 0.5 \times \text{moles of NaOH} \\ &= 0.5 \times 2.39 \times 10^{-3} \text{ mol} \\ &= 1.19944 \\ &= 1.2 \times 10^{-3} \text{ moles}\end{aligned}$$

**dii.**

$$\begin{aligned}[H_2SO_4] &= 1.20 \times 10^{-3} / 25 \times 10^{-3} \\ &= 1.20 / 25 \\ &= 0.048 \\ &= 0.05 \text{ moles / L}\end{aligned}$$

OR if not using rounded up figure from (i)

$$\begin{aligned}[H_2SO_4] &= 1.19944 \times 10^{-3} / 25 \times 10^{-3} \\ &= 1.19944 / 25 \\ &= 0.0479776 \\ &= 0.05 \text{ moles / L} \\ &= (5 \times 10^{-2} \text{ moles/L}).\end{aligned}$$