VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

2004 VCE VET Laboratory Skills: GA 2: Written Examination

GENERAL COMMENTS

VCE VET Laboratory Skills is one of the smaller VCE VET programs offered. Given the small sample size, it was difficult to establish any trends. Generally, the questions were answered well and the students had a clear understanding of what was required.

The question that caused the most difficulty for students was Question 12 from Section 1 of the examination paper. In part a of this question, students found it difficult to discuss the situation. This may have been due to a lack of life experience or a lack of complete understanding of the scenario.

None of the students selected Elective 2 'Perform biological laboratory procedures'. It is not known if this was due to the difficulty of the questions, or the way the units of competence were delivered in the participating schools.

SPECIFIC INFORMATION

Students did well in the multiple-choice areas of the paper and did not appear to have any difficulty with any specific questions. The tables below indicate the correct answers.

Section 1 – Core units

Multiple-choice

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

Question 11

Marks	0	1	2	3	4	5	Average
%	0	0	0	0	30	70	**4.7**

Five of the following:

- no protective clothing
- unlabelled chemicals
- soft drink type bottle with straw
- long hair not tied back
- naked flame
- male wearing short pants
- doorway obstructed with boxes/other objects
- pouring chemical above eye level.

Question 12

12a

Marks	0	1	2	Average
%	40	40	20	**0.8**

Issues that could be discussed included:

- technicians are more likely to assume ownership of the staffing problems
- feedback on the success or difficulties of change is likely to be optimised
- a cooperative attitude from the technicians is more likely.

12b

Marks	0	1	2	3	4	Average
%	0	10	30	40	20	**2.7**

i.

Any two of the following:

- all laboratories are kept operational or working
- management cost savings and/or instructions have been satisfied
- technicians wanting to learn more will likely be satisfied
- technicians are less likely to be bored or lazy when work demand is low in some laboratories
- more even sharing of workload.

ii.

Any two of the following:

- some technicians may leave or resign
- some technicians may become more difficult to work with because they are resentful
- some technicians may become work-stressed
- some laboratories may be un-staffed or vacant when an unusual or unexpected demand occurs, as there would be more laboratories than technicians
- a fire, water leak, break-in, equipment failure, etc., may go unnoticed in a laboratory if no one is present
- there may be insufficient time or training in new areas.

Question 13a–c

Marks	0	1	2	3	Average
%	0	0	20	80	**2.8**

13a

Answers that addressed one of the following points were acceptable:

- acids should be neutralised (by addition of sodium carbonate or a suitable base)
- if they are common acids such as sulphuric or hydrochloric, they can be diluted first with copious water, then flushed down the laboratory sink
- if they are organic acids, they should be stored in a leak-proof container, then labelled properly with chemical name, date, where they come from, etc., and removed by a special waste removalist
- they should be kept for removal by special or chemical waste contractors.

13b

Answers that addressed one of the following were acceptable:

- to make sure it's properly/thoroughly clean
- tap water has some contaminants, chemicals, salts, etc., that will remain on the glassware or equipment
- distilled water rinses off anything remaining from a tap water wash
- distilled water is cleaner, has less chemicals and contaminants, or will form suds better than tap water.

13c

Answers that addressed one of the following were acceptable:

- into a glass/glass-waste bin/container
- into a soda or pyrex glass/glass-waste bin
- into a special solid-waste bin/container.

Question 14a–d

Marks	0	1	2	3	4	5	6	Average
%	0	0	10	10	20	30	30	**4.6**

14a

Upper and lower control limits should have been drawn on the graph at 41.5 and 42.5.

14b

11/12/2004

14c

Any two of the following:

- water level in the water-bath too low or out of water
- room/day/ambient temperature greater than 42.5ºC
- thermostat failed/jammed on
- control knob moved or knocked
- digital thermometer calibration is incorrect.

14d
Equipment to be calibrated:
- control of water-bath
- thermometer
- spatial temperature variation check of the water-bath.

Section 2 – Electives

Elective 1 – PMLTEST300 Perform basic tests

Multiple-Choice

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

Question 11a–b

Marks	0	1	2	3	Average
%	0	30	50	20	**1.9**

11a
27.80 mL

11b
- 27.50 ml (two marks were given for this answer)
- 27.56 (one mark was given for this answer)

Question 12

Marks	0	1	2	3	Average
%	0	0	0	100	**3.0**

Answers needed to paraphrase or list any three of the following:
- company details
- effects: acute effects, chronic effects, first aid, formula
- personal protective equipment
- emergency responses
- storage and handling
- transport
- toxicity: environmental effects, physical properties, risk and/or safety phrases
- expiry date
- waste/disposal.

Question 13

Marks	0	1	Average
%	40	60	**0.6**

Answers needed to paraphrase or discuss any of the following:

- creates more or greater surface area as a powder for the same weight
- the atoms/molecules can get closer together/quicker as a powder than as dense solid
- the atoms/molecules can react together/quicker as a powder than as dense solid
- has a greater surface to volume ratio.

Question 14

Marks	0	1	2	3	Average
%	0	0	0	100	**3.0**

14a
lemon juice and tomato juice

14b
salt and sugar

14c
baking soda

Question 15

Marks	0	1	2	3	4	Average
%	0	0	40	10	50	**3.1**

Toxic	Corrosive	Flammable	Radioactive	Explosive
• lead nitrate • mercury	• sulphuric acid • sodium hydroxide	• petrol • alcohol • hydrogen gas	• uranium	• hydrogen gas • petrol

Eight substances had to be correctly inserted into a table to obtain four marks; therefore, two correct answers were required to gain each mark.

Question 16
16a–b

Marks	0	1	2	Average
%	20	0	80	**1.6**

16a
100–130 grams

16b
lead nitrate

16c

Marks	0	1	2	Average
%	20	0	80	**1.6**

i.
50˚C (+/- 2˚C)
ii.
80grams (+/- 5grams)

16d

Marks	0	1	2	Average
%	40	0	60	**1.2**

Do not heat to greater than 35˚C.

Elective 2 – PMLTEST301A Performing biological laboratory procedures

Multiple-choice

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

Question 11

11a

Cell	Letter
neutrophil	B
lymphocyte	C
erythrocyte	A

11b

i.

Neutrophil: kills bacteria and then engulfs the remnants by phagocytosis.

ii.

Lymphocyte: is responsible for making antibodies or killing viruses.

iii.

Erythrocyte: is responsible for the transport of oxygen and carbon dioxide.

11c

Answers that addressed or paraphrase any two of the following were acceptable:

- do not allow blood to come in contact with hands, surfaces or utensils
- do not produce aerosols
- wear correct personal protective equipment
- wear gloves
- wear a mask
- wear a lab coat
- use a recommended disinfectant.

Question 12

12a

Order	Steps
4	check pH
3	heat to dissolve
7	pour into sterile Petri dishes
8	allow to set
1	weigh dry ingredients
5	sterilise
6	cool to 50ºC
2	add water

12b

Answers that addressed or paraphrased two of the following points were accepted:

- time
- pressure
- temperature.

12c
Answers that addressed or paraphrased two of the following points were accepted:

- long, heat resistant gloves
- face shield
- laboratory coat
- covered shoes.

Question 13

Order	Steps
8	microsopy
2	dehydration
5	cutting sections
3	clearing
6	mounting
7	staining
4	embedding
1	fixation

Elective 3 – PMLTEST303A Prepare working solutions

Multiple-choice

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

Question 11a–c

Marks	0	1	2	3	4	Average
%	0	0	80	10	10	2.3

11a

- the acidity or alkalinity/basicity of solutions/substances/chemicals/liquids, etc.
- the hydrogen ion/hydronium ion concentration
- –log10 [H3O+]
- the logarithm or negative logarithm or inverse logarithm or log of hydronium or hydrogen ion concentration.

11b

- a pH meter
- a pH electrode
- a combined pH electrode
- a glass electrode and calomel electrode, pair.

11c
pH = –log 10 [H3O+]

Question 12a–b

Marks	0	1	2	Average
%	0	10	90	1.9

12a
0.1M hydrochloric acid

12b
Answers that addressed or paraphrased any of the following were acceptable:

- because the pH must be lowered/ reduced, so acid needs to be added
- the hydrochloric acid is acidic and so will lower the pH
- the water is not acidic enough to lower the pH and the sodium hydroxide is basic and will raise the pH.

Question 13a–c

Marks	0	1	2	3	4	Average
%	0	10	10	40	40	**3.1**

13a
Either of:

- a solution that can be used directly, or straight away, or without having to measure its concentration, to measure another solution/unknown solution/chemical, etc.
- a pure substance that is used to measure/assay another substance.

13b
Any of:

- a solution that has had its concentration measured or determined
- a solution of known concentration
- a solution that will be used to measure another substance/solution
- a solution that is already or previously measured to use for something else
- a solution that has had its concentration measured by titration
- a solution that has been prepared and standardised against or by another standard solution.

13c
Answers that addressed or paraphrased any two of the following were acceptable:

- to tell/show where the titration end-point is
- to tell/show where/when to stop titrating and measure the volume used
- to allow us to show/measure where the reaction is complete/finished or at equilibrium/neutralised
- to show/measure the titrant/titrating solution/volume used
- to show a colour change for measuring the unknown solution.

Question 14

Marks	0	1	2	Average
%	0	20	80	**1.8**

Answers that addressed or paraphrased any of the following were acceptable:

- no, it is not pure/pure enough
- no, it has other things/substances/chemicals present
- no, sodium carbonate is not the same as sodium hydroxide
- no, because it would have to be standardised before use.

Question 15

Marks	0	1	2	3	Average
%	0	0	40	60	**2.6**

- spectrophotometer, colourimeter or photometer
- top loading balance, balance or laboratory or mass balance
- pH meter, pH meter and electrode, etc

Question 16a–e

Marks	0	1	2	3	4	5	Average
%	0	0	0	20	70	10	**3.9**

16a
KOOCC6H4COOH

16b
a salt

16c
anhydrous

16d
204.22

16e
204.22