VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

2007 VCE VET Engineering Studies Certificate II GA 2: Written examination

GENERAL COMMENTS

Some students performed very well on the 2007 VCE VET Engineering Certificate II examination; however, the average responses fell short in their understanding of basic engineering principles. Student responses generally lacked the depth of knowledge required in the trade. In particular, operational planning, work-holding methods and drawing interpretation stood out as key areas for improvement.

Because Sections A and B were the same as for the Certificate III exam, the comments for these two sections also reflect the Certificate III students' responses.

In the short answer section of the paper the following general approaches were followed in allocating marks.

- To gain marks, responses needed to be consistent with the level of knowledge expected of a trainee in the engineering industry at a Certificate II standard and with the knowledge covered in the competency statements.
- Students should be aware that they are more likely to be awarded marks for short, concise answers that are appropriate to the question, rather than for providing a range of responses.
- If a response did not address the subject of a question it was not given marks.

SPECIFIC INFORMATION

For each question, an outline answer (or answers) is provided. In some cases the answer given is not the only answer that could have been awarded marks.

Section A – VBN 771 Apply electrotechnology principles in an engineering environment

The table below indicates the percentage of students who chose each option. The correct answer is indicated by shading.

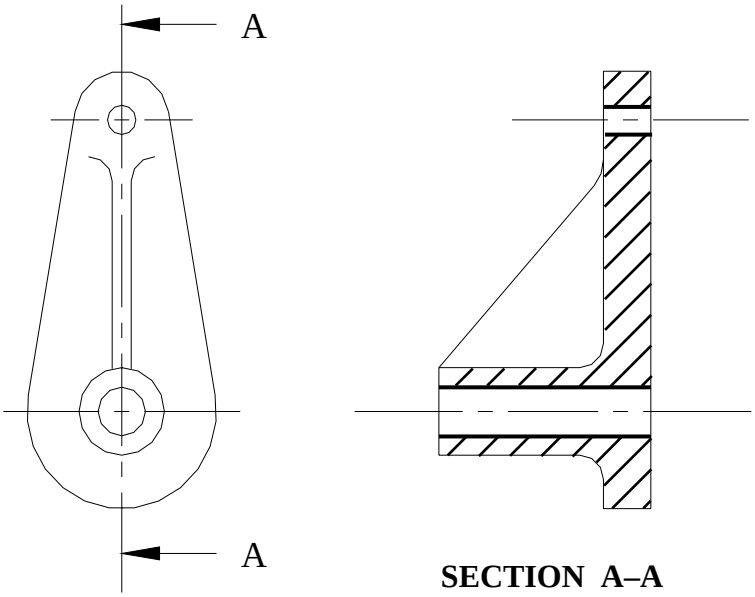
Question	% A	% B	% C	% D	Comments
1	6	10	14	70	
2	9	65	7	20	
3	93	1	2	4	
4	26	32	30	12	Question 4 required knowledge of the various types of transducers and the practical applications for each type. Option B would be the most common use for a piezo electric device.
5	92	4	1	3	
6	3	2	81	14	
7	9	16	21	54	
8	3	74	14	9	
9	60	24	10	6	
10	30	54	13	3	
11	18	8	14	60	
12	27	45	24	4	This question should have been straightforward for students who had been given practical training in the use of a voltmeter to measure voltage.
13	4	16	76	4	
14	20	77	1	1	Option B (short) is what causes excessive current, not what excessive current results in, which is an open circuit (option A). Perhaps student training should explain more concisely the role of protective devices.
15	2	5	80	12	

The multiple-choice section of the exam was answered reasonably well by most students.

Section B – VBN 773 Produce engineering sketches and drawings

Question 1

Marks	0	1	2	3	Average
%	78	17	5	0	**0.3**



SECTION A–A

One mark each was allocated for:

- holes drawn in solid lines and not sectioned
- correct section lines
- correct labelling (Section A–A).

Most students appeared to have little knowledge of what a section view is.

Question 2

Marks	0	1	Average
%	73	27	**0.3**

Third-angle projection

A surprisingly large number of students did not know what this basic drawing symbol stood for.

Questions 3a–c.

Marks	0	1	2	3	4	Average
%	4	21	8	64	3	**2.4**

3a.
M4 (4 mm was also accepted)

3b.

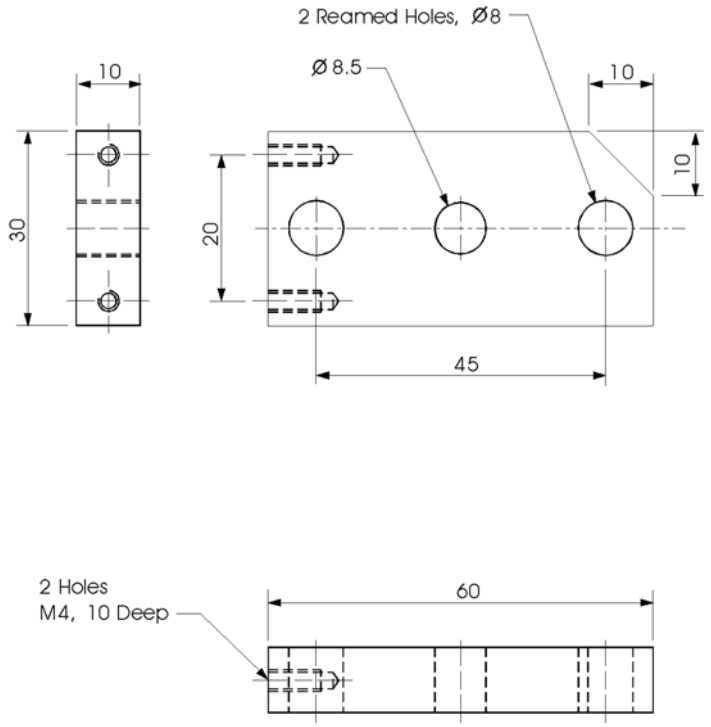
- maximum 60.25 mm
- minimum 59.75 mm

3c.
7.8–7.9 mm

Most students selected a drill size that was much too small, demonstrating a lack of understanding of reaming.

Question 4

Marks	0	1	2	3	4	5	6	7	Average
%	13	15	14	22	22	10	4	1	**2.7**



Marks were allocated for:

- correct views in third angle projection
- hidden detail correctly shown
- use of conventional drawing systems (correct line types, placement of dimensions, etc.) as well as the general layout and neatness of the sketch.

Most students correctly sketched in the views using third-angle projection. Marks were lost when students left out dimensions, or over dimensioned (that is, dimensioning the same feature two or three times in different views).

Section C – VBN 776 Using basic engineering concepts to plan the manufacture of engineering components

Question 1a.

Marks	0	1	2	Average
%	55	35	10	**0.6**

Acceptable answers included any two of:

- the article made will meet the required quality standards
- operations decided will be most efficient
- the tools and equipment can be organised in advance
- the progress of work can be planned and organised to meet the delivery date
- the cost of manufacture will be as low as possible.

A lot of students simply wrote ‘so you have a plan to work to’, which did not demonstrate the reason for the plan.

Question 1b.

Marks	0	1	2	3	Average
%	36	38	19	7	**1.0**

1bi.
Any size between 211 and 215 mm was accepted.

1bii.
As a run-out groove when threading (so the handle screws up, flat against the face was also accepted).

1biii.
A grooving tool or parting tool (just 'lathe tool' was not accepted).

Question 1c–d.

Marks	0	1	2	Average
%	30	45	24	**0.9**

1c.
Mild steel

Some students wrote brass, getting it confused with the head ends.

1d.
Answer needed to make some reference to the tap being supported by the tailstock.

Question 1e.

Marks	0	1	2	Average
%	29	24	47	**1.2**

1ei.
Either of:

- because it won't damage the work being hit
- because it is a soft metal.

1eii.
Acceptable answers included:

- aluminium
- nylon
- lead
- rubber.

Question 2

Marks	0	1	2	3	4	5	6	Average
%	29	25	29	13	2	2	1	**1.5**

One mark was allocated for each row.

The work holding method for the lathe needed to specify a four jaw chuck. All critical equipment and cutters to complete the job needed to be specified.

Operational planning was an obvious area of weakness by the majority of students.

Op. No.	Operation Description	Type of Machine	Work holding method	Equipment/cutters
1	Check Size	NA*	Hand	Steel rule
2	Clean and debur	NA*	Vice	File
3	Face off one end. Turn ∅18 and chamfer one end	Centre lathe	4 jaw chuck	Either of: • right hand roughing tool • right hand turning tool.
4	Drill and countersink hole for M12 thread	Centre lathe	4 jaw chuck	• Centre drill • ∅ 10.2 drill or tapping drill • Countersinking tool
5	Tap M12 thread	Centre lathe	4 jaw chuck	• M12 tap • Tap wrench
6	Repeat steps 3–5 for other end	NA*	NA*	NA*
7	Mark out hole for M10 in preparation for drilling	NA*	Either of: • marking out table • bench.	Either of: • rule and scriber • vernier height gauge • odd leg callipers. • Centre Punch
8	Drill and countersink hole for M10	Either of: • bench drill • pillar drill.	Drill vice	• Centre drill or pilot drill • ∅ 8.6 drill or tapping drill • Countersink
9	Tap M10 × 1.5 thread	NA*	Either of: • bench vice • machine vice • drill vice.	• M10 tap • Tap wrench Either of: • try square • steel rule • tap in drilling machine.
10	Finish	NA*	Either of: • hand • vice.	• Emery cloth • Smooth file

Section D – VBN 777 Handle engineering materials in a safe and proper manner

Overall, the questions in this section were answered quite well by most students, showing an understanding of safety requirements in the workplace.

Question 1

Marks	0	1	Average
%	29	71	**0.7**

Your own and others around you (just 'your own' was not accepted)

Question 2

Marks	0	1	Average
%	80	20	**0.2**

A plate clamp

Question 3

Marks	0	1	Average
%	34	66	**0.7**

Any one of:

- chain
- webbing
- wire rope ('rope' was also accepted).

Question 4

Marks	0	1	Average
%	12	88	**0.9**

Acceptable answers included cuts from burrs or crushed fingers. Any answer that showed an understanding of the hazards involved was accepted.

Question 5

Marks	0	1	2	Average
%	13	71	16	**1.0**

Any two of:

- the maximum load to be lifted
- when it was last tested
- the date it is due to be retested.

Question 6

Marks	0	1	2	Average
%	29	55	16	**0.9**

Material	Storage location
Drums of solvent	Flameproof cabinet (or similar)
Steel sheet, steel plate or bar stock	In racks

'In a cool dry place' was not accepted as a storage location for drums of solvent.

Question 7

Marks	0	1	Average
%	60	40	**0.4**

The product manufacturer (product supplier was also accepted)

Question 8

Marks	0	1	2	Average
%	21	32	46	**1.3**

Any two of:

- precautions for use
- first aid information
- safe handling and storage
- effects on health
- product ingredients.

Question 9

Marks	0	1	Average
%	9	91	**0.9**

So the correct extinguisher is chosen, or so that time is not wasted searching for extinguishers in case of fire.

Question 10

Marks	0	1	Average
%	10	90	**0.9**

No naked flames (no sparks and other similar answers were also accepted)

Question 11

Marks	0	1	Average
%	2	98	**1.0**

Any two of:

- safety glasses
- gloves
- a face shield
- an apron
- safety boots.

Question 12

Marks	0	1	Average
%	15	85	**0.9**

Any two of:

- keep back straight
- keep load close to body
- lift using legs
- size up the load
- get help if it is too heavy for one person.

Section E – VBN 778 Produce basic engineering components using fabrication and machining techniques

Question 1a.

Marks	0	1	2	Average
%	22	43	35	**1.1**

1ai.
27.64 mm

1aii
2.64 mm.

Consequential errors were not penalised in part ii. Therefore, students who used an incorrect answer from part i. correctly in their calculation for part ii. were awarded the mark for part ii.

Question 1b.

Marks	0	1	2	3	4	Average
%	14	57	21	7	2	**1.3**

1bi.
Either of:

- a slotting cutter
- a side and face cutter.

A considerable number of students answered end mill, not realising that the mill is horizontal.

1bii.
Touch the cutter on the side of the work and move in half cutter plus half work-piece. Position the cutter approximately in middle and measure the distance on each side was also accepted.

The majority of students clearly did not understand the principles in centralising a cutter.

1biii.
Either of:

- a vernier calliper
- an internal micrometer.

A ruler was a common answer which obviously fell short of the accuracy required.

Question 1c–e.

Marks	0	1	2	3	Average
%	34	37	23	6	**1.0**

1c.
Check that the vice (fixed jaw) is square to the table (parallel to the table was also accepted).

1d.
Towards the fixed jaw

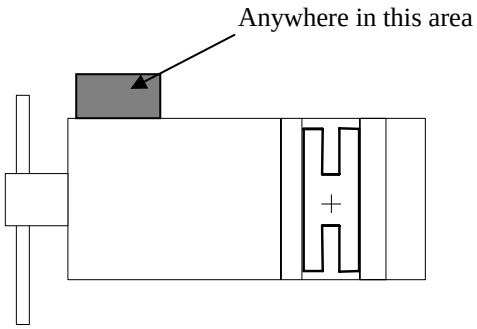
1e.
Check that the body is square to the base of the vice (make sure everything is tight was also accepted).

Question 1f–h.

Marks	0	1	2	3	Average
%	10	29	47	14	**1.7**

1f.
6.8 mm

1g.
The stop should be positioned to prevent the vice from spinning clockwise



1h.
Lift it off the base with parallel strips

Question 1i–j.

Marks	0	1	2	3	Average
%	57	26	11	7	**0.7**

1i.
Dress the wheel

1j.
Drill M8 hole through, then drill a 10 mm hole from the same side. The vice must be clamped so the work doesn't move.

Question 2
2a.

Marks	0	1	2	Average
%	44	5	51	**1.1**

933 RPM

Question 2b.

Marks	0	1	2	3	Average
%	34	39	22	6	**1.0**

2bi.
12.69 mm

2bii.
0.345 mm

The depth of the cut is half the diameter.

2biii.
The cross-slide

Question 2c–d.

Marks	0	1	2	3	Average
%	54	31	14	2	**0.6**

2c.
Clean the anvil and spindle faces (one mark), close the micrometer and check for zero reading (one mark).

2d.
Compound rest (top slide was also accepted)

Question 2e–f.

Marks	0	1	2	Average
%	22	47	31	**1.1**

2e.
D. reduce feed rate

2f.
C. carriage

Question 2g.

Marks	0	1	2	Average
%	4	15	80	**1.8**

Acceptable answers included any two of:

- clothing caught in rotating parts
- leaving the chuck key in the chuck
- cuts from tools or the swarf.

Question 2h.

Marks	0	1	Average
%	48	52	**0.5**

In a vee block or in a vice

Question 3a–d.

Marks	0	1	2	3	4	Average
%	11	20	39	25	4	**1.9**

3a.
Coat the surface with blue stain or texta (witness marking was also accepted)

3b.
A protractor

A bevel gauge was not accepted.

3c.
Dividers

A compass was not accepted.

3d.
A sheet metal bender

Question 3e–h.

Marks	0	1	2	3	4	5	Average
%	5	6	17	32	29	10	**3.0**

3ei.
D

3eii.
B

3f.
Self tapping screws

Some students seemed to overlook the fact that the box cannot be accessed from the inside.

3g.
Centre punched

3h.
Either of:

- stainless steel
- aluminium.

Other suitable materials were also accepted.

Question 4a–b.

Marks	0	1	2	3	Average
%	21	36	27	17	**1.4**

4ai.
The thread is metric.

4aii.
The major diameter of the thread is 10 mm. The diameter of thread was also accepted.

4b.
Acceptable answers included:

- nyloc nuts
- lock-nuts
- spring washers.