

2016 VCE VET Engineering Studies examination report

General comments

The majority of students performed well overall, particularly in the areas of environmental sustainability and material handling.

Whilst most students understood the theory of 5S, some struggled when it came to understanding the practical application of 5S.

With engineering drawings, most did a good job of sketching isometric shapes, but struggled to draw following correct drawing convention such as correct use of centre lines and dimensioning.

Specific information

This report provides sample answers or an indication of what answers may have included. Unless otherwise stated, these are not intended to be exemplary or complete responses.

The statistics in this report may be subject to rounding resulting in a total more or less than 100 per cent.

Section A – Multiple-choice questions

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	9	67	14	10	
2	43	1	18	37	Students struggle with some aspects of engineering drawing standards.
3	24	61	9	7	
4	13	76	5	6	
5	68	5	0	27	
6	0	0	100	0	
7	0	1	1	98	
8	94	3	0	3	
9	8	76	14	2	
10	3	2	94	1	
11	93	3	2	1	
12	9	6	83	2	
13	1	10	12	76	
14	11	28	2	60	
15	6	3	84	7	
16	3	96	0	1	
17	3	0	0	96	
18	8	5	82	6	
19	3	5	2	90	

Question	% A	% B	% C	% D	Comments
20	30	60	3	7	

Section B

Question 1

Marks	0	1	2	3	Average
%	11	30	34	24	1.7

Item	Mechanical device or aid
oxygen cylinder (from room to room)	trolley
20 × 5 kg bags of bolts (from truck to storeroom)	flat trolley/wheelbarrow/forklift with bags on pallet
heavy vice (to be lifted onto milling machine table)	hydraulic lift trolley/hoist

Incorrect responses included devices not suitable for task or 'two-person lift', which did not address the question.

Question 2

Marks	0	1	2	3	Average
%	2	16	38	44	2.3

Acceptable answers included:

- install energy-saving globes/LEDs
- sensors for lights in offices and external lights
- install solar panels
- install skylights in factory
- turn off machines if not in use.

This question was mostly answered well, showing a good understanding of environmental issues.

Question 3a.

Marks	0	1	Average
%	24	76	0.8

The apprentice may be exposing herself to dangerous chemicals and needs to be aware of safe handling practices.

Question 3b.

Marks	0	1	Average
%	25	75	0.8

MSDS

Question 4a.

Marks	0	1	2	3	Average
%	4	8	50	37	2.2

Description of 5S step	5S step
Make sure everything is clean, functioning and ready to go.	Shine
Establish common ways of working to maintain the 5S system.	Standardise
Remove all items from the workplace that are not required for current production.	Sort

Some students confused Sustain with Standardise for the second point.

Question 4b.

Marks	0	1	2	Average
%	4	31	65	1.6

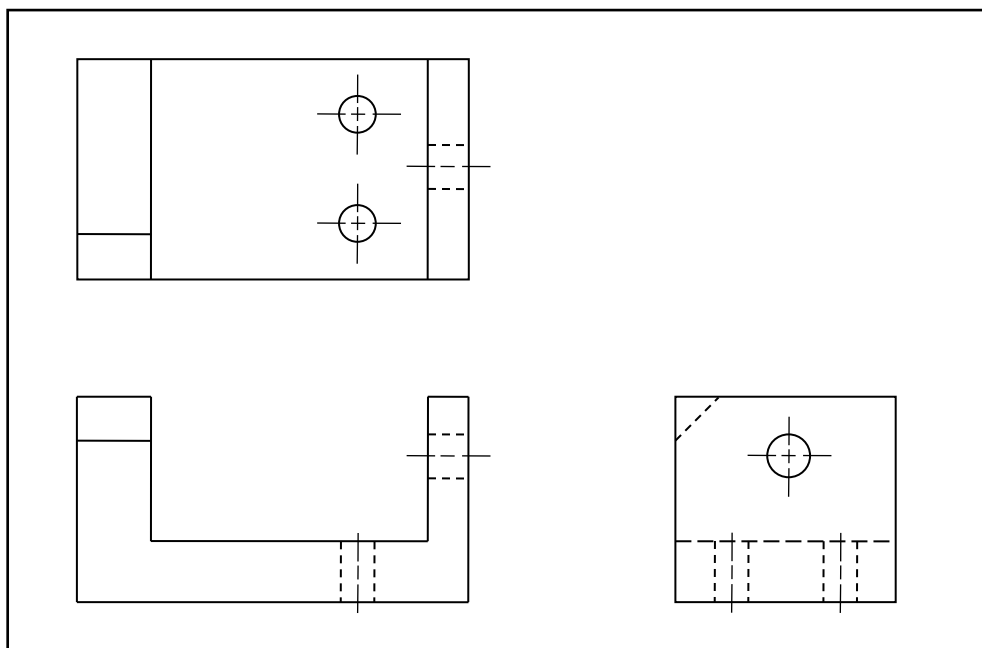
The explanation should have included key points such as:

- safer workplace
- more space
- saves time/less time searching for items
- improved quality of work
- faster production/increased efficiency.

This question was answered well by the majority of students.

Question 5

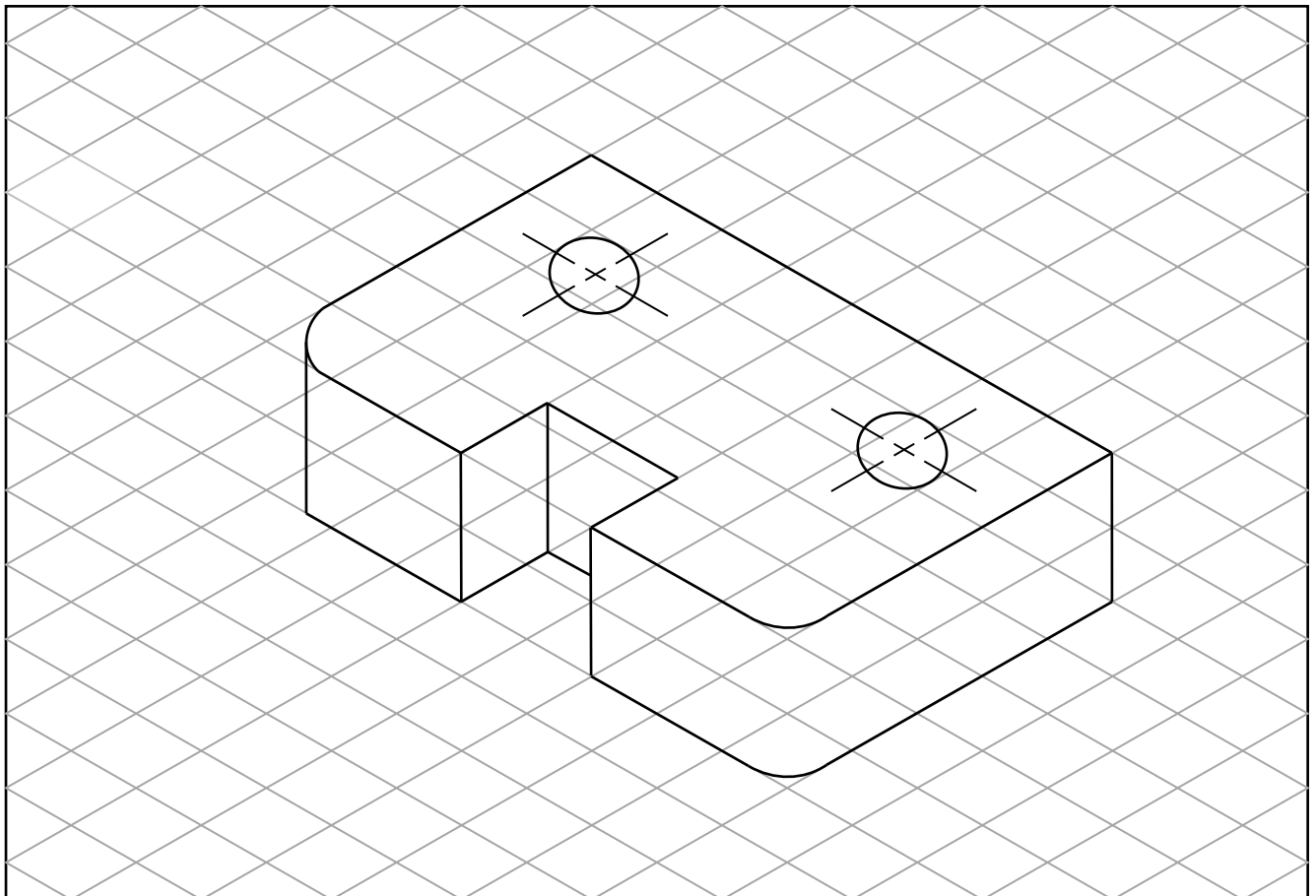
Marks	0	1	2	3	4	5	6	Average
%	10	5	6	13	19	26	21	3.9



Many students appeared not to understand the basics of sketching in third-angle projection. Their responses included incorrect views and a lack of hidden detail and centre lines.

Question 6

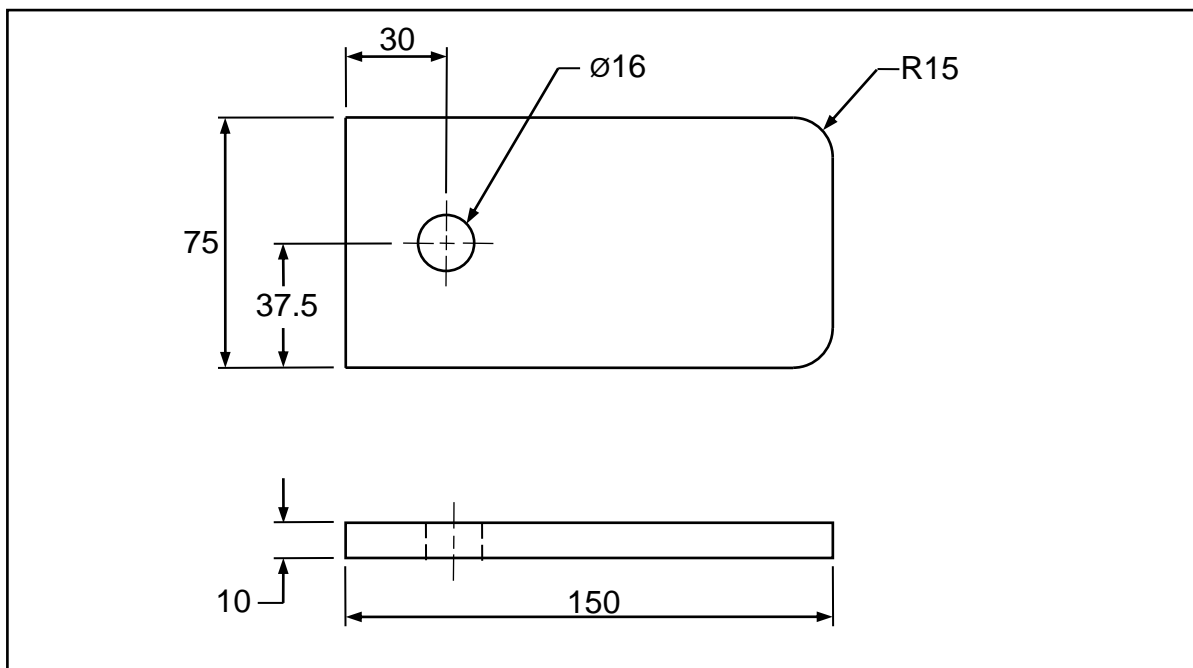
Marks	0	1	2	3	4	5	Average
%	16	3	2	7	22	49	3.7



Most students answered this question well, showing a good understanding of isometric views.

Question 7

Marks	0	1	2	3	4	5	Average
%	4	4	14	29	35	13	3.3



While most students attempted this question and interpreted the sizes correctly, many students did not use correct drawing conventions.

Question 8a.

Marks	0	1	2	Average
%	25	52	22	1

Acceptable answers included (any two of):

- time wasted searching for tools
- duplication of tools
- some tools may not be accessible to everyone
- you do not know if a tool is missing until you go looking for it.

Most students were able to list one disadvantage correctly but struggled to list a second. Some students misread the question and gave advantages instead of disadvantages.

Question 8b.

Marks	0	1	2	3	4	Average
%	4	10	31	39	16	2.6

Items	What should be done during the Sort process
a set of spanners that is used frequently for assembly	keep in area
two screwdrivers, not required for production, that were left in the area by the maintenance team	return to maintenance
a broken power drill that was used to deburr holes before it broke; it has since been replaced with a new one	throw out drill, or tag for repair
an old, large table that has two quality manuals on it and is frequently used as the table where unwanted junk is dumped	keep quality manuals, remove table from area (red tag table)

Responses to this question needed to include what to do during the Sort process – either keep or remove from area. Some students gave details of setting in order and cleaning, which were not required.

Question 8c.

Marks	0	1	Average
%	23	77	0.8

Either:

- colour-code tools
- label tools.

This question was answered well by the majority of students.

Question 8d.

Marks	0	1	2	Average
%	3	32	65	1.6

Acceptable answers included (any two of):

- safety hazards such as tripping
- time wasted/difficult to find items
- lack of space to do your work
- tools and materials easily damaged.

This question was answered well by the majority of students.

Question 8e.

Marks	0	1	2	Average
%	48	23	29	0.8

All the people who use the tools (operators and team leader) should decide. If everyone is involved, correct decisions will be made and everyone will have some ownership of the process.

The majority of students suggested that the decision should be made by the team leader because they are in charge, missing a key point of 5S – to involve the team in its implementation and operation.

Question 8f.

Marks	0	1	2	3	Average
%	38	17	17	28	1.4

Suggestions for sustaining the 5S systems include (any one of):

- conduct regular 5S audits – this would highlight what is working and what needs to be improved, which will help sustain the system
- hold regular 5S meetings – this would keep the team focused on 5S and serve as a way of getting feedback for continued improvement of 5S
- recognise and reward 5S efforts – this would help motivate teams and individuals
- develop a cleaning roster and set specific times to complete roster activities – this would keep on top of what has been achieved and prevent the system from going backwards.

Most students struggled to give a suitable answer to this question. A large number simply suggested that people who do not sustain 5S should be punished or sacked.

Question 9a.

Marks	0	1	Average
%	2	98	1

July

Question 9b.

Marks	0	1	Average
%	13	87	0.9

1020 reject parts for the year

Question 9c.

Marks	0	1	2	Average
%	34	7	60	1.3

2% rejected

This question was answered well by the majority of students.

Question 10

Marks	0	1	2	3	Average
%	1	2	23	74	2.7

Acceptable answers included (any three of):

- not wearing safety glasses
- chuck guard not in place
- long material sticking out of headstock
- cluttered tools on top of headstock.

This question was answered well by the majority of students.

Question 11a.

Marks	0	1	Average
%	33	67	0.7

Steel will rust.

'Steel is heavy' was also accepted.

This question was answered well by the majority of students.

Question 11b.

Marks	0	1	Average
%	35	65	0.7

Aluminium

'Stainless steel' was also accepted.

This question was answered well by the majority of students.

Question 11c.

Marks	0	1	Average
%	87	13	0.2

16 pieces

A large number of students calculated the surface area of one piece and divided the total area of the sheet by the area of one piece, which gave an answer of 17 pieces, but in practice you can only get 16 pieces.

Question 11d.

Marks	0	1	2	Average
%	50	3	47	1

12.5%

Question 11e.

Marks	0	1	2	Average
%	26	6	69	1.4

\$97.50

This question was answered well by the majority of students.

Question 12a.

Marks	0	1	2	Average
%	4	36	60	1.6

Acceptable answers included:

- cut hands from sharp edges (no gloves)
- cut/crushed toes (no safety shoes).

Question 12b.

Marks	0	1	Average
%	16	84	0.9

Either:

- use two-person lift
- use mechanical lifting aid.

This question was answered well by the majority of students.

Question 13

Marks	0	1	2	Average
%	2	17	81	1.8

Acceptable answers included (any two of):

- wear safety glasses
- tighten vice
- clamp vice to drill table
- turn vice so handle is on left, and hold vice
- put guard around drill chuck.

This question was answered well by the majority of students.

Question 14

Marks	0	1	2	3	4	5	Average
%	2	1	10	32	39	16	3.6

Task	Essential PPE items
using an angle grinder	1. safety glasses/face shield
	2. ear muffs
walking through a warehouse	1. hi-vis vest
	2. safety boots/hard hat
welding	1. welding mask
	2. gloves

drilling holes using a bench drill	1. safety glasses/face shield
	2. safety boots
pouring chemicals	1. respirator
	2. face shield

Most students were able to match one item, but a large number of students found difficulty in correctly matching two safety items.

Question 15

Marks	0	1	Average
%	33	67	1.7

Acceptable answers included (one of):

- these are the upper and lower limits
- this is the maximum deviation allowed for the size
- maximum size is 18.05 and minimum size is 17.95.

This question was answered well by the majority of students.

Question 16

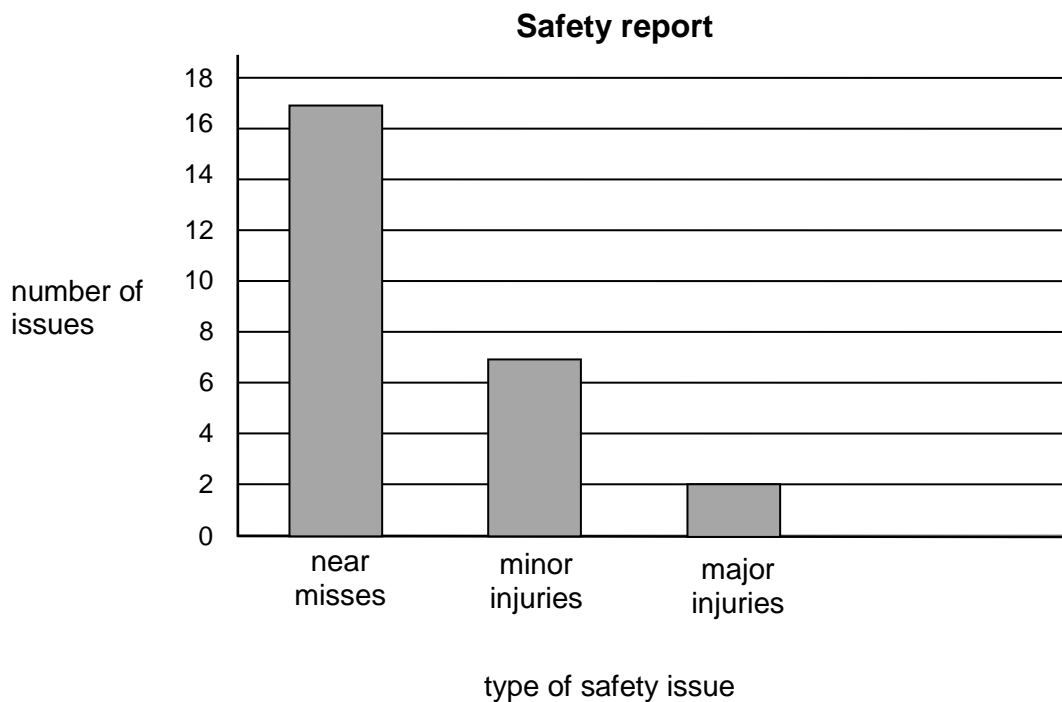
Marks	0	1	2	3	4	5	6	Average
%	4	4	11	19	19	21	22	4

Action	Advantage to company	Potential advantage to environment
installing solar panels	reduces power bills	reduces greenhouse gasses
installing a rainwater tank	cheaper water bills	uses less natural resources/reduces processing or treatment of water
installing ceiling insulation in the office area	reduces heating and cooling costs	reduces greenhouse gasses

While most students attempted this question, some did not complete the entire table. Others confused the advantages between the company and environment.

Question 17

Marks	0	1	2	Average
%	4	6	90	1.9



This question was answered well by the majority of students.

Question 18a.

Marks	0	1	2	Average
%	33	3	64	1.3

936 hours

This question was answered well by the majority of students.

Question 18b.

Marks	0	1	2	Average
%	21	34	46	1.3

Install sensors so lights come on only when needed. This will save on energy bills.

Some students answered 'install LEDs', which did not answer the question.