2018 VCE VET Engineering examination report

General comments

Overall, students performed well on the 2018 examination, with most students attempting the majority of the questions.

Students demonstrated a general knowledge of 5S, but seemed to struggle with detailed application in given scenarios.

Basic sketching of components was handled well, but students seemed to struggle with understanding the fundamentals of Australian Standards, particularly with correct dimensioning practices.

Handling engineering materials and environmental sustainability were dealt with well.

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	% No answer	Comments
1	12	78	2	8	0	
2	26	61	12	2	0	
3	10	7	76	7	0	
4	2	13	2	83	0	
5	9	86	5	0	0	
6	68	18	12	1	1	
7	9	14	15	62	0	
8	11	15	72	3	0	
9	26	14	54	5	0	A hydraulic jack is not a lifting accessory for a block and tackle.
10	11	12	62	15	0	
11	1	96	3	0	0	
12	0	1	7	91	0	
13	1	2	79	17	0	
14	0	2	97	1	0	

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Question	% A	% B	% C	% D	% No answer	Comments
15	10	49	7	33	0	Responses indicated that some students are not familiar with standard welding symbols.
16	6	45	6	42	0	Some students were not clear of the difference between 'Standardise' and 'Sustain'.
17	16	6	12	66	0	Most students chose option D, wear personal protective equipment (PPE), not relating it to the 'hierarchy of control'.
18	4	95	2	0	0	
19	36	24	17	23	0	
20	2	1	84	12	0	

Section B

Question 1a.

Marks	0	1	2	Average
%	5	56	39	**1.4**

Safety issue: Specific safety issues such as 'tripping over wire' were accepted.

5S issue: Specific 5S issues such as 'difficult to find items' and 'item locations not visually marked' were accepted.

The majority of students were able to identify a safety issue; some students struggled with identifying a 5S issue.

Question 1b.

Marks	0	1	Average
%	28	72	**0.7**

Sort

This question was generally answered well.

Question 1c.

Marks	0	1	2	Average
%	28	41	31	**1.1**

Any two of the following (or similar) answers were accepted:

- store grinder in correct location
- label shelving
- rearrange and put similar items together
- put in system for stock control of items
- find best location for each item.

Many students wrote answers that were not related to the 'Set in order' step of 5S.

Question 1d.

Marks	0	1	2	Average
%	20	42	38	**1.2**

Any two of the following (or similar) answers were accepted:

- frequency of use
- who uses the items
- size/weight of item
- space available
- legislative/safety issues relating to item
- not obstructing people or parts movement.

Question 1e.

Marks	0	1	2	Average
%	33	49	18	**0.9**

Any two of the following (or similar) answers were accepted:

- conduct regular 5S audits
- hold regular 5S meetings
- implement cleaning schedule/roster.

Most students were only able to give one correct response.

Question 2a.

Marks	0	1	2	Average
%	57	34	9	**0.6**

Any two of the following (or similar) answers were accepted:

- bending and reaching forward to store stub axles
- repetition
- dropping axle on foot
- cutting hands on sharp edges

A large number of students focused on the machining issues rather than the manual handling issues.

Question 2b.

Marks	0	1	Average
%	77	23	**0.3**

Raise the storage bin off the ground or change the area layout to reduce repetitive bending/twisting.

A large number of students focused on machining safety and did not provide an improvement other than the use of PPE.

Question 3

Marks	0	1	2	Average
%	11	27	62	**1.5**

Any two of the following (or similar) answers were accepted:

- fines
- jail sentence
- closure of business
- ordered to repair damage to the environment.

This question was answered well by the majority of students.

Question 4

Marks	0	1	2	Average
%	6	53	41	**1.4**

- two-person lift
- use lifting aid (hoist, crane, etc.)

Question 5

Marks	0	1	2	3	Average
%	12	20	29	39	**1.9**

Item	Best way to visually mark
set of spanners	shadow board (or similar)
portable welder stored on the floor	lines on floor/photo or sign showing location
small boxes of bolts on a shelf	labels on shelf/photo bolts on shelf

This question was answered well by the majority of students.

Question 6

Marks	0	1	Average
%	49	51	**0.5**

Power or electricity

Some students gave the answer ‘air’ without considering the resource required to produce the compressed air.

Question 7

Marks	0	1	Average
%	70	30	**0.3**

Power usage to run machinery, equipment and lighting

Other answers were also accepted, such as fumes from processes.

A large number of students responded with answers that were very narrowly focused (not necessarily a 'typical factory') or answered too generically (e.g. 'by polluting').

Question 8

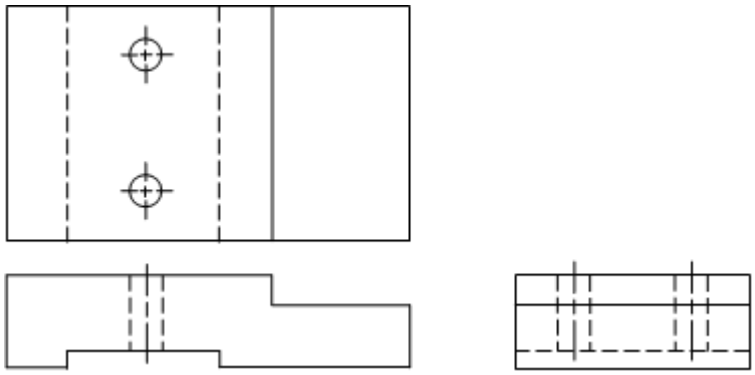
Marks	0	1	2	Average
%	13	36	51	**1.4**

The following (or similar) answers were accepted:

- damage (cuts, fraying, etc.)
- load rating.

Question 9

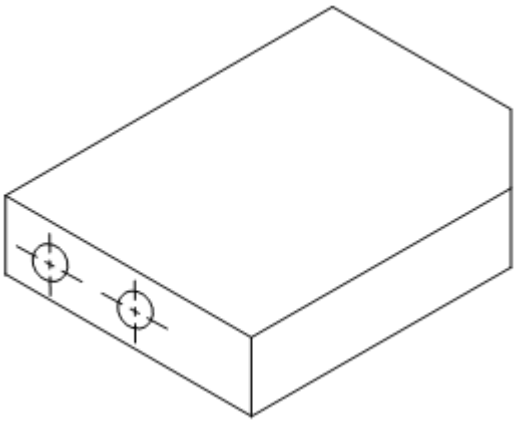
Marks	0	1	2	3	4	5	6	Average
%	4	4	9	21	20	27	15	**3.9**



The majority of students drew the basic views but struggled with views in correct third angle, had incorrect hidden detail or missing centre lines.

Question 10

Marks	0	1	2	3	4	5	Average
%	11	3	5	9	25	48	**3.8**



This was drawn very well by many students.

Question 11

Marks	0	1	2	3	Average
%	18	22	38	22	**1.7**

Examples of acceptable answers included:

- put tools away
- sweep floor
- empty bins
- clean machines/equipment
- throw away off cuts

Some student answers did not relate to the 'daily actions', but more general 5S actions such as 'completing audits'.

Question 12

Marks	0	1	2	3	Average
%	18	29	30	23	**1.6**

Examples of acceptable answers included (three of):

- throw out
- return to store
- place in red tag area
- put in another area that needs item
- sell
- recycle

Most students struggled to give three correct answers.

Question 13

Marks	0	1	2	Average
%	50	7	43	**1**

Acceptable: 320 + 250 + 400 + 540 + 347 = 1857

Rejects: 40 + 50 + 80 + 120 + 33 = 323

Total: 1857 + 323 = 2180

323 / 2180 = 14.8%

The most common error made by students was that they did not divide rejects by the 'total number made', but just divided by the 'total acceptable'.

Question 14a.

Marks	0	1	2	Average
%	81	1	18	**0.4**

Hyp = √300 + 1000

= √1 090 000

= 1044 mm

Plate size = 1044 × 1200

This question was not answered well by the majority of students. Most students took sizes directly from the sketch and did not calculate the angled face.

Question 14b.

Marks	0	1	2	3	Average
%	64	22	6	8	**0.6**

(Sloped face) $1.044 \times 1.2 = 1.2528\ m^2$

(2 ends) $1 \times 1.9 = 1.9\ m^2$

(Back face) $1 \times 1.2 = 1.2\ m^2$

Total area $1.2528 + 1.9 + 1.2 = 4.3528\ m^2$

The majority of students did not take into account the angled side of the two end pieces.

Question 14c.

Marks	0	1	Average
%	69	31	**0.3**

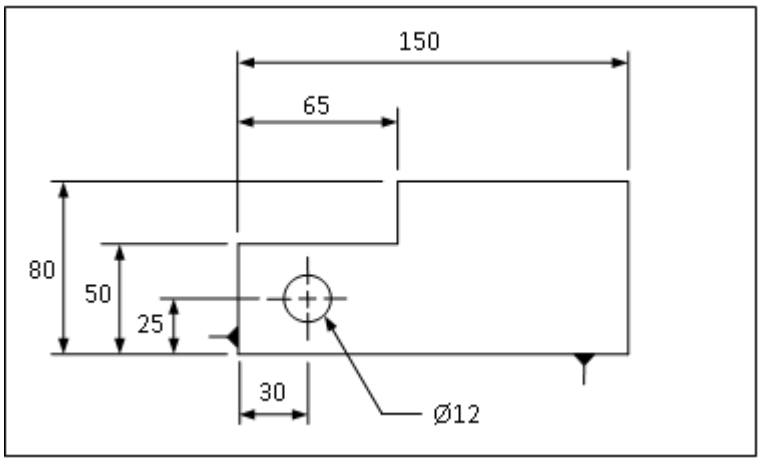
Acceptable answers included:

- plate clamp
- magnetic attachment.

Some students did not seem to understand that the action required ‘an accessory with the crane’ and answered with generic lifting devices.

Question 15

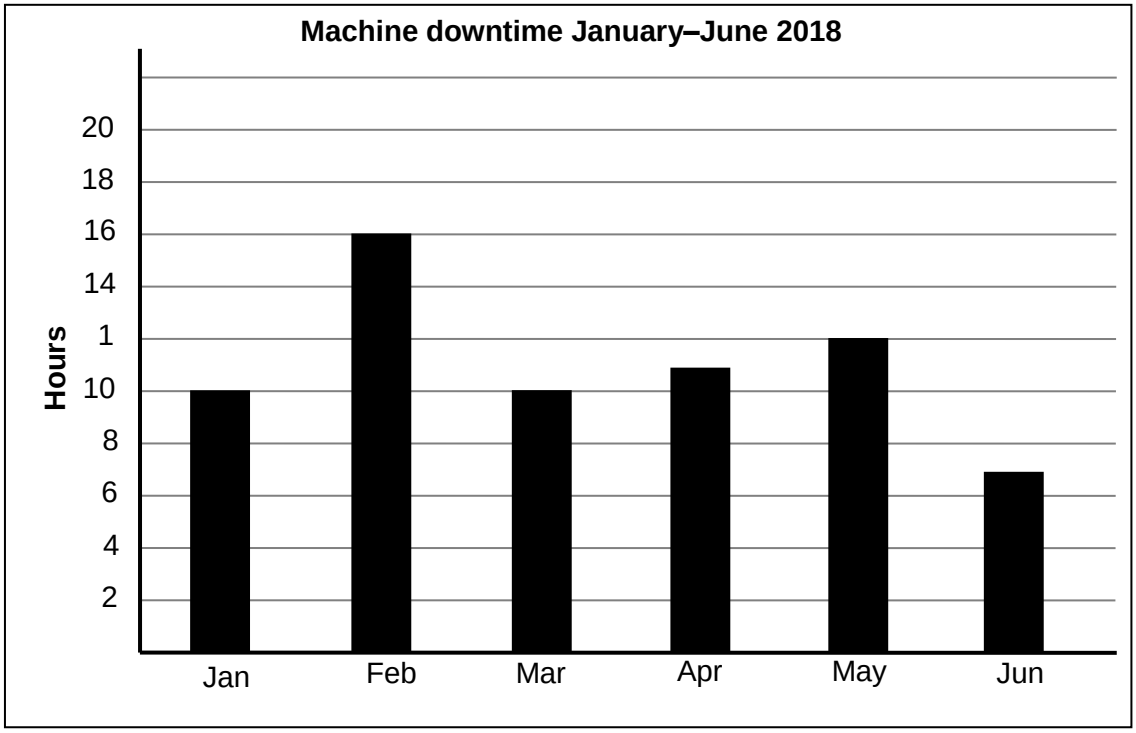
Marks	0	1	2	3	4	Average
%	35	15	20	21	9	**1.5**



Few students fully understood correct dimensioning convention; a large number simply duplicated the dimensions from the question without change.

Question 16

Marks	0	1	2	3	4	Average
%	9	5	7	57	23	**2.8**



This question was answered well overall. The most common error was students graphing the lathe and mill separately and not the combined amount.

Question 17

Marks	0	1	2	Average
%	68	6	26	**0.6**

Min: 0.03

Max: 0.08

This question was attempted by the majority of students, but generally not answered well.

Question 18

Marks	0	1	2	3	4	Average
%	9	6	35	30	19	**2.5**

Safety hazard: weld flash/hot surfaces/fumes

Precaution: welding mask/welding gloves/mask or respirator

Environmental hazard: gas fumes/risk of fire

Precaution: fume extractor/filter/don't weld around flammable material

Students needed to be specific with their answers. Some gave generic answers such as 'wear PPE', but this was not acceptable.

Question 19a.

Marks	0	1	Average
%	72	28	**0.3**

A resource that is renewable and will not run out (or similar)

Some students struggled to give an acceptable definition.

Question 19b.

Marks	0	1	2	Average
%	27	32	40	**1.2**

Sustainable natural resource: water/wind/sun

Non-sustainable natural resource: oil/coal/gas

Question 20

Marks	0	1	2	3	Average
%	25	21	30	24	**1.6**

Waste hierarchy level	Suggested action
re-use	pallets sent back to be reused
recycle	aluminium offcuts/plastic wrap
reduce	less plastic wrap/polystyrene (use alternative)

The majority of students answered this well. The most common error was suggesting an action that did not match the 'hierarchy level'.

Question 21

Marks	0	1	2	3	Average
%	8	23	34	35	**2**

Any three of the following (or similar) answers were accepted:

- turn off equipment/lights when not in use
- install solar panels
- install skylights/more natural lighting
- sensors or timers on lights
- repair compressed air leaks
- purchase energy-efficient equipment.

This question was answered well; however, some students gave answers that were very similar (e.g. turn off lights when leaving and turn off lights if no one is in the room).

Question 22a.

Marks	0	1	Average
%	37	63	**0.7**

Safety Data Sheet

This question was answered well by the majority of students.

Question 22b.

Marks	0	1	2	Average
%	28	18	54	**1.3**

Any two of the following (or similar) answers were accepted:

- name/type of chemical
- hazards of chemical
- safe handling/use of PPE
- safe storage
- safe disposal
- health/emergency response

This question was answered well by the majority of students.

Question 23

Marks	0	1	2	3	Average
%	22	5	6	67	**2.2**

Total area: $35 \times 26 = 910\ m^2$

Dispatch: $5 \times 8 = 40$

Car park: $8 \times 19 = 152$

Office: $4 \times 6 = 24$

$40 + 152 + 24 = 216\ m^2$

Factory: $910 - 216 = 694\ m^2$

This question was answered well by the majority of students.

Question 24a.

Marks	0	1	Average
%	53	47	**0.5**

Pallet truck or walker stacker (or similar)

Some students gave forklift as their response, but this requires a licence.

Question 24b.

Marks	0	1	2	Average
%	29	62	9	**0.8**

Acceptable responses included:

Hazard	Control
boxes falling off	restack boxes/secure boxes

cannot see the path ahead	restack boxes/pull pallet truck
muscle injury from pushing/pulling	use correct posture when handling pallet truck

Students who did not attain full marks gave the same hazard twice (using different words), or gave an unsatisfactory control.