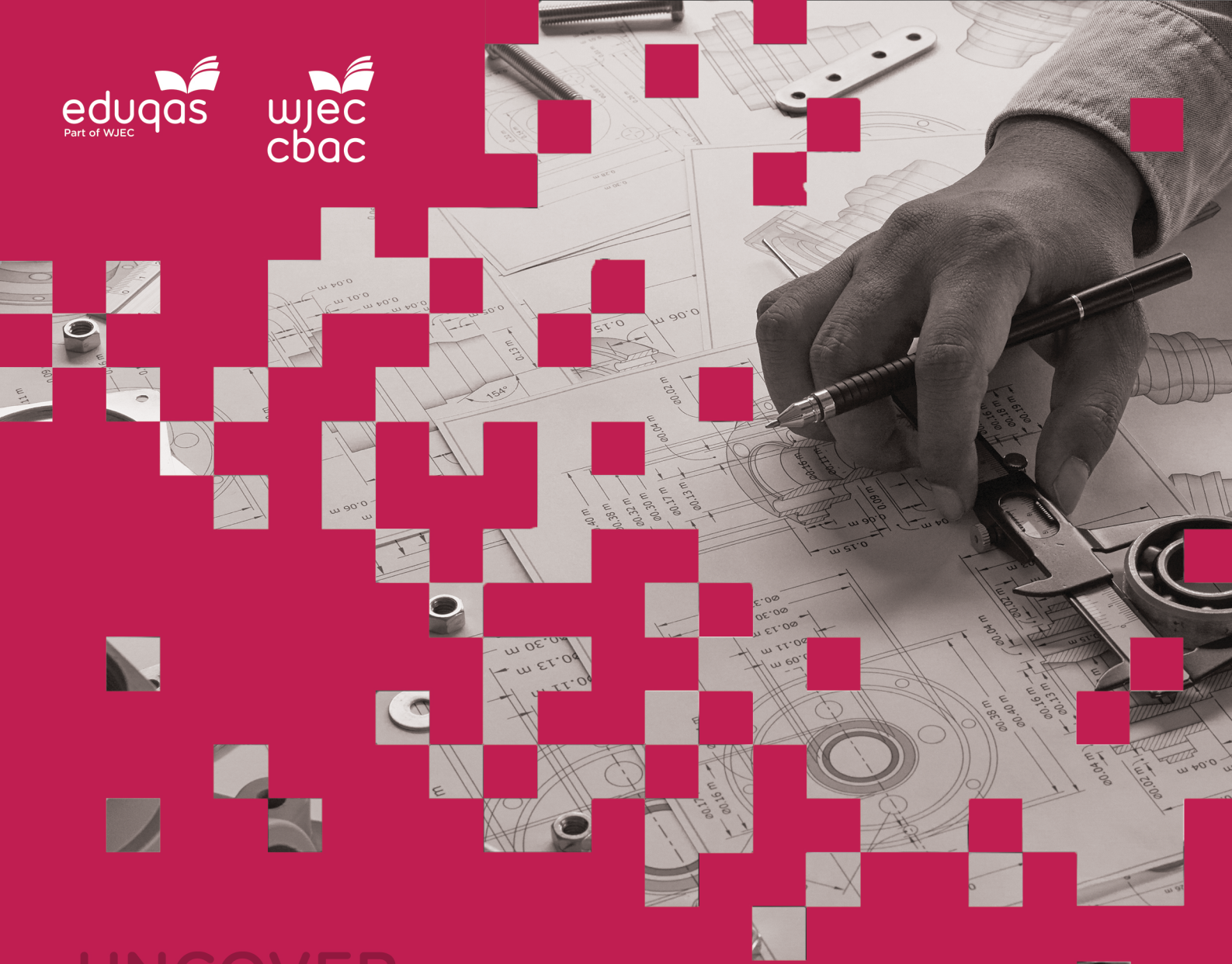

UNCOVER
LEARNER
POTENTIAL

Level 1/2 Vocational Award in

ENGINEERING

(Technical Award)

Teaching from 2022 | Award from 2024

Version 2 - June 2023

SAMPLE ASSESSMENT MATERIALS - UNIT 3

WJEC Level 1/2 Vocational Award in Engineering (Technical Award)

SAMPLE ASSESSMENT MATERIALS

UNIT 3

For teaching from 2022
For award from 2024

Contents

Surname	Centre Number	Candidate Number
Other Names		4

LEVEL 1/2 VOCATIONAL AWARD

ENGINEERING

UNIT 3

Solving Engineering Problems

1 hour 30 minutes

SAMPLE ASSESSMENT MATERIALS

ADDITIONAL MATERIALS

A calculator.

INSTRUCTIONS FOR CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Answer all questions.

Write your name, centre number and candidate number in the spaces at the top of this page.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	20	
2.	27	
3.	23	
4.	10	
Total	80	

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part question.

The total number of marks available is 80.

You are reminded of the need for clear and accurate written communication.

Question 4 provides an opportunity to draw together knowledge and understanding from across the full course of study. You will be rewarded for drawing together knowledge and understanding of different areas of the specification.

*Answer **all** questions.*

Examiner only

1. The pictures below show a 'recumbent road bike'. It is a type of bicycle where the user is lying down on their back while cycling.

(a) (i) The main frame of the recumbent bike is manufactured from square section mild steel.

State **two** reasons for using square section mild steel to manufacture the frame.

Reason 1: [1]

……

……

Reason 2: [1]

……

(ii)

……

State the classification of material that mild steel belongs to. [1]

Classification……

(iii) Complete the table below, stating the type of physical property needed for the named bike part. [3]

Examiner only

Part	Physical property needed
Spokes	……
Tyre	……
Gear cogs	……

(b) The recumbent bike frame has a bent frame and has been manufactured using a jig. [2]

Describe why a jig has been used in the process of bending the frame.

……

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……

(c) Describe **two** structural features of a standard road bicycle. [4]

Structural feature 1:

……

……

Structural feature 2:

……

……

Examiner only

(d) Several tests will be carried out on a bicycle to ensure its safety and its life-expectancy.

(i) Describe the difference between a destructive test and a non-destructive test. [2]

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(ii) Describe, using diagrams and notes, the testing process that has been carried out on the bike spoke for its tensile strength. [4]

Space for diagrams

Examiner only

(iii) Parts of the bike frame must be malleable. [2]

Outline what is meant by 'malleability'.

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2. Below is a picture of a dustpan, made by a pupil in a school workshop. It is made from 1.5mm thick, sheet metal. The handle is made from a 2mm thick, flat metal bar.

(a) (i) Name a suitable metal to use to make the dustpan and state **two** properties that make it a suitable material.

Metal: [1]

……

Property 1: [1]

……

Property 2: [1]

……

(ii) Name a suitable tool to cut the sheet metal to the correct size. [1]

Tool:

……

(iii) Shown below are three tools used in the production of the dustpan. [6]
Complete the table below by correctly naming the tool and stating its use.

Examiner only

Tool	Tool name	Use
	.....	....
	.....	....
	.....	....

Examiner only

(b) The pan and handle are assembled together using a temporary fixing.

Name a suitable temporary fixing for this process. [1]

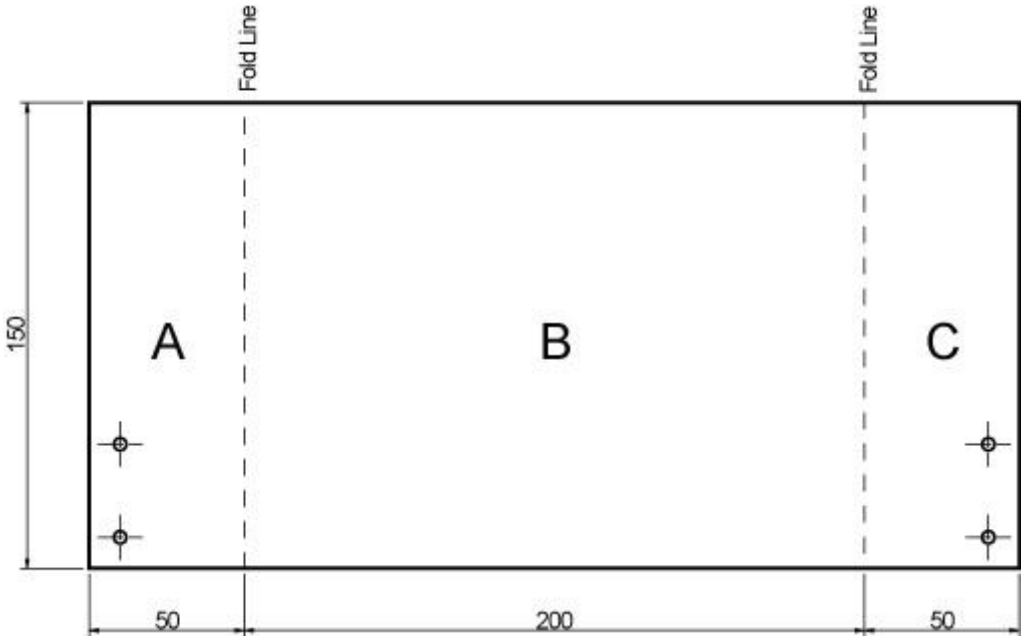
……

……

(c) Using notes and sketches, show the process of using a temporary fixing to join two pieces of sheet metal together. [6]

Examiner only

(d) Shown below is the sheet metal that is to be used to create **part** of the dustpan **before** it has been shaped. Four holes have been drilled for fixings.



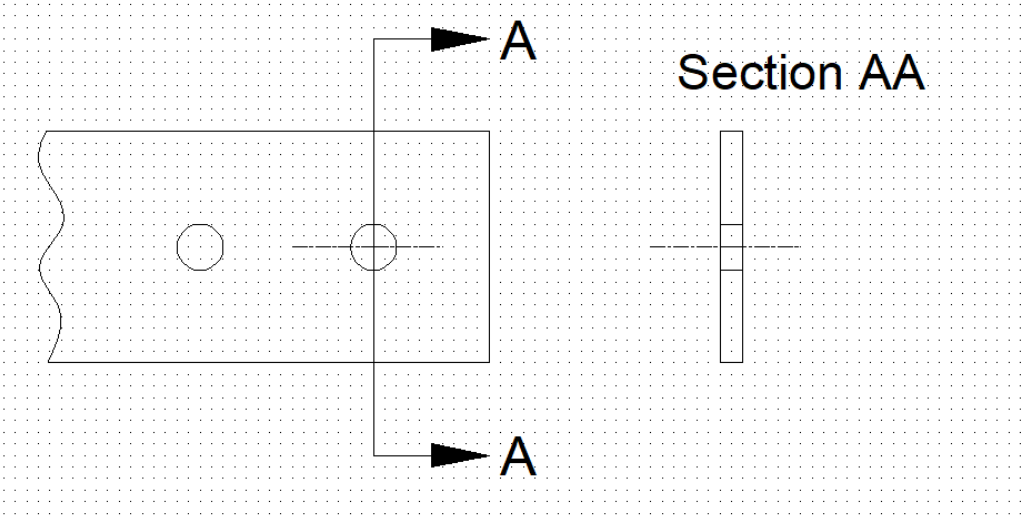
(i) Calculate the total volume of the shape if the holes have a diameter of 4mm and the material is 1.5mm thick. Show your workings. [8]
Round off your answers to 2 decimal places.

Calculation:

Examiner only

(ii) Below is a sectional view of part of the pan handle. [2]

Complete the drawing by showing the solid part of the metal.



3. The picture below shows a typical machine, usually seen in an engineering workshop.

(a) (i) Name the machine shown and describe its primary purpose. [2]

Name of machine:

.....

.....

Primary purpose:

.....

.....

(ii) Complete the following table, stating **three** hazards of using this machine, and **three** control measures in order to use it safely. [6]

Examiner only

Hazard	Control Measure
1: …… ……	1: …… ……
2: …… ……	2: …… ……
3: …… ……	3: …… ……

(iii) Name the process of identifying the dangers of using a tool or piece of machinery in the workshop, and the control measures involved in working safely. [1]

……

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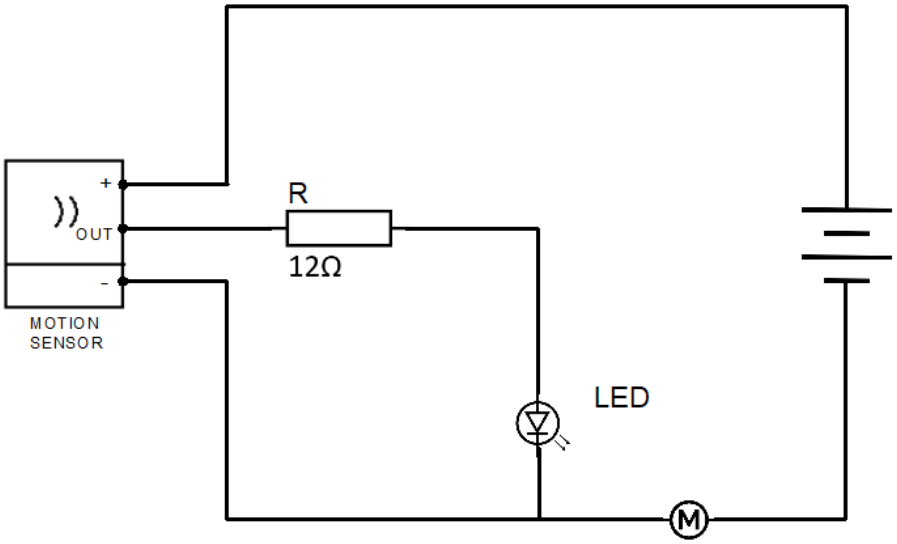
Examiner only

Below is a picture of a scary feature found in a haunted house, at a funfair. As people walk past the feature, it activates a motion sensor.

The motion sensor is at the front of the feature. When someone walks past the sensor, the arms move around, and the eyes light up.

Here is part of the electronic circuit.



(b) The current running through the circuit is 0.5 amps. [3]
Using Ohms Law, calculate the voltage needed to run the circuit. Show your workings.

Examiner only

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(c)

(i) The cost of a blank 200mm x 150mm circuit board is £3.60. [2]
Calculate how many 30mm x 40mm boards can be manufactured from a single blank circuit board.

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The cost of the components for the electronic circuit are shown below: [3]

Examiner only

Component	Cost (per single unit unless otherwise stated)
Motion sensor	£0.75
Battery	50p
Motor	£2.75p
LED	60p (per pack of ten)
Resistor	40p (per strip of 20)

(i) Calculate the overall cost to produce one electronic circuit. The circuit includes all components listed in the table above and a blank circuit board. Show your workings.

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(d) Many different materials are used in traditional funfair signage such as metal, wood and plastic frames, fabric, and electronic circuits. Many of the signs include old style glass light bulbs of various colours. [6]

The funfair replaces its signs when they become faulty or start to look worn or untidy. The owner of the funfair would like dispose of old signage in a way that minimises the impact on the environment.

Explain, using examples, how the funfair could dispose of the items that are no longer needed in a way that limits environmental impact.

Examiner only

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4. In Question 4, you will be rewarded for drawing together knowledge and understanding from across your full course of study.

Examiner only

Developments in technology over recent years have had an impact on the home.
Below are pictures of a range of smart speakers used in the home.

Discuss how recent developments in technology have had an impact on the development of the smart speaker and their possible impacts in the home. [10]

Examiner only

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END OF PAPER

Mark Scheme

Guidance for examiners

Positive marking

It should be remembered that candidates are writing under examination conditions and credit should be given for what the candidate writes, rather than adopting the approach of penalising him/her for any omissions. It should be possible for a very good response to achieve full marks and a very poor one to achieve zero marks. Marks should not be deducted for a less than perfect answer if it satisfies the criteria of the mark scheme.

For questions that are objective or points-based, the mark scheme should be applied precisely. Marks should be awarded as indicated and no further subdivision made.

Mark schemes often list points which may be included in candidates' answers. The list is not exhaustive. The inclusion of *'Credit any other valid response.'* (or similar instruction) within mark schemes allows for the possible variation in candidates' responses. Credit should be given according to the accuracy and relevance of candidates' answers.

Appropriate terminology is reflected in exemplar responses in mark schemes. However, unless there is a specific requirement within a question, candidates may be awarded marks where the answer is accurate but expressed in their own words.

Banded mark schemes

For band marked questions mark schemes are in two parts: the indicative content and the assessment grid.

The indicative content suggests the range of points and issues which may be included in candidates' answers. It can be used to assess the quality of the candidate's response. As noted above, indicative content is not intended to be exhaustive and candidates do not have to include all the indicative content to reach the highest level of the mark scheme.

However, to reach the highest level of the mark scheme a candidate must meet the requirements of the highest mark band. Where a response is not creditworthy, that is, it contains nothing of any significance to the mark scheme, or where no response has been provided, no marks should be awarded.

The marking of banded mark questions should always be positive. This means that, for each candidate's response, marks are accumulated for the demonstration of relevant skills, knowledge and understanding; they are not deducted from a maximum on the basis of errors or omissions.

Examiners should first read and annotate the candidate's answer to pick out the evidence that is being assessed in that question. The mark scheme can then be applied. This is done as a two-stage process.

Stage 1 – Deciding on the band

Beginning at the lowest band, examiners should look at the candidate's answer and check whether it matches the descriptors for that band. If the descriptors at the lowest band are satisfied, examiners should move up to the next band and repeat this process for each band until the descriptors match the answer.

If an answer covers different aspects of different bands within the mark scheme, a 'best fit' approach should be adopted to decide on the band and then the candidate's response should be used to decide on the mark within the band. For instance, if a response is mainly in band 2 but with a limited amount of band 3 content, the answer would be placed in band 2, but the mark awarded would be close to the top of band 2 as a result of the band 3 content.

Examiners should not seek to mark candidates down as a result of small omissions in minor areas of an answer.

Stage 2 – Deciding on the mark

During standardising (the marking conference), detailed advice from the Principal Examiner on the qualities of each mark band will be given. Examiners will then receive examples of answers in each mark band that have been awarded a mark by the Principal Examiner. Examiners should mark the examples and compare their marks with those of the Principal Examiner.

When marking, examiners can use these examples to decide whether a candidate's response is of a superior, inferior, or comparable standard to the example. Examiners are reminded of the need to revisit the answer as they apply the mark scheme in order to confirm that the band and the mark allocated is appropriate to the response provided.

Differentiation within our mark schemes

The following grid demonstrates our starting point to formulating our mark schemes. These are used in order to ensure differentiation between our bands. Mark schemes will use this table as the basis for the assessment of each question but will reflect the specific demands of the question.

Band Descriptor	AO1	AO2	AO3
Excellent	• Aware of a wide range of detailed and accurate knowledge. • Demonstrates fully developed understanding that shows relevance to the demands of the question. • Effective and precise use of terminology.	• Knowledge and understanding is consistently applied to the context of the question/task. • Practical skills are consistently and effectively applied and are of a high standard. • Is able to form a fully developed and thorough interpretation that is fully accurate.	• Analysis and evaluation skills are used in a highly effective way. • Evidence is selected to construct an effective and balanced argument. • Detailed and substantiated evaluation that offers secure judgements leading to rational conclusions.
Very Good Good	• Has a range of detailed and accurate knowledge. • Demonstrates well developed understanding that is relevant to the demands of the question. • Precise use of terminology.	• Knowledge and understanding is applied to the context of the question/task. • Practical skills are effectively applied and are of a high to medium standard. • Is able to form a developed interpretation that is mostly accurate.	• Analysis and evaluation skills are used in an effective way. • Evidence is selected to construct a developed argument, that may not be presented in equal measure. • Detailed evaluation that offers generally secure judgements, with some link between rational conclusions and evidence.
Satisfactory	• Includes accurate knowledge. • Demonstrates sound understanding that is relevant to the demands of the question/task • Generally precise use of terminology.	• Knowledge and understanding is mainly applied to the context of the question/task. • Practical skills are appropriately applied and are of a medium standard. • Is able to form a sound interpretation that is generally accurate.	• Analysis and evaluation skills are used in an appropriate and sound way. • Evidence is selected to construct a sound argument OR • Evidence is selected to construct a detailed one-sided argument. • Evaluation that offers some judgements, with some link between conclusions and evidence.

Basic	• Shows some accurate knowledge. • Demonstrates partial understanding that is relevant to the demands of the question. • Some use of appropriate terminology.	• Knowledge and understanding is partially applied to the context of the question/task. • Practical skills are of a medium to low-level standard. • Is able to form some interpretation that shows some accuracy.	• Analysis and evaluation skills are used in a suitable way with a sound level of competence but may lack precision. • Evidence is selected to construct a one-sided argument • Evaluation that offers generalised judgements and conclusions, with minimal use of evidence.
Limited	• Limited knowledge with some relevance to the topic or question. • Little or no development seen. • Very little or no use of terminology.	• Knowledge and understanding is applied in a minimal manner to the context of the question/task. • Practical skills are of a low-level standard. • Can only form a simple interpretation, if at all, with very limited accuracy.	• Analysis and evaluation skills are used with limited competence. • Unsupported evaluation that offers simple or no judgements/conclusions.

When you look at each of our mark schemes, each band has a sequence of performance descriptors. The descriptors work like a ladder: from a bottom rung, to a top. The lower-level band 'Limited' is the simplest descriptor in terms of candidates' performance. The descriptors progress through the grid to the more challenging aspect of that assessment objective. It's important to note that not all questions will use every bullet point listed in the table above, however candidates should demonstrate **all of the requirements** that are included in the published mark schemes in order to achieve full marks at a particular level. If a candidate gets full marks at a particular level, markers should see whether they're also demonstrating any of the requirements from the next level up. Often candidates will achieve some of the descriptors at one level, but not all of them. In this case, apply a best fit principle.

Further information on how the mark schemes for our Vocational Awards have been constructed, including information on the use of the mark bands for Excellent, Very Good and Good can be found in the Vocational Awards Administration Guide.

Question		Answer	AO1	AO2	AO3	Total Mark
1.	*The pictures below show a 'recumbent road bike'. It is a type of bicycle where the user is lying down on their back while cycling.*					
	(a)(i) The main frame of the recumbent bike is manufactured from square section mild steel. *State two reasons for using square section mild steel to manufacture the frame.*		2			2
		Award **one** mark for each correct reason (up to a maximum of **two** marks) for example: • good strength to weight ratio • can easily be welded together • a good finish can be applied to the surface • readily available in stock form • can be cut easily. Credit any other valid response.				
	(ii)	*State the classification of material that mild steel belongs to.*	1			1
		Award **one** mark for stating the correct classification: • Ferrous				
	(iii)	*Complete the table below, stating the type of physical property needed for the named bike part.*	3			3
		Award **one** mark for each correct physical property: Spokes – tension or compression Tyre – elasticity Gear cogs – corrosive resistance Credit any other valid response.				
	(b) *The recumbent bike frame has a bent frame and has been manufactured using a jig.* *Describe why a jig has been used in the process of bending the frame.*		2			2
		Award **one** mark for a basic description of why a jig has been used in the process of bending the frame, for example: • By using a jig, a higher level of accuracy can be achieved with the frame • By bending the frame on a jig, the same level of accuracy can be achieved with each made frame • Using a jig allows the frames to be produced more quickly				

		• Using a jig on the frames allows a quicker turnover of parts allowing more to pe produced in a shorter timeframe. Award **two** marks for a developed description of why a jig has been used in the process of bending the frame, for example: • Using a jig allows the frames to be produced accurately and quickly without losing the quality of the frame shape. Credit any other valid response.				

	(c)	*Describe two structural features of a standard road bicycle.*	4			4
		Award **one** mark (up to a maximum of **two** marks) for each basic description of the structural feature of a standard road bicycle, for example: • The bike frame is a structural feature because it carries the weight of the rider • The handlebar stem is a structural feature because it carries the weight of the rider. Award **two** marks (up to a maximum of **four** marks) for each developed description of the structural feature of a standard road bicycle, for example: • The bike frame is a structural feature because it carries the weight of the rider and uses triangulation which makes the frame structurally strong • The handlebar stem is a structural feature because it carries the weight of the rider, and this is transferred through the stem. Candidates may describe structural features such as: • wheel fork • wheel hub • down tube • wheel, tyres and spokes • seat post • crank arm. Credit any other valid response.				

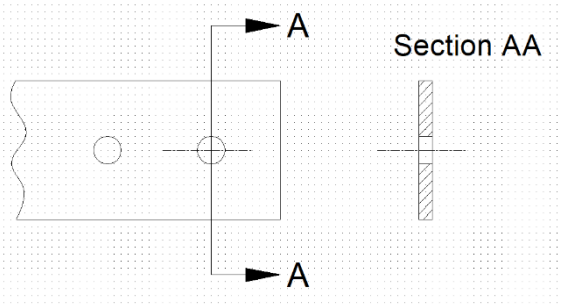
	(d)	*Several tests will be carried out on a bicycle to ensure its safety and its life-expectancy.*				
	(i)	*Describe the difference between a destructive test and a non-destructive test.*	2			2
		Award up to **two** marks for stating the correct difference between the two types of tests that includes an accurate description of **both** types of tests: • destructive test - a material/product is continually tested until it fails or breaks • non-destructive test - a product is continually tested, but not to the point of failure. Award a maximum of **one** mark if the definition describes only one of the tests. Credit any other valid response.				
	(ii)	*Describe, using diagrams and notes, the testing process that has been carried out on the bike spoke for its tensile strength.*	4			4
		Award up to **two** marks for the quality of the sketches, and up to **two** marks for the quality of notes. Sketches: Award **two** marks for clear sketches that show a spoke being held in a clamping device, with some method of pulling it on the other end. There should be a measuring device that measures the breaking point of the spokes. There should also be a method of measuring the amount of tension in the spoke. Award **one** mark for a simple sketch that is missing some of the important information, such as the clamping device. Notes: Award **two** marks for a clear description of what the sketches show, including a description of the purpose of the test. All parts are labelled, and the test is clearly understood. Award **one** mark for a simple description of the test. The sketches might only be labelled using single words. Credit any other valid response.				

3.2.3	(iii)	*Parts of the bike frame must be malleable.* *Outline what is meant by 'malleability'.*	2			2
		Award **one** mark for a basic outline of what is meant by malleability, for example: • Malleability is where a material can be pressed or stretched into a different shape. Award **two** marks for a developed outline of what is meant by malleability, for example: • Malleability is the capability of a material to deform under compression, so it is able to be pressed or stretched into a different shape without breaking. Credit any other valid response.				

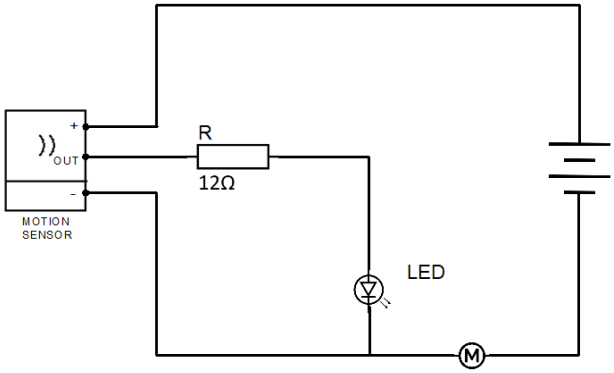
Question		Answer	AO1	AO2	AO3	Total Mark
2.		*Below is a picture of a dustpan, made by a pupil in a school workshop. It is made from a 1.5mm thick, sheet metal. The handle is made from 2mm thick, flat metal bar.*				
	(a) (i)	*Name a suitable metal to use to make the dustpan and state two properties that make it a suitable material.*	3			3
		Award **one** mark for correctly naming a metal, for example: • sheet steel • aluminium. Award **one** mark for naming a correct property (up to a maximum of **two** marks), for example: • light • malleable • easily shaped. • cost effective Credit any other valid response.				
	(ii)	*Name a suitable tool to cut the sheet metal to the correct size.*	1			1
		Award **one** mark for naming a suitable tool to cut the metal sheet, for example: • tinsnips • hacksaw • guillotine. Credit any other valid response.				
	(iii)	*Shown below are three tools used in the production of the dustpan.* *Complete the table below by correctly naming the tool and stating its use.*	6			6
		Award **one** mark for correctly naming each piece of equipment, and **one** mark for each correct use. Name — Purpose Scriber: — To mark out metal surfaces. Centre punch: — To create an indentation or dimple to the surface of the metal to mark the centres of the holes or circles. Engineer's square: — Used with a scriber to mark out lines at 90° off a straight edge. Credit any other valid response.				

	(b)	*The pan and handle are assembled together using a temporary fixing.* *Name a suitable temporary fixing for this process.*	1			1
		Award **one** mark for correctly stating the name of a suitable temporary fixing, for example: • mushroom head rivet • nut and bolt • machine screw. Credit any other valid response.				
	(c)	*Using notes and sketches, show the process of using a temporary fixing to join two pieces of sheet metal together.*		6		6
		Award up to a maximum of **three** marks for the sketching, and a up to a maximum of **three** marks for the notes. Quality of sketching: • award **one** mark for a simple solution that includes a single sketch showing the process of using one of the temporary fixings to join two pieces of sheet metal together that is accurate • award **two** marks for an appropriate solution that includes more than one sketch showing the process of using one of the temporary fixings to join two pieces of sheet metal together that is accurate • award **three** marks for a wholly appropriate solution that includes a detailed set of sketches showing the process of using one of the temporary fixings to join two pieces of sheet metal together that is detailed and accurate. Quality of notes: • award **one** mark for a few single word annotations that are largely accurate • award **two** marks for simple annotations that are accurate • award **three** marks for detailed annotations that are accurate. Responses may include sketches showing: • two pieces of sheet metal • a temporary fixing placed through drilled holes • a metalwork vice • hand tools required • detailed notes describing each step. Credit any other valid response.				

	(d)	*Shown below is the sheet metal that is to be used to create part of the dustpan before it has been shaped. Four holes have been drilled for fixings.*				
3.4.1	(i)	*Calculate the total volume of the shape if the holes have a diameter of 4mm and the material is 1.5mm thick. Show your workings.* *Round off your answers to 2 decimal places.*		8		8
		Award up to **8 marks** for relevant steps in the calculation as follows: Award 1 mark for: • correct calculation of part A (first vertical rectangle): area of a rectangle 50 x 150 = 7 500 [1] • correct use of πr^2 to calculate the area of one hole [1] • correct calculation: 3.14 x 2 x 2 = [1] • correct total = 12.56 [1] • correct calculation of four holes = 12.56 x 4 = 50.24 [1] • correct calculation of the area of large rectangle: (B) 200 x 150 = 30 000 [1] • correct calculations: [15 000 + 30 000] - 50.24 = 44 949.76 [1] Volume = 44 949.76 x 1.5 = 67 424.64mm^3 [1] Do not penalise for any errors carried forward. Credit should be given where it is clear that an appropriate mathematical method has been used.				

		Below is a sectional view of part of the pan handle.				
	(ii)	*Complete the drawing by showing the solid part of the metal.*		2		2
		Award **two** marks for a completed drawing that shows the correct shading in the two rectangles (top and bottom rectangles) on the drawing labelled AA using diagonal hatched lines.  Award **one** mark for a completed drawing that shows: • one correct rectangle shaded using diagonal hatched lines • two correct rectangles shaded, not using diagonal hatched lines.				

Question		Answer	AO1	AO2	AO3	Total Mark
3.	*The picture shows a typical machine, usually seen in an engineering workshop.*					
	(a)(i)	*Name the machine shown and describe its primary purpose.*	2			2
		Award **one** mark for the correct name of the machine: • pillar drill • machine drill • pedestal drill. Award **one** mark for the correct purpose of the machine: • to drill holes into different materials. Credit any other valid response.				
	(ii)	*Complete the following table, stating three hazards of using this machine, and three control measures in order to use it safely.*	6			6
		Award **one** mark (up to a maximum of **three** marks) for each correct hazard of using the machine stated, for example: • debris (Swarf) projects into the user's eyes • injury to fingers/hand • user's tie/long hair gets caught in the drill/chuck/spindle • injury to others nearby. Award **one** mark (up to a maximum of **three** marks) for each correct control measure: • user should wear safety goggles / glasses • user should keep fingers/hands away from moving parts • user should use a machine vice to hold the work • loose clothing should be tucked away • long hair should be tied back • ensure that no-one is nearby when operating the machine.				
	(iii)	*Name the process of identifying the dangers of using a tool or piece of machinery in the workshop, and the control measures involved in working safely.*	1			1
		Award **one** mark for correctly naming the process of identifying the dangers of using a tool or piece of machinery in the workshop, and the control measures involved in working safely: • Risk assessment.				

		Below is a picture of a scary feature found in a haunted house, at a funfair. As people walk past the feature, it activates a motion sensor. *There is a motion sensor at the front of the feature. When someone walks past the sensor, the arms move around, and the eyes light up.* *Here is part of the electronic circuit.*  				
	(b)	*The current running through the circuit is 0.5 amps.* *Using Ohms Law, calculate the voltage needed to run the circuit. Show your workings.*		3		3
		Award up to **three** marks for the calculation as follows: • using the correct units of measurement [1] • correct calculation of: V = O.5amps x 12 Ohm resistance [1] • correct answer of: V = 6v / 6 volts [1] Do not penalise for any errors carried forward. Credit should be given where it is clear that an appropriate mathematical method has been used.				
	(c)	*(i) The cost of a blank 200mm x 150mm circuit board is £3.60. Calculate how many 30mm x 40 mm boards can be manufactured from a single blank circuit board.*		2		2
		Award up to **2 marks** for relevant steps in the calculation as follows: Calculating the area of the full and desired boards: [1] • the area of blank board 200 x 150 = 30,000mm2 • the area of required circuit 30 x 40 = 1,200mm Calculating how many smaller boards can be manufactured: • 30,000 / 1200 = 25 [1] Do not penalise for any errors carried forward. Credit should be given where it is clear that an appropriate mathematical method has been used.				

		(ii) Calculate the overall cost to produce one electronic circuit. The circuit includes all components listed in the table above and a blank circuit board. Show your workings.		3		
		Award up to **3 marks** for relevant steps in the calculation as follows: Calculating the cost of individual components from packs: [1] • the LED 60/10 = 6p • the resistor 40/20 = 2 Adding component costs: [2] • the motor = £2.75p + single LED £0.06p + Single resistor £0.02p, battery £0.50p, sensor £0.75p, circuit board £0.24p • correct Total: £4.32 Do not penalise for any errors carried forward. Credit should be given where it is clear that an appropriate mathematical method has been used.				

	(d)	*Many different materials are used in traditional funfair signage such as metal, wood and plastic frames, fabric, and electronic circuits. Many of the signs include old style glass light bulbs of various colours.* *The funfair replaces its signs when they become faulty or start to look worn or untidy. The owner of the funfair would like dispose of old signage in a way that minimises the impact on the environment.* *Explain, using examples, how the funfair could dispose of the items that are no longer needed in a way that limits environmental impact.*		6		6
		Indicative content: • candidates may discuss issues relating to disposal and recycling • candidates may discuss issues relating to the significance of sustainability • the displays could be repaired, lengthening their life span • constituent parts from other broken displays could be used to repair the damaged ones • the displays may be discarded because they cannot be repaired and replaced with new ones • replacing the displays could stem from 'wear and tear', in being moved around constantly, while the funfair is touring • the displays may be broken down to their constituent parts and recycled, which would be good for the environment • flat wood/metal panels could be renovated for use in new exhibits • electrical cables could be tested and reused or sent for recycling • ferrous and non -ferrous metals used in gears, wheels, etc. could be melted and reused. Credit any other valid response.				
Band		AO2: *Apply skills (including practical skills), knowledge and understanding in a variety of contexts and in planning and carrying out investigations and tasks.*				
3		5-6 marks A very good response which demonstrates: • a highly effective and detailed explanation of how the funfair could dispose of the items that are no longer needed in a way that limits environmental impact • consideration of a wide range of possibilities effectively applied to the context of the funfair				

2	**3-4 marks** A good response which demonstrates: • an effective explanation of how the funfair could dispose of the items that are no longer needed in a way that limits environmental impact • consideration of a range of possibilities that are applied to the context of the funfair
1	**1-2 marks** A basic response which demonstrates: • some explanation of how the funfair could dispose of the items that are no longer needed in a way that limits environmental impact • consideration of some possibilities that are partially applied to the context of the funfair
	0 Marks Response not creditworthy or not attempted.

	4	*Developments in technology over recent years have had an impact on the home.*				
3.1.2		*Discuss how recent developments in technology have had an impact on the development of the smart speaker and their possible impacts in the home.*			10	10
		Indicative content: This question provides learners with the opportunity to draw together knowledge and understanding from across the full course of study. In addition to points related to describing engineering developments, responses should be rewarded for drawing together knowledge and understanding of other areas of the specification such as primary features of engineered products, identifying features of other engineered products and function of the proposed solution. Responses in the higher bands may draw together knowledge and understanding from across the full course of study. • Wi-Fi connectivity in the home – linked to Government initiatives to get every home 'online'. The quality of Wi-Fi internet (broadband, fibre) keeps improving, and is becoming more and more available to homes across the country • homes are becoming more reliant of Wi-Fi and can use it to control multiple systems such as heating, television, security lighting systems, etc. • microprocessor technology and manufacture – the size of microprocessors has become smaller, but their capacity and speed has increased. Microprocessors are very powerful • products are expected to be more functional and powerful but smaller in size, i.e. home computers perform multiple tasks but are now slimline and much lighter, and require less energy				

		• connectivity of other electrical devices to the speaker – some speakers can be linked to the following electrical devices, and can be controlled via mobile phones (television, heating system, home CCTV, lighting system, music system) • the expectation from homeowners is that all devices will be able to be linked and perform tasks effectively and quickly. Developments in connectivity has meant that there is a less reliance on the need for cables • ease of online ordering through the speaker. A person doesn't have to leave the house, these days. Anything they need can be ordered online, through one of these speakers • various functions of the speaker, such as play a radio station, play games with the user, listen to the current news, access tv listings, play music, set reminders, make phone calls, access and amend calendar • products in the home are likely to have more than just one function and the expectation is this technology will develop further. This will also mean that more traditional everyday products in the home could become more and more obsolete such as CD players, radios etc. Credit any other valid response.				

Band	AO3: *Analyse and evaluate information, making reasoned judgements and presenting conclusions.*
4	**9-10 marks** An excellent response which demonstrates: • well-developed and balanced discussion that covers a wide range of ideas • a fully considered discussion of the possible impacts in the home • perceptive and rational judgements, with clear and relevant links between conclusions and evidence.
3	**6-8 marks** A good response which demonstrates: • developed discussion that covers a range of ideas that may not be presented in a balanced way • a considered discussion of the possible impacts in the home • sensible judgements, with relevant links between conclusions and evidence.
2	**3-5 marks** A basic response which demonstrates: • some discussion that covers few ideas that are not balanced • some discussion of the possible impacts in the home • some judgements, with few links between conclusions and evidence.

1	**1-2 marks** A limited response which demonstrates: • a limited number of ideas are discussed without detail • minimal discussion of the possible impacts in the home • few judgements that are not supported by evidence.
	0 marks Response not creditworthy or not attempted

Unit 3: Mapping of questions to specification content and assessment objectives:

Mark Allocation																
			Section										Total	AO1	AO2	AO3
Question			3.1.1	3.1.2	3.1.3	3.2.1	3.2.2	3.2.3	3.3.1	3.3.2	3.3.3	3.4.1	3.4.2				
1	a	i					2							2	2		
		ii				1								1	1		
		iii					3							3	3		
	b									2				2	2		
	c		4											4	4		
	d	i						2						2	2		
		ii						4						4	4		
		iii				2								2	2		
2	a	i				3								3	3		
		ii							1					1	1		
		iii							6					6	6		
	b								1					1	1		
	c								6					6		6	
	d	i										8		8		8	
		ii											2	2		2	
3	a	i							2					2	2		
		ii									6			6	6		
		iii									1			1	1		
	b	i										3		3		3	
	c	i										2		2		2	
		ii										3		3		3	
	d				6									6		6	
4				10										10			10
Total			4	10	6	4	5	8	16	2	7	16	2	80	40	30	10

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Instagram - @WJECforstudents

Email: info@wjec.co.uk
Telephone: 029 2026 5000

eduqas

FOR CENTRES IN ENGLAND:

www.eduqas.co.uk
Facebook - Eduqas
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Instagram - @Eduqasforstudents

Email: info@eduqas.co.uk
Telephone: 029 2026 5465