



**NCFE Level 1/2 Technical Award in Engineering
(603/2963/4)**

Sample 2018

Unit 01 Understand the engineering world

Mark Scheme

Version 1

SAMPLE

This mark scheme has been written by the Assessment Writer and refined, alongside the relevant questions, by a panel of subject experts through the external assessment writing process and at standardisation meetings.

The purpose of this mark scheme is to give you:

- examples and criteria of the types of response expected from a learner
- information on how individual marks are to be awarded
- the allocated assessment objective(s) and total mark for each question.

Marking guidelines

General guidelines

You must apply the following marking guidelines to all marking undertaken throughout the marking period. This is to ensure fairness to all learners, who must receive the same treatment. You must mark the first learner in exactly the same way as you mark the last.

- The mark scheme must be referred to throughout the marking period and applied consistently. Do not change your approach to marking once you have been standardised.
- Reward learners positively giving credit for what they have shown, rather than what they might have omitted.
- Utilise the whole mark range and always award full marks when the response merits them.
- Be prepared to award zero marks if the learner's response has no creditworthy material.
- Do not credit irrelevant material that does not answer the question, no matter how impressive the response might be.
- The marks awarded for each response should be clearly and legibly recorded in the grid on the front of the question paper.
- If you are in any doubt about the application of the mark scheme, you must consult with your Team Leader or the Chief Examiner.

Guidelines for using extended response marking grids

Extended response marking grids have been designed to award a learner's response holistically and should follow a best-fit approach. The grids are broken down into levels, with each level having an associated descriptor indicating the performance at that level. You should determine the level before determining the mark.

When determining a level, you should use a bottom up approach. If the response meets all the descriptors in the lowest level, you should move to the next one, and so on, until the response matches the level descriptor. Remember to look at the overall quality of the response and reward learners positively, rather than focussing on small omissions. If the response covers aspects at different levels, you should use a best-fit approach at this stage, and use the available marks within the level to credit the response appropriately.

When determining a mark, your decision should be based on the quality of the response in relation to the descriptors. You must also consider the relative weightings of the assessment objectives, so as not to over/under credit a response. Standardisation materials, marked by the Chief Examiner, will help you with determining a mark. You will be able to use exemplar learner responses to compare to live responses, to decide if it is the same, better or worse.

You are reminded that the indicative content provided under the marking grid is there as a guide, and therefore you must credit any other suitable responses a learner may produce. It is not a requirement either, that learners must cover all of the indicative content to be awarded full marks.

Assessment objectives

This unit requires learners to:

A01	Recall knowledge and show understanding.
A02	Apply knowledge and understanding.
A03	Analyse and evaluate knowledge and understanding.

The weightings of each assessment objective can be found in the qualification specification.

Question number	Marking guidance	Total marks
1	<p>The image below shows a prosthetic running blade which is an advanced type of prosthesis used by amputee athletes to replace a missing body part.</p> <p>State the engineering discipline which is responsible for the development of prosthetic running blades</p> <p>Award one mark for any one of the following:</p> <p>Answer:</p> <ul style="list-style-type: none"> • Biomedical Engineering • Bioengineering • Bio • Medical 	<p>1</p> <p>AO1=1</p>
2	<p>Electric vehicle sales are projected to reach 45 million worldwide by 2040.</p> <p>List one advantage and one disadvantage of current electric car designs.</p> <p>Advantages:</p> <ul style="list-style-type: none"> • No emissions • No petrol/diesel costs • Low maintenance • Reduced noise pollution • Cost effective <p>Disadvantages:</p> <ul style="list-style-type: none"> • Few recharging points • Short driving range • Reduced speed • Recharging times 4-6 hours • Not as much choice of models as petrol/diesel cars <p>Reward any other suitable response.</p>	<p>2</p> <p>AO1=2</p>

<p>3</p>	<p>An employee has sustained an injury whilst using an engineering machine.</p> <p>Explain why a report form must be completed and state one example of what it could be used for.</p> <p>Award one mark for an accurate explanation:</p> <ul style="list-style-type: none"> • It is a legal requirement under Riddor (2013) to report and record serious incidents. <p>Award one mark for stating one accurate use for the report:</p> <ul style="list-style-type: none"> • it could be used in criminal or civil proceedings • it could be used in internal disciplinary proceedings • to monitor and address risks and hazards • it could be requested by medical professional for diagnosis and treatment. <p>Accept any other suitable response.</p>	<p>2</p> <p>A02=2</p>
<p>4</p>	<p>Identify which one of the following activities the Manual Handling Operations Regulations would be most relevant:</p> <p>A) Ensuring a work area is free from obstructions, completing an accident report in the event of an injury B) Handling and storing chemicals in a locked cabinet correctly C) Lifting then moving a heaving box from one location to another D) Setting up a fixed machine for a practical task.</p> <p>Answer - C) Lifting then moving a heaving box from one location to another.</p>	<p>1</p> <p>A01=1</p>
<p>5</p>	<p>State two types of personal protective equipment required when using a soldering iron in an engineering workshop.</p> <p>Answer:</p> <ul style="list-style-type: none"> • safety glasses or goggles • apron or coveralls <p>Clothing will not be accepted as an answer.</p> <p>Reward any other suitable response.</p>	<p>2</p> <p>A01=2</p>

6	<p>You work as an Oil and Gas Chemical Engineer for a petroleum engineering Company. Your job involves the process of extracting oil and natural gas from reservoirs.</p> <p>As part of your job role you must follow safety procedures and meeting standards which includes adhering to the COSHH regulations.</p> <p>Discuss the importance of COSHH in a chemical engineering environment and analyse the possible impact of not adhering to the COSHH regulations.</p> <table border="1"> <thead> <tr> <th>Level</th><th>Marks</th><th>Description</th></tr> </thead> <tbody> <tr> <td>2</td><td>7 – 9</td><td> <p>A wide range of relevant knowledge and understanding is shown, which is accurate and detailed. Subject specific terminology is used consistently throughout.</p> <p>Application of knowledge and understanding is appropriate, with clear relevance to the context.</p> <p>Analysis and evaluation is present and very effective. The conclusions drawn are fully supported by judgements.</p> </td></tr> <tr> <td>2</td><td>4 – 6</td><td> <p>A range of relevant knowledge and understanding is shown, but may be lacking in sufficient detail, with a few errors. Subject specific terminology is used, but is not always consistent.</p> <p>Application of knowledge and understanding is mostly appropriate, but sometimes lacks clarity, and there may be a few errors. Analysis and evaluation is present and effective but may be lacking appropriate development. There are attempts to draw conclusions, which are supported by judgements, but it is likely that some will be irrelevant.</p> </td></tr> <tr> <td>1</td><td>1 – 3</td><td> <p>A limited range of relevant knowledge and understanding is shown, but is often fragmented. Subject specific terminology, if used, is often inappropriate and a lack of understanding is evident.</p> <p>Application of knowledge and understanding is inappropriate, with any attempt showing fundamental errors.</p> <p>Analysis and evaluation, if present, is of limited effectiveness. Attempts to draw conclusions are seldom successful and likely to be irrelevant.</p> </td></tr> <tr> <td></td><td>0</td><td>No rewardable material</td></tr> </tbody> </table>	Level	Marks	Description	2	7 – 9	<p>A wide range of relevant knowledge and understanding is shown, which is accurate and detailed. Subject specific terminology is used consistently throughout.</p> <p>Application of knowledge and understanding is appropriate, with clear relevance to the context.</p> <p>Analysis and evaluation is present and very effective. The conclusions drawn are fully supported by judgements.</p>	2	4 – 6	<p>A range of relevant knowledge and understanding is shown, but may be lacking in sufficient detail, with a few errors. Subject specific terminology is used, but is not always consistent.</p> <p>Application of knowledge and understanding is mostly appropriate, but sometimes lacks clarity, and there may be a few errors. Analysis and evaluation is present and effective but may be lacking appropriate development. There are attempts to draw conclusions, which are supported by judgements, but it is likely that some will be irrelevant.</p>	1	1 – 3	<p>A limited range of relevant knowledge and understanding is shown, but is often fragmented. Subject specific terminology, if used, is often inappropriate and a lack of understanding is evident.</p> <p>Application of knowledge and understanding is inappropriate, with any attempt showing fundamental errors.</p> <p>Analysis and evaluation, if present, is of limited effectiveness. Attempts to draw conclusions are seldom successful and likely to be irrelevant.</p>		0	No rewardable material	<p>9</p> <p>AO1=3 AO2=3 AO3=3</p>
Level	Marks	Description															
2	7 – 9	<p>A wide range of relevant knowledge and understanding is shown, which is accurate and detailed. Subject specific terminology is used consistently throughout.</p> <p>Application of knowledge and understanding is appropriate, with clear relevance to the context.</p> <p>Analysis and evaluation is present and very effective. The conclusions drawn are fully supported by judgements.</p>															
2	4 – 6	<p>A range of relevant knowledge and understanding is shown, but may be lacking in sufficient detail, with a few errors. Subject specific terminology is used, but is not always consistent.</p> <p>Application of knowledge and understanding is mostly appropriate, but sometimes lacks clarity, and there may be a few errors. Analysis and evaluation is present and effective but may be lacking appropriate development. There are attempts to draw conclusions, which are supported by judgements, but it is likely that some will be irrelevant.</p>															
1	1 – 3	<p>A limited range of relevant knowledge and understanding is shown, but is often fragmented. Subject specific terminology, if used, is often inappropriate and a lack of understanding is evident.</p> <p>Application of knowledge and understanding is inappropriate, with any attempt showing fundamental errors.</p> <p>Analysis and evaluation, if present, is of limited effectiveness. Attempts to draw conclusions are seldom successful and likely to be irrelevant.</p>															
	0	No rewardable material															

	<p>Indicative content/possible content could include:</p> <p>Importance of COSHH in a chemical engineering environment.</p> <ul style="list-style-type: none"> • Identifying what the health hazards could be. • Producing a risk assessment to prevent harm to health. • Providing control measures to reduce harm to health. • Providing information, instruction and training for employees and other relevant people. • Ensure staff are making use of control measures. • Check and maintain all control measures to ensure they are in good working order. • HR Provision to provide monitoring of health in appropriate cases. • Emergency plan. <p>Possible impact of not adhering to the COSHH regulations.</p> <ul style="list-style-type: none"> • A person could be at increased risk of a health defect, injury or worst case death. • An employee could face disciplinary action for failing to follow the guidelines. • An employer could face legal action, resulting in a fine or stop trading • An employer could face civil action, resulting in a compensation pay out and financial losses • Damage to equipment from incorrect use/storage of substances, resulting in financial losses • Loss or wastage of product due to incorrect use/storage of substances resulting in financial losses <p>Reward any other suitable response.</p>	
7	<p>Identify which one of the following units would be used to measure current.</p> <p>A) Amps B) Candela C) Degrees D) Seconds</p> <p>Answer - A) Amps</p>	<p>1</p> <p>AO1=1</p>
8	<p>Select which one of the following units of measurement is not an SI base Unit.</p> <p>A) Kilogram (kg) B) Meter (m) C) Pound (lb) D) Second (s)</p> <p>Answer - C) Pound (lb)</p>	<p>1</p> <p>AO1=1</p>

<p>9</p>	<p>The image below shows the Humber Bridge which opened on 24th June 1981. It was the world's longest single span bridge, a title held until 1998. The bridge spans the River Humber connecting Hull in East Yorkshire to Barton-upon-Humber in North East Lincolnshire.</p> <p>State why basic SI units of length and mass would have be used in the development of the Humber Bridge.</p> <p>Award 1 mark for length Award 1 mark for mass</p> <p>Indicative content/possible answers could include:</p> <p>Length - to calculate:</p> <ul style="list-style-type: none"> • distance between each shore line (1 mark) • height of the support in relation to the required length (1 mark) • amount of cabling need to support the structure (1 mark) • length of the final bridge (1 mark) • setting the speed limit on the road in relation to stopping distances (1 mark) • potential number of vehicles on the bridge at any one time. (1 mark) <p>Mass - to calculate:</p> <ul style="list-style-type: none"> • maximum weight of a vehicle allowed to use the bridge (1 mark) • maximum weight in total on the bridge at any one time (1 mark) • setting the speed limit on the road in relation to stopping distances, (based on vehicle weights) (1 mark) • Total weight of the bridge, in relation to statistical risk of collapse or damage (1 mark) <p>Award any other suitable response.</p>	<p>2</p> <p>A02=2</p>
-----------------	---	-------------------------------------

10	<p>The total power input to a power station is 672 MW. The useful power output is 536 MW. Making use of the relevant supplied equation, calculate the efficiency of this power station.</p> <p>Show your workings out and round up to the nearest whole unit.</p> <p>Award 1 mark for each of the following:</p> <ul style="list-style-type: none"> • Correct selection of equation from a given list. Efficiency (%) = (useful energy out ÷ total energy in) x 100. • Correct application of equation using the figures given - (536/672)*100 • Correct answer - 80% 	<p>3</p> <p>AO1=1 AO2=2</p>
11	<p>If a car increases in velocity from +5 m/s to +15 m/s in three seconds, what is its acceleration?</p> <p>Show your workings out and round up to one decimal place.</p> <p>Award 1 mark for each of the following:</p> <ul style="list-style-type: none"> • Correct selection of equation from a given list. Acceleration = Change in velocity ÷ Time • Correct application of equation using the figures given. Acceleration = 10 m/s ÷ 3s • Correct answer - 3.3 m/s 	<p>3</p> <p>AO1=1 AO2=2</p>
12	<p>Explain what the two equations shown below would be used for in the development of a washing machine.</p> <p>Efficiency (%) = (useful energy out ÷ total energy in) x 100%.</p> <p>Current = power ÷ voltage</p> <p>Award 1 mark for each of the following:</p> <ul style="list-style-type: none"> • Efficiency equation - 1 correct use of • Current - 1 correct use of <p>Award one mark for any one of the following:</p> <p>Efficiency:</p> <ul style="list-style-type: none"> • To calculate efficiency rating which is now required to be on labels on all household appliances. (1 mark) • To calculate the efficiency for promotion of appliance performance. (1 mark) <p>Award one mark for the following:</p> <ul style="list-style-type: none"> • Current - To calculate the fuse size required for the plug (1 mark) 	<p>2</p> <p>AO2=2</p>

13	<p>A space station travels 39 kilometres in 5 seconds. How fast is it travelling?</p> <p>A) 7.8 kilometres/second B) 19.5 kilometres/second C) 78 kilometres/second D) 195 kilometres/second</p> <p>Answer - A) 7.8 kilometres/second</p>	<p>1</p> <p>AO1=1</p>
14	<p>The image below illustrates an engineering drawing of a support bracket. Identify the projection that has been used to produce this engineering drawing.</p> <p>Answer: Third angle projection</p>	<p>1</p> <p>AO1=1</p>
15	<p>You are a draughtsperson working for a local electrical engineering company called EcoCity Solutions, who specialise in renewable energy. You have been asked to draft engineering drawings for a new wind turbine.</p> <p>Explain why you would apply scale in this engineering drawing.</p> <p>2 marks for application:</p> <ul style="list-style-type: none"> • The wind turbine will need to be scaled down (1 mark) so that it can fit onto the page. (1 mark) <p>2 marks for analysis and evaluation:</p> <ul style="list-style-type: none"> • Accurate use of scale will provide clearly defined and accurate measurements so that the wind turbine can be built/manufactured (1 mark) • Accurate use of scale will ensure ease of communicating the design/product (1 mark) <p>Award any other suitable response.</p>	<p>4</p> <p>AO2=2 AO3=2</p>
16	<p>List two pieces of information which should be included in the contents of a title block in an engineering drawing.</p> <p>Award 1 mark each for any two of the following:</p> <ul style="list-style-type: none"> • author • drawing number • date • title • materials • scale • sheet number • system of measurement 	<p>2</p> <p>AO1=2</p>

17	<p>The image below illustrates a type of line used in engineering drawing. Explain how this line would be used in an engineering drawing.</p> <p>Award 1 mark for each correct explanation up to a maximum of two from the following:</p> <ul style="list-style-type: none"> • to represent something which is there but cannot be seen from the direction of the projection • used to represent edges which are not visible from the current viewing angle. • using the hidden line will support with the reading and interpretation of the drawing • represent internal features that are obscured by the object. 	<p>2 AO2=2</p>
18	<p>Select which of the following is the correct calculation for converting from inches into centimetres.</p> <p>A) x 25.4 B) ÷ 25.4 C) x 2.54 D) ÷ 2.54</p> <p>Answer - C) x 2.54</p>	<p>1 AO1=1</p>

19	Evaluate the benefits of working to BS8888 when producing engineering drawings.		9
			AO1=3 AO2=3 AO3=3
	Level	Marks	Description
	2	7-9	<p>A wide range of relevant knowledge and understanding is shown, which is accurate and detailed. Subject specific terminology is used consistently throughout.</p> <p>Application of knowledge and understanding is appropriate, with clear relevance to the context.</p> <p>Analysis and evaluation is present and very effective. The conclusions drawn are fully supported by judgements.</p>
	2	4-6	<p>A range of relevant knowledge and understanding is shown, but may be lacking in sufficient detail, with a few errors. Subject specific terminology is used, but not always consistently.</p> <p>Application of knowledge and understanding is mostly appropriate, but sometimes lacks clarity, and there may be a few errors. Analysis and evaluation is present and effective but may be lacking appropriate development. There are attempts to draw conclusions, which are supported by judgements, but it is likely that some will be irrelevant.</p>
1	1-3	<p>A limited range of relevant knowledge and understanding is shown, but is often fragmented. Subject specific terminology, if used, is often inappropriate and a lack of understanding is evident.</p> <p>Application of knowledge and understanding is inappropriate, with any attempt showing fundamental errors.</p> <p>Analysis and evaluation, if present, is of limited effectiveness. Attempts to draw conclusions are seldom successful and likely to be irrelevant.</p>	
	0	No rewardable material	

	<p>Indicative content/possible content could include:</p> <ul style="list-style-type: none"> • Recalling what BS8888 is - British national framework standard, developed for engineering drawings and geometrical tolerance. • BS888 covers all of the requirements for the technical specification of products and their component parts. • BS888 explains the way in which engineering drawings outline and present the specifications. • BS8888 covers all of the symbols and information that engineers need to include on their drawings, be they manually produced or created using CAD systems. • It includes, in one document, all the international standards (ISO) needed to prepare technical product specifications for international communication of drawings. • By adhering to BS8888 benefits the production of engineering drawings - Better efficiency and fewer mistakes being made. This in turn leads to a more productivity helping to increase revenue. <p>Accept any other suitable response.</p>	
--	---	--

<p>20</p>	<p>The image below shows a row of wind turbine. The blades of a wind turbine are fabricated from glass reinforced plastic (GRP).</p> <p>Explain two properties of glass reinforced plastic which makes it a suitable material for this purpose.</p> <p>Award one mark for each correct property identified to a maximum of two marks:</p> <ul style="list-style-type: none"> • Mechanical strength • Light weight • Corrosion resistant • Flexible • Thermal insulation • High weight to strength ratio • Non-corrosive • Electrical insulation • Hardness • UV resistant • Chemical resistance • Soundproof <p>Award one mark for each accurate explanation of the identified properties to a maximum of two marks.</p> <p>Indicative content/possible content could include:</p> <ul style="list-style-type: none"> • Mechanical strength: high strength to weight ratio which means this can function well under the extreme weather conditions moving freely without damage or breakages. • Light weight: Allows the wind to move the blades with ease to generate power. It also avoids instability and the tower being top heavy. • Corrosion resistant: can withstand extreme temperatures, salt air, UV rays often associated with the locations of wind farms, especially off-shore. Corrosion resistance offers a longer life expectancy than alternative materials, such as stainless steel. <p>Accept any other suitable response.</p> <p>Two accurate explanations for one property will not be awarded 2 marks.</p> <p>An accurate explanation of a property that has been incorrectly named will be awarded.</p>	<p>4</p> <p>AO2=4</p>
------------------	---	-------------------------------------

21	<p>Identify the softwood from the list below:</p> <p>A) Ash B) Balsa C) Cedar D) Oak</p> <p>Answer - C) Cedar</p>	<p>1</p> <p>AO1=1</p>
----	---	-------------------------------------

22	<p>As consumers become more environmentally aware, engineers have had to look at better ways to manufacture products.</p> <p>One example of this is a fleece top which can be fabricated from just 8 plastic bottles, by shredding the plastic and turning it into polyester thread.</p> <p>Explain one environmental benefit of using recycled materials in the production of a fleece top.</p> <ul style="list-style-type: none"> • 1 mark for an explanation which may not be completely accurate but appropriate to the context • 1 mark for an explanation which may be fully accurate but not appropriate to the context • 2 marks for a brief analysis that is fully accurate and appropriate to the context • 3 marks for a detailed and fully accurate analysis that is appropriate to the context <p>Indicative content/Possible content could include:</p> <p>Environmental benefits:</p> <ul style="list-style-type: none"> • Reduce waste • Energy conservation • Reduce pollution • Reducing raw extraction • Assisting a good cause (improving consumer perception), • Improve technologies development. <p>A brief explanation which may not be completely accurate but appropriate to the context.</p> <ul style="list-style-type: none"> • If we use plastic bottles to make fleeces it would stop all pollution from plastic bottles. <p>A brief explanation which may be fully accurate but not appropriate to the context</p> <ul style="list-style-type: none"> • Using plastic bottles to make a fleece would make buying raw materials cheaper and save a company a lot of money. 	<p>3</p> <p>AO2=1 AO3=2</p>
----	--	---

	<p>A brief explanation that is fully accurate and appropriate to the context.</p> <ul style="list-style-type: none"> Recycling plastic bottles would be helping environmental charities who work to protect sea life. <p>A detailed and fully accurate explanation that is appropriate to the context.</p> <ul style="list-style-type: none"> By using plastic bottle to manufacture a fleece we are using materials which are already in existence and therefore we would be reducing the need for raw extraction or fossil fuels, which will eventually run out. By reducing the use of fossil fuels we are more environmentally friendly, but we are also using something which is waste, so we would also be reducing waste. <p>Accept any other suitable response.</p>	
--	---	--

23	<p>The image below shows a standard household milk pan.</p> <p>The pan section is fabricated from a non-ferrous metal and the handle from a thermoset polymer.</p> <p>Evaluate why these materials have been selected to construct the milk pan based on their properties and characteristics.</p> <table border="1"> <thead> <tr> <th>Level</th><th>Marks</th><th>Description</th></tr> </thead> <tbody> <tr> <td>2</td><td>7-9</td><td> <p>A wide range of relevant knowledge and understanding is shown, which is accurate and detailed. Subject specific terminology is used consistently throughout.</p> <p>Application of knowledge and understanding is appropriate, with clear relevance to the context.</p> <p>Analysis and evaluation is present and very effective. The conclusions drawn are fully supported by judgements.</p> </td></tr> <tr> <td>2</td><td>4-6</td><td> <p>A range of relevant knowledge and understanding is shown, but may be lacking in sufficient detail, with a few errors. Subject specific terminology is used, but not always consistently.</p> <p>Application of knowledge and understanding is mostly appropriate, but sometimes lacks clarity, and there may be a few errors.</p> <p>Analysis and evaluation is present and effective but may be lacking appropriate development. There are attempts to draw conclusions, which are supported by judgements, but it is likely that some will be irrelevant.</p> </td></tr> <tr> <td>1</td><td>1-3</td><td> <p>A limited range of relevant knowledge and understanding is shown, but is often fragmented. Subject specific terminology, if used, is often inappropriate and a lack of understanding is evident.</p> <p>Application of knowledge and understanding is inappropriate, with any attempt showing fundamental errors.</p> <p>Analysis and evaluation, if present, is of limited effectiveness. Attempts to draw conclusions are seldom successful and likely to be irrelevant.</p> </td></tr> <tr> <td></td><td>0</td><td>No rewardable material</td></tr> </tbody> </table>	Level	Marks	Description	2	7-9	<p>A wide range of relevant knowledge and understanding is shown, which is accurate and detailed. Subject specific terminology is used consistently throughout.</p> <p>Application of knowledge and understanding is appropriate, with clear relevance to the context.</p> <p>Analysis and evaluation is present and very effective. The conclusions drawn are fully supported by judgements.</p>	2	4-6	<p>A range of relevant knowledge and understanding is shown, but may be lacking in sufficient detail, with a few errors. Subject specific terminology is used, but not always consistently.</p> <p>Application of knowledge and understanding is mostly appropriate, but sometimes lacks clarity, and there may be a few errors.</p> <p>Analysis and evaluation is present and effective but may be lacking appropriate development. There are attempts to draw conclusions, which are supported by judgements, but it is likely that some will be irrelevant.</p>	1	1-3	<p>A limited range of relevant knowledge and understanding is shown, but is often fragmented. Subject specific terminology, if used, is often inappropriate and a lack of understanding is evident.</p> <p>Application of knowledge and understanding is inappropriate, with any attempt showing fundamental errors.</p> <p>Analysis and evaluation, if present, is of limited effectiveness. Attempts to draw conclusions are seldom successful and likely to be irrelevant.</p>		0	No rewardable material	<p>9</p> <p>AO1=3 AO2=3 AO3=3</p>
Level	Marks	Description															
2	7-9	<p>A wide range of relevant knowledge and understanding is shown, which is accurate and detailed. Subject specific terminology is used consistently throughout.</p> <p>Application of knowledge and understanding is appropriate, with clear relevance to the context.</p> <p>Analysis and evaluation is present and very effective. The conclusions drawn are fully supported by judgements.</p>															
2	4-6	<p>A range of relevant knowledge and understanding is shown, but may be lacking in sufficient detail, with a few errors. Subject specific terminology is used, but not always consistently.</p> <p>Application of knowledge and understanding is mostly appropriate, but sometimes lacks clarity, and there may be a few errors.</p> <p>Analysis and evaluation is present and effective but may be lacking appropriate development. There are attempts to draw conclusions, which are supported by judgements, but it is likely that some will be irrelevant.</p>															
1	1-3	<p>A limited range of relevant knowledge and understanding is shown, but is often fragmented. Subject specific terminology, if used, is often inappropriate and a lack of understanding is evident.</p> <p>Application of knowledge and understanding is inappropriate, with any attempt showing fundamental errors.</p> <p>Analysis and evaluation, if present, is of limited effectiveness. Attempts to draw conclusions are seldom successful and likely to be irrelevant.</p>															
	0	No rewardable material															

	<p>Indicative content/possible content could include:</p> <p>Properties and characteristics of a non-ferrous metal pan, with evaluative benefits:</p> <ul style="list-style-type: none"> • Thermal conductivity <ul style="list-style-type: none"> ○ Heat up and retain heat well to perform its desired function • Silver colour <ul style="list-style-type: none"> ○ Aesthetically pleasing to the consumer (association with silver and cleanliness) ○ Reflect heat • High melting point <ul style="list-style-type: none"> ○ Does not soften when exposed to high temperature of hob top • Hard <ul style="list-style-type: none"> ○ resists scratch when cleaned (scrubbed with scourer) • Lightweight <ul style="list-style-type: none"> ○ Ease of use, especially when full • Strong <ul style="list-style-type: none"> ○ Resists dents and miss-shaping providing longevity of product • Non -corrosive <ul style="list-style-type: none"> ○ Will not rust, washing up and dishwasher safe providing longevity of product ○ Will not contaminate food contents • Smooth finish <ul style="list-style-type: none"> ○ Easy to clean • Easy to manufacture <ul style="list-style-type: none"> ○ Can be die cast into any design ○ Reduced manufacturing costs ○ Mass market production <p>Properties and characteristics of thermoset polymer handle, with evaluative benefits:</p> <ul style="list-style-type: none"> • Thermal Insulator <ul style="list-style-type: none"> ○ Will not heat up or retain heat and burn user • Dark colour <ul style="list-style-type: none"> ○ Clearly visible on hob top ○ Aesthetically goes with any kitchen colour scheme • Smooth finish <ul style="list-style-type: none"> ○ Easy to clean • Will not soften or melt <ul style="list-style-type: none"> ○ Will retain shape when exposed to high temperature of hob top • Easy to manufacture <ul style="list-style-type: none"> ○ Can be injection moulded into any design taking into consideration ergonomics ○ Reduced manufacturing costs ○ Mass market production • Lightweight <ul style="list-style-type: none"> ○ Ease of use, especially when full. <p>Accept other suitable responses.</p>	
--	--	--

24	<p>The image below shows a marking out tool.</p> <p>State the name of the tool.</p> <p>Answer- Engineers Scriber or Scriber</p>	<p>1</p> <p>AO1=1</p>
25	<p>State which of the following saws would be the most appropriate tool to use when cutting a 12mm aluminium round bar?</p> <p>A) Coping saw B) Hacksaw C) Scroll saw D) Tenon saw</p> <p>Answer - B) Hacksaw</p>	<p>1</p> <p>AO1=1</p>
26	<p>The image below illustrates a modification manufacturing technique. State the technique being used to waste a piece of metal.</p> <p>Answer - Draw filing</p> <p>Filing on its own will not be accepted.</p>	<p>1</p> <p>AO1=1</p>
27	<p>In computer aided manufacturing what do the initials CNC stand for?</p> <p>A) Computer number capability B) Computer number capacity C) Computer numerical containment D) Computer numerical control</p> <p>Answer - D) Computer numerical control</p>	<p>1</p> <p>AO1=1</p>
28	<p>The image below shows a screwdriver bit.</p> <p>Select the name of this bit.</p> <p>A) Allen B) Philips C) Slot D) Torx</p> <p>Answer - D) Torx</p>	<p>1</p> <p>AO1=1</p>

29	<p>The image below shows a number of the same type of engineering component.</p> <p>Select the name of this component.</p> <p>A) Bolt B) Nail C) Rivet D) Screw</p> <p>Answer - C) Rivet</p>	<p>1</p> <p>AO1=1</p>
30	<p>The image below shows a machine commonly found in an engineering workshop.</p> <p>Select which answer best describes its function.</p> <p>A) Buffing materials B) Polishing materials C) Sanding materials D) Sharpening tools</p> <p>Answer- A) Buffing materials</p>	<p>1</p> <p>AO1=1</p>
31	<p>A laser cutter is a computer aided machine often found in an engineering workshop.</p> <p>Justify the requirement for full training prior to using this computer aided machine.</p> <p>Award one mark for identifying that it would be a health and safety requirement.</p> <p>Award one mark for each justification:</p> <ul style="list-style-type: none"> It reduces the risk of injury to individuals (1 mark) reduces the risk of damage to the piece of equipment (1 mark) 	<p>3</p> <p>AO3=3</p>

<p>32</p>	<p>List two activities which should be undertaken in setting up and preparing a pillar drill for use.</p> <p>Award one mark for each correct activity identified to a maximum of two marks from the following:</p> <ul style="list-style-type: none"> • Ensure area is clear from debris and there is no damage to the machine. • Fit the drill bit into the chuck of the pillar drill and tighten it using a key • Pull guard across to cover the drill bit • Adjust the table to the correct position so that the desired cut will be achieved • Adjust the table to the correct height so that the desired cut will be achieved • Secure work piece; drill press vice, clamped to drill table. <p>Accept other suitable responses.</p>	<p>2</p> <p>AO1=2</p>
------------------	--	-------------------------------------

<p>33</p>	<p>Identify two safety features found on a metal lathe.</p> <p>Answer 1</p> <p>Answer 2</p> <p>Award one mark for each correct safety feature identified to a maximum of two marks from the list below:</p> <ul style="list-style-type: none"> • A guard • Micro switches • Emergency stop switch/button or emergency foot or knee switches/button. 	<p>2</p> <p>AO1=2</p>
------------------	---	-------------------------------------

Assessment Objective Grid

Question	AO1	AO2	AO3	Total	MCQ	SMQ	MMQ 2-8	LAQ 9
1	1			1		•		
2	2			2			•	
3		2		2			•	
4	1			1	•	•		
5	2			2			•	
6	3	3	3	9				•
7	1			1	•	•		
8	1			1	•	•		
9		2		2			•	
10	1	2		3			•	
11	1	2		3			•	
12		2		2			•	
13	1			1	•	•		
14	1			1		•		
15		2	2	4			•	
16	2			2			•	
17		2		2			•	
18	1			1	•	•		
19	3	3	3	9				•
20		4		4			•	
21	1			1	•	•		
22		1	2	3			•	
23	3	3	3	9				•
24	1			1		•		
25	1			1	•	•		
26	1			1		•		
27	1			1	•	•		
28	1			1	•	•		
29	1			1	•	•		
30	1			1	•	•		
31			3	3			•	
32	2			2			•	
33	2			2			•	
Total	36	28	16	80	11	15	15	3
Total marks per question type					11	15	38	27