



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

Paper number: Past Paper

November 2021

Unit 01 Understanding the engineering world

Mark Scheme

V1.0 Pre-Standardisation

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 penalising them for 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:

AO1	Recall knowledge and show understanding.
AO2	Apply knowledge and understanding.
AO3	Analyse and evaluate knowledge and understanding.

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

Qn	Mark scheme	Total marks
----	-------------	-------------

Total: 80 marks

1	<p>Which of the following describes a feature of a pulley?</p> <p>Answer: D A wheel with a groove</p>	<p>1</p> <p>AO1=1</p>
---	--	------------------------------

2	<p>Integrated circuits use many different components in the control of systems and processes.</p> <p>Which engineering discipline do integrated circuits belong to?</p> <p>Answer: B Electrical</p>	<p>1</p> <p>AO1=1</p>
---	---	------------------------------

3	<p>Name one unit of measurement for current in a circuit.</p> <p>Award one mark for any of the following:</p> <ul style="list-style-type: none"> • microamp • milliamp • amp • kiloamp. 	<p>1</p> <p>AO1=1</p>
---	--	------------------------------

4	<p>Some workplace injuries must be reported to RIDDOR.</p> <p>Describe one type of workplace injury that must be reported to RIDDOR.</p> <p>Award up to 2 marks for a description of one reportable incident:</p> <ul style="list-style-type: none"> • loss of a limb (1) through amputation (1) • permanent (1) loss of sight (1) • scalping (1) requiring hospital treatment (1) • loss of consciousness (1) caused by head injury (1) or asphyxia (1) • death or injury (1) because of a work-related accident (1) • Over-seven-day incapacitation of a worker (1) because of a work-related accident. (1) <p>Accept any other suitable response listed under HSE guidance.</p>	<p>2</p> <p>AO2=2</p>
---	--	------------------------------

5	<p>A mountain bike is travelling down a hill.</p> <p>Calculate the momentum of the bike and state a common unit of momentum.</p> <p>Use the following data: The mass of the bike is 20 kg. The velocity of the bike is 10 m/s.</p> <p>Use the equations on pages 2 and 3.</p> <p>Show your working.</p> <p>Award one mark for correct workings to a maximum of 2 marks (AO2) for correct answer.</p> <p>momentum = mass x velocity</p> <p>Momentum = 20 X 10 (1) Answer = 200 (1)</p> <p>Momentum = <input style="width: 100px; height: 30px; border: 1px solid black;" type="text" value="200"/></p> <p>State a common unit of momentum:</p> <p>Award one mark (AO1) for suitable units; does not need to relate to answer above.</p> <p>Units of momentum:</p> <ul style="list-style-type: none"> • kg m/s (kilogram meters per second). <p>Accept any other suitable response.</p>	<p>3</p> <p>AO1=1</p> <p>AO2=2</p>
----------	---	---

<p>6 (a)</p>	<p>A drawing title block includes the system of measurement.</p> <p>State two other items that a drawing title block includes.</p> <p>Award one mark each to a maximum of 2 marks:</p> <ul style="list-style-type: none"> • author • drawing number • date • title • materials • scale • sheet number • projection. <p>Accept any other suitable response.</p>	<p>2</p> <p>AO1=2</p>
---------------------	--	-------------------------------------

<p>6 (b)</p>	<p>Which one of the following is a three-dimensional projection method?</p> <p>Answer: A Axonometric</p>	<p>1</p> <p>AO1=1</p>
---------------------	---	-------------------------------------

<p>7</p>	<p>What type of alloy is solder?</p> <p>Answer: B Non-ferrous</p>	<p>1</p> <p>AO1=1</p>
-----------------	--	-------------------------------------

<p>8</p>	<p>An oil seal needs to have chemical resistance and durability.</p> <p>State two elastomers that could be used for an oil seal.</p> <p>Award one mark each to a maximum of 2 marks:</p> <ul style="list-style-type: none"> • rubber • neoprene. <p>Accept any other suitable response.</p>	<p>2</p> <p>AO1=2</p>
-----------------	---	-------------------------------------

9	<p>Identify an engineering discipline that might use a component like the gearbox shown in Figure 1 and explain what a gearbox is used for.</p> <p>Award one mark (AO1) for identification of an engineering discipline.</p> <p>Identification of automotive/aerospace industry or any other suitable response.</p> <p>Award up to a maximum of 2 marks (AO2) for an explanation of use.</p> <ul style="list-style-type: none"> • A series of integrated gears (1) designed to change turning force/torque and speed. (1) • Gearboxes are used in vehicles so they can travel fast and slow (1) in different road/driving conditions. (1) <p>Accept any other suitable response.</p>	<p>3</p> <p>AO1=1</p> <p>AO2=2</p>
----------	---	---

10	<p>Developments in computer software applications have improved the design of engineering structures.</p> <p>Explain how software applications benefit the engineering industry.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Level</th> <th style="text-align: center;">Marks</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">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. Analysis and evaluation are present and very effective.</p> <p>The conclusions drawn are fully supported by judgements.</p> </td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">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 are present and effective but may be lacking appropriate</p> </td> </tr> </tbody> </table>	Level	Marks	Description	3	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. Analysis and evaluation are present and very effective.</p> <p>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 are present and effective but may be lacking appropriate</p>	<p>9</p> <p>AO1=3</p> <p>AO2=3</p> <p>AO3=3</p>
Level	Marks	Description									
3	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. Analysis and evaluation are present and very effective.</p> <p>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 are present and effective but may be lacking appropriate</p>									

		development. There are attempts to draw conclusions, which are supported by judgements, but it is likely that some will be irrelevant.
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 creditworthy material

Indicative content:

3: Justification or evaluative statements to include the following:

- designs can be tested in an application to see if they work
- computers make the design faster to achieve
- 3D can be easily used to inform
- multiple calculations can be undertaken
- enables different variations to be tested (eg earthquakes where simulations can be performed on a building to ensure it resists shaking)
- paperless process, saving resources and better for environment
- faster method of designing (eg due to built-in software features)
- standards are incorporated
- design can be easily changed.

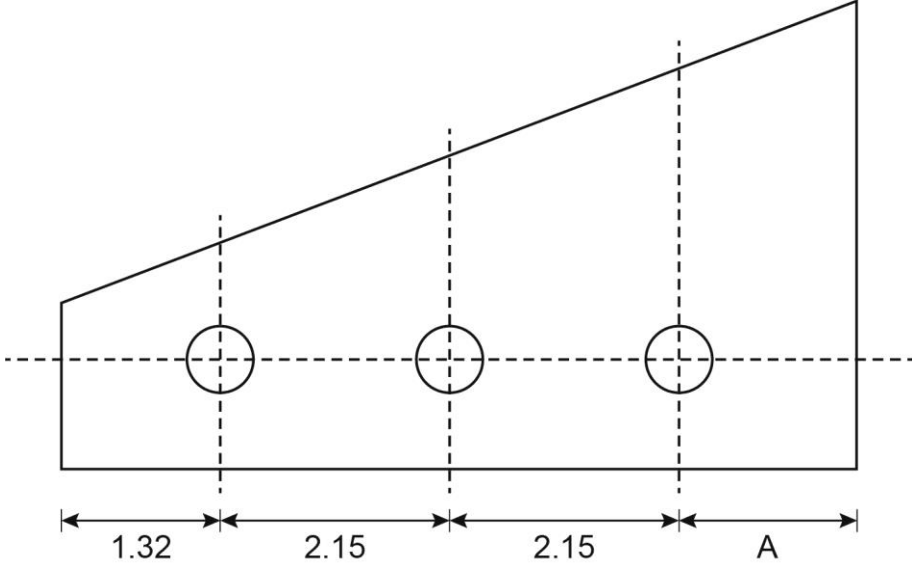
2: Reasoned statements with some justification to include the following:

- faster method of designing
- easily shared with others/stakeholders
- paperless method resulting in less waste
- drawings can be printed from software.
- cheaper method of designing.

1: Brief statements with no justification:

- quicker method
- everyone uses the software
- paperless
- cheaper.

	<p>0: No written material that has any reference to the context of software applications.</p> <p>Accept any other suitable response.</p>	
--	--	--

<p>11 (a)</p>	<p style="text-align: center;">Figure 2</p>  <p>Figure 2 shows a support bracket for a car transporter's ramps. Calculate dimension A shown in Figure 2.</p> <p>All dimensions are in cm.</p> <p>Overall length = 7.62 cm</p> <p>Show your working.</p> <p>Award one mark for working out and one mark for correct answer to a maximum of 2 marks.</p> <p>= 7.62 – (1.32 + 2.15 + 2.15) (1)</p> <p>= 2 cm (1)</p>	<p style="text-align: center;">2</p> <p style="text-align: center;">AO2=2</p>
----------------------	---	---

<p>11 (b)</p>	<p>Which one of the following is the name given to the dotted lines shown in Figure 2?</p> <p>Award one mark for either A Construction or D Hidden.</p>	<p style="text-align: center;">1</p> <p style="text-align: center;">AO1=1</p>
----------------------	---	---

<p>12</p>	<p>Identify two properties of stainless steel and give a benefit of each property.</p>	<p style="text-align: center;">4</p> <p style="text-align: center;">AO1=2</p>
------------------	--	---

	<p>Award one mark (AO1) for each identification of a property and one mark (AO3) for each linked benefit to a maximum of 4 marks.</p> <ul style="list-style-type: none"> • strength of the material (1) so it doesn't deform or bend or misshape when used. (1) • hardness (1) remains intact over time and won't deform. (1) • toughness (1) has a long life in a range of applications. (1) • high melting point (1) so heat won't affect its integrity. (1) <p>Accept any other suitable response.</p>	<p>AO3=2</p>
--	---	---------------------

<p>13</p>	<p>Calculate the total volume of material needed to make the wheel bearing in Figure 3.</p> <p>Use the following data: Volume of void = 30.77 cm³ Height = 5 cm Outside diameter = 3.8 cm $\pi = 3.14$</p> <p>Use the equations on pages 2 and 3.</p> <p>Show your working.</p> <p>Volume of cylinder = $\pi \times \text{radius}^2 \times \text{height of cylinder}$</p> <p>Volume = $(\pi \times (3.8 \div 2)^2 \times 5) = 56.68$ (1)</p> <p>Volume of space = 30.77</p> <p>Difference = $(56.68 - 30.77)$</p> <p>= 25.91 cm³ or 25.91 (1)</p> <p>Accept answers using π with additional decimal places.</p>	<p>2</p> <p>AO2=2</p>
------------------	---	-------------------------------------

<p>14 (a)</p>	<p>Identify a feature that shows an engineering drawing has been produced using imperial dimensions.</p> <p>Award one mark for a correct response.</p> <ul style="list-style-type: none"> • The dimension would be annotated in inches (1") and/or feet (1') and stated in the title block. <p>Accept any other suitable response.</p>	<p>1</p> <p>AO1=1</p>
----------------------	--	-------------------------------------

<p>14 (b)</p>	<p>What is the name for the horizontal line with arrows at either end in Figure 4?</p> <p>Answer: A Dimension</p>	<p>1 AO1=1</p>
----------------------	--	----------------------------------

<p>14 (c)</p>	<p>Complete Table 1 by answering the questions below.</p> <p>i. How is the person who created an engineering drawing identified on it?</p> <p>ii. When is a sheet number included in an engineering drawing?</p> <p>iii. How is a scale specified in an engineering drawing?</p> <p style="text-align: center;">Table 1</p> <table border="1"> <thead> <tr> <th>Question</th> <th>Answer</th> </tr> </thead> <tbody> <tr> <td>i)</td> <td>Author name/initials would be in title block</td> </tr> <tr> <td>ii)</td> <td>When there is more than one sheet</td> </tr> <tr> <td>iii)</td> <td>As a ratio eg 1:100, 100 in size is 1 on the paper</td> </tr> </tbody> </table> <p>Accept any other suitable response.</p>	Question	Answer	i)	Author name/initials would be in title block	ii)	When there is more than one sheet	iii)	As a ratio eg 1:100, 100 in size is 1 on the paper	<p>3 AO1=3</p>
Question	Answer									
i)	Author name/initials would be in title block									
ii)	When there is more than one sheet									
iii)	As a ratio eg 1:100, 100 in size is 1 on the paper									

<p>15</p>	<p>An engineer must specify a material for a power station chimney.</p> <p>Explain why concrete is a suitable material for a power station chimney.</p> <p>Award one mark for each valid point up to a maximum of 3 marks for a linked response.</p> <ul style="list-style-type: none"> • Concrete is strong and durable (1) and does not rot (1) which is useful in taller structures, making it suitable for a power station chimney. (1) • Concrete has better wearing characteristics (1) with better impact resistance and longer lasting (1), which is useful in different weather conditions and exposed locations. (1) • Concrete is heat resistant (1) which is important for hot gas emissions, making it suitable for a power station chimney (1) and can be easily cleaned. (1) 	<p>3 AO3=3</p>
------------------	--	----------------------------------

	Accept any other suitable response.	
--	-------------------------------------	--

16	<p>A car review website is testing the performance of a new car.</p> <p>Calculate the vehicle's acceleration in m/s^2 and average speed in m/s.</p> <p>Use the following data:</p> <p>Starting velocity = 30 m/s</p> <p>Finishing velocity = 100 m/s</p> <p>Time = 30 s</p> <p>Distance travelled = 500 m</p> <p>Use the equations on pages 2 and 3.</p> <p>Show your working.</p> <p>Acceleration = change in velocity \div time</p> <p>= $100 - 30$ (1)</p> <p>= $70 \div 30$ (1)</p> <p>= 2.33 m/s^2 (1)</p> <p>Speed = distance \div time</p> <p>= $500 \text{ m} / 30 \text{ s}$ (1)</p> <p>= 16.66 m/s (Accept in range of 16.6 to 16.7) (1)</p> <p>Accept any other suitable response.</p>	<p>5</p> <p>AO2=5</p>
-----------	---	-------------------------------------

17	Electric power producers in the UK now rely less on fossil fuels. Discuss the ways that engineering has reduced the impact of power generation on the environment.	9 AO1=3 AO2=3 AO3=3												
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; padding: 5px;">Level</th> <th style="width: 10%; padding: 5px;">Marks</th> <th style="padding: 5px;">Description</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">3</td> <td style="text-align: center; padding: 5px;">7-9</td> <td style="padding: 5px;"> <p>A coherent explanation with reference to the impact of engineering in a renewable source context</p> <p>A wide range of relevant knowledge and understanding is shown, which is accurate and detailed.</p> <p>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 are present and very effective. The conclusions drawn are fully supported by judgements.</p> </td> </tr> <tr> <td style="text-align: center; padding: 5px;">2</td> <td style="text-align: center; padding: 5px;">4 – 6</td> <td style="padding: 5px;"> <p>A coherent explanation of how engineering has contributed to reducing the impact on the modern world’s reliance on fossil fuels.</p> <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 are 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 style="text-align: center; padding: 5px;">1</td> <td style="text-align: center; padding: 5px;">1 – 3</td> <td style="padding: 5px;"> <p>A basic explanation of applied engineering, which may not be fully accurate. Doesn’t mention renewable source context at all.</p> <p>A limited range of relevant knowledge and understanding is shown, but is often</p> </td> </tr> </tbody> </table>			Level	Marks	Description	3	7-9	<p>A coherent explanation with reference to the impact of engineering in a renewable source context</p> <p>A wide range of relevant knowledge and understanding is shown, which is accurate and detailed.</p> <p>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 are present and very effective. The conclusions drawn are fully supported by judgements.</p>	2	4 – 6	<p>A coherent explanation of how engineering has contributed to reducing the impact on the modern world’s reliance on fossil fuels.</p> <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 are 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 basic explanation of applied engineering, which may not be fully accurate. Doesn’t mention renewable source context at all.</p> <p>A limited range of relevant knowledge and understanding is shown, but is often</p>
Level	Marks	Description												
3	7-9	<p>A coherent explanation with reference to the impact of engineering in a renewable source context</p> <p>A wide range of relevant knowledge and understanding is shown, which is accurate and detailed.</p> <p>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 are present and very effective. The conclusions drawn are fully supported by judgements.</p>												
2	4 – 6	<p>A coherent explanation of how engineering has contributed to reducing the impact on the modern world’s reliance on fossil fuels.</p> <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 are 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 basic explanation of applied engineering, which may not be fully accurate. Doesn’t mention renewable source context at all.</p> <p>A limited range of relevant knowledge and understanding is shown, but is often</p>												

			<p>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, are of limited effectiveness. Attempts to draw conclusions are seldom successful and likely to be irrelevant.</p>	
	0		No creditworthy material	
<p>Indicative content:</p> <p>3: Justification or evaluative statements to include any of the following:</p> <ul style="list-style-type: none"> • engineering in terms of wind turbines and wind farms both onshore and offshore • engineering electrical cabling to connect wind sources to the grid • strong, clear confident engineering technology justified • engineering – hydro-electric applications • solar voltaic technology using roofs to produce electrical energy • geothermal applications • ground and air source heat pumps engineering technology • engineering materials to reduce the amount of energy lost eg heat from buildings. <p>2: Reasoned statements with some justification to include any of the following:</p> <ul style="list-style-type: none"> • some statements on applications of engineering to renewable sources of energy • engineered materials are briefly mentioned • reduction on use of oil is briefly mentioned • some references to examples given • mechanical engineering technology for turbines – wind, sea, tidal and hydro technology. <p>1: Brief statements with no justification:</p> <ul style="list-style-type: none"> • very brief statements on how engineering has reduced the reliance on fossil fuels • statements on wind and one other new engineering technology. <p>0: No written material that has any reference to the context of a reduction in fossil fuel reliance or renewable energy solutions.</p>				

	Accept any other suitable response.	
18	<p>Which one of the following is a type of motion?</p> <p>Answer: A Change in velocity</p>	<p>1</p> <p>AO1=1</p>
19	<p>Which one of the following describes the heat of combustion?</p> <p>Answer: D The total amount of energy released</p>	<p>1</p> <p>AO1=1</p>
20	<p>Which one of the following describes the mechanical property of plasticity?</p> <p>Answer: D Permanent deformation</p>	<p>1</p> <p>AO1=1</p>
21	<p>Which one of the following is a unit of electrical resistance?</p> <p>Answer: B Ohms</p>	<p>1</p> <p>AO1=1</p>
22 (a)	<p>Name the joining tool shown in Figure 5 and describe one application for this tool.</p> <p>Award one mark (AO1) for identification of the tool in Figure 5.</p> <ul style="list-style-type: none"> • Spanner. <p>Accept Plain-ended spanner.</p> <p>Do not accept adjustable spanner or combination spanner.</p> <p>Award one mark (AO2) for an application of the tool in Figure 5.</p> <ul style="list-style-type: none"> • For tightening nuts and/or bolts. <p>Accept any other suitable response.</p>	<p>2</p> <p>AO1=1</p> <p>AO2=1</p>
22 (b)	<p>There are many different joining tools used in Engineering.</p> <p>Identify a different joining tool from the one shown in Figure 5.</p> <p>Award one mark for identification.</p> <ul style="list-style-type: none"> • Riveting gun. • Screwdriver (Phillips, Torx, slotted, Pozidriv). 	<p>1</p> <p>AO1=1</p>

	<ul style="list-style-type: none"> • Hot glue gun. • Soldering iron. • Nail gun. <p>Accept any other suitable response.</p>	
--	--	--

22 (c)	<p>Identify the tool shown in Figure 6 and describe how you would use it.</p> <p>Award one mark (AO1) for correct identification.</p> <ul style="list-style-type: none"> • Buffing wheel. (1) <p>Award 2 marks (AO2) for a description of the tool shown in Figure 6.</p> <ul style="list-style-type: none"> • Application of buffing compound to the wheel (1) to act as an abrasive against material being buffed. (1) <p>Accept any other suitable response.</p>	<p>3</p> <p>AO1=1</p> <p>AO2=2</p>
---------------	--	---

23 (a)	<p>A product sometimes needs a polished finish to look attractive or reflective.</p> <p>Identify one engineering material that can have a polished finish and give one example of where this polished material might be used effectively.</p> <p>Award one mark (AO1) for identification:</p> <ul style="list-style-type: none"> • stainless steel (1) • aluminium (1) • chrome (applied to another metal eg brass or copper). (1) <p>Award one mark (AO3) for an example of an effective use:</p> <ul style="list-style-type: none"> • car lights for reflectiveness/visibility (1) • mirrors for clear, accurate reflection (1) • fixings which require a reflective, attractive finish. (1) <p>Accept any other suitable response.</p>	<p>2</p> <p>AO1=1</p> <p>AO3=1</p>
---------------	---	---

23 (b)	<p>Identify one material where oxidation occurs and give a reason why oxidation should be prevented.</p> <p>Award one mark (AO2) for an example:</p> <ul style="list-style-type: none"> • lead (1) • copper (1) • mild steel (1) • aluminium. (1) <p>Award one mark (AO3) for a reason why oxidation should be prevented.</p> <ul style="list-style-type: none"> • Product remains attractive by reducing discoloration (eg lead goes grey, copper goes green with sulphates, mild steel rusts a red colour). • Increased longevity/usage of a product (eg car bodywork). • Helps retain value as appearance of product remains the same for longer. <p>Accept any other suitable response.</p>	<p>2</p> <p>AO2=1</p> <p>AO3=1</p>
---------------	---	---

24	<p>Engineering is replacing telephone lines with fibre.</p> <p>Explain how replacing telephone lines with fibre is changing our lives.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%;">Level</th> <th style="width: 10%;">Marks</th> <th style="width: 80%;">Description</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">7 – 9</td> <td> <p>A coherent explanation with reference to communication technological advances and its applications with smart technology</p> <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 are present and very effective. The conclusions drawn are fully supported by judgements.</p> </td> </tr> </tbody> </table>	Level	Marks	Description	3	7 – 9	<p>A coherent explanation with reference to communication technological advances and its applications with smart technology</p> <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 are present and very effective. The conclusions drawn are fully supported by judgements.</p>	<p>9</p> <p>AO1=3</p> <p>AO2=3</p> <p>AO3=3</p>
Level	Marks	Description						
3	7 – 9	<p>A coherent explanation with reference to communication technological advances and its applications with smart technology</p> <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 are present and very effective. The conclusions drawn are fully supported by judgements.</p>						

2	4 – 6	<p>A clear explanation with reference to some technological communication advances and its application in context.</p> <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 are 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 basic explanation of technology and its application in effective communications</p> <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 may be inappropriate, and may show fundamental errors.</p> <p>Analysis and evaluation, if present, are of limited effectiveness. Attempts to draw conclusions are seldom successful and likely to be irrelevant.</p>
	0	No creditworthy material

Indicative content:

3: Justification or evaluative statements to include the following:

- electronic connectivity of a phone to the internet and the many applications in communication that this enables
- superfast speeds for downloading films and data
- greater capacity in fibre cables
- remote working capabilities resulting in changing work practices
- some cannot access due to cost/location (where it isn't available) thus leading to disadvantage

	<ul style="list-style-type: none">• explanation includes the benefits of such applications to the user in terms of total connectivity eg email, text messages• several examples are quoted with a range of benefits• strong justification on communication technologies. <p>2: Reasoned statements with some justification to include the following:</p> <ul style="list-style-type: none">• there is some justification on the use of telecommunication technology• at least two benefits are illustrated• a range of applications are illustrated• some explanation on fibre cable technology. <p>1: Brief statements with no justification:</p> <ul style="list-style-type: none">• some reference to communication applications• brief statements on the benefits of such technology• little or no justification statements have been included. <p>0: No written material that has any reference to the context of communication.</p> <p>Accept any other suitable response.</p>	
--	---	--

Assessment Objective Grid

Question	AO1	AO2	AO3	Total
1	1			1
2	1			1
3	1			1
4		2		2
5	1	2		3
6a	2			2
6b	1			1
7	1			1
8	2			2
9	1	2		3
10	3	3	3	9
11a		2		2
11b	1			1
12	2		2	4
13		2		2
14a	1			1
14b	1			1
14c	3			3
15			3	3
16		5		5
17	3	3	3	9
18	1			1
19	1			1
20	1			1
21	1			1
22a	1	1		2
22b	1			1
22c	1	2		3
23a	1		1	2
23b		1	1	2
24	3	3	3	9
Total	36	28	16	80