



Mark Scheme (Pre-Standardisation)

February 2021

NQF BTEC Level 1/Level 2 Firsts in
Applied Science

Unit 8: Application of Science (20474E)

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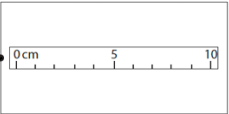
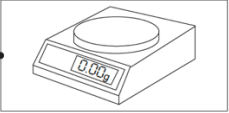
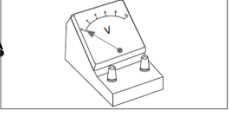
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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- All marks on the mark scheme should be used appropriately.
- All marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if a candidate's response is not worthy of credit according to the mark scheme.
- Where some judgment is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt about applying the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed-out work should be marked UNLESS the candidate has replaced it with an alternative response.
- Phonetic spelling should be accepted.

BTEC Next Generation Mark Scheme Unit 8

Item	Expected answers	Additional guidance	Marks
1 (a)(i)	<div style="display: flex; align-items: center; justify-content: center;"> <div style="border: 1px solid black; padding: 5px; margin-right: 20px;">measures voltage</div> <div style="border: 1px solid black; padding: 5px; margin-right: 20px;">measures length</div> <div style="display: flex; flex-direction: column; gap: 10px;"> <div style="border: 1px solid black; padding: 5px; text-align: center;"></div> <div style="border: 1px solid black; padding: 5px; text-align: center;"></div> <div style="border: 1px solid black; padding: 5px; text-align: center;"></div> <div style="border: 1px solid black; padding: 5px; text-align: center;"></div> <div style="border: 1px solid black; padding: 5px; text-align: center;"></div> </div> </div>	only one line from each box allowed	2 clerical
1 (a)(ii)	D measuring cylinder		1 grad
1 (b)	<p>allow time to cool down (1)</p> <p>use a (heatproof) glove (1)</p>	<p>allow don't touch while hot</p> <p>allow wrap a cloth around the neck of the flask / use tongs to pick up the flask</p> <p>ignore PPE (personal protective equipment)/hazmat suits</p> <p>do not accept plastic/latex gloves</p>	2 grad
Total mark			5

Item	Expected answers	Additional guidance	Marks
2 (a)(i)	temperature		1 clerical
2 (a)(ii)	line between the two drawn already (1) starting from 0 (1) flattening out at the same place as the others (1)	ignore any lines above the flat section	3 grad
2 (b)	Any four points from: Method measure known volume of sodium thiosulfate into a flask (1) add a measured volume of hydrochloric acid (1) (place the flask on the cross) start stopwatch/timer {immediately/when acid is added} (1) stop stopwatch/timer when cross is no longer visible (1) repeat the experiment with three different concentrations of sodium thiosulphate (1) OR use the same volume of solution but replace some of the sodium thiosulphate with water (1) AND Any two points from: Controls same volume of acid (1) same concentration of acid (1) same initial temperature (1) stir/swirl the flask the same each time (1) same cross used each time (1) same total volume of solution (1)	accept amount for volume throughout ignore 'time the experiment' accept dilute the sodium thiosulfate	6 expert
Total mark			10

Item	Expected answers	Additional guidance	Marks
3	column labelled mass (of sodium chloride) (1) column labelled time (taken for sodium chloride to dissolve) (1) data placed in correctly ascending/descending order of mass/time (1)	ignore units	3 expert
Total mark			3

Item	Expected answers	Additional guidance	Marks
4 (a)(i)	<p>Axes (2) both label and unit required for each axis X-axis: voltage/V (1) and Y-axis: current/A (1)</p> <p>Scaling (2) scale appropriate (1) linear scale on both axes (1)</p> <p>Plotting (2) all 6 points plotted correctly (2) OR 4 or 5 points plotted correctly (1)</p>	allow reversal of axes allow 1 mark if both axes labelled, but units missing data range needs to cover at least half the graph paper in both directions if numbers on the axes are taken directly from the table in the order of the table then allow a maximum of 2 marks for correct axes +/- one small square if bar chart drawn 2 marks max for axes labels and units	6 expert

4 (a)(ii)	Any two from: repeat the reading (1) ignore the result (1) {draw a graph/use the trend} to predict the value for the anomalous result (1)		2 grad
4 (b)	2.5 (3) 2.489 (2) OR $\frac{11.2}{4.5}$ (2) 11.2 = I x 4.5 (1)	accept any number of decimal places	3 expert
Total mark			11

Item	Expected answers	Additional guidance	Marks
5 (a)	44 (2) OR $\frac{56 + 34 + 65 + 45 + 20}{5}$ (2) OR 56 + 34 + 65 + 45 + 20 (1) OR a number divided by 5 (1)	$\frac{220}{5}$ 220	2 grad
5 (b)(i)	4(cm) /four	+/- one small square	1 clerical
5 (b)(ii)	(from day 4) plant height increases (1) no growth/change in height from days 0-4 (1)	allow positive correlation	2 grad
Total mark			5

Item	Expected answers	Additional guidance	Marks
6 (a)	circle around point at (30, 60)	clip with (b)	1 grad
6 (b)	line of best fit drawn missing points by no more than 1 small square and missing point at 30	line must be straight ignore line above and below the bottom and top points ignore dot to dot and sketched lines, tramlining clip with (a) allow ecf	1 grad
6 (c)	Any two linked pairs: incident light ray was at more than 30° to normal (1) so reflected ray was also at the same (larger) angle (1) OR mirror was twisted away from the incident ray (1) so larger angle of reflection produced (1) OR protractor not lined up with the mirror correctly / protractor read in reverse (1) so angle measured was larger (1)		4 expert
Total Mark			6

Item	Expected answers	Additional guidance	Marks
7	conclusion 1 is partially supported (1) the numbers of bees is at their lowest in January, however there is insufficient data to say this is always the case (1) conclusion 2 is not supported (1) the maximum bee population is approximately two to three months after the maximum amount of pollen (1)		4 expert
Total Mark			4

Item	Indicative Content		Marks
8	<p>Strengths looking at a variety of different lifestyle factors including diet, hydration and exercise requires learners to eat five different portions of fruit and vegetables a day requires learners to exercise every day</p> <p>Weaknesses no specific quantity of water is mentioned the time of exercise isn't specified the type of exercise isn't specified the method doesn't take into account the learners' medical conditions or dietary preferences the method isn't specific about what type of protein the learners should consume the method doesn't consider other food types such as carbohydrates the method doesn't have a time limit five learners is not a sufficient sample size the method doesn't specify the gender or age of the learners asked to test the method no monitoring of the method is identified the method doesn't specify how much a portion of fruit or vegetables is/ whether it is one portion each for each of five people, maybe use 4 or 6 people)</p> <p>Improvements Drink two litres of water a day Specify a type of exercise and a length of time for which the exercise should be carried out Devise a method to evaluate Increase the number of learners testing the method and the diversity of these learners Check the medical conditions of learners testing the method Learners are required to keep a food and exercise diary</p>		6 expert
Level	0	no rewardable material.	
Pass	1-2	Basic arguments on both sides identified, or only one side considered. The answer is likely to be in the form of a list. Points made will be superficial/generic and not applied/directly linked to the situation in the question. No conclusion produced or the conclusion a consequence of only one side of the argument being considered.	
Merit	3-4	Arguments for and against are described, but there will be more emphasis on one side than the other. The answer will be unbalanced. A conclusion is present, but this is either implicit or as a result of unbalanced consideration of the arguments. There is little or	

		unfocused justification of the conclusion. Most points made will be relevant to the situation in the question, but the link will not always be clear.
Distinction	5-6	Balanced explanation of both sides for and against. A conclusion is produced which is justified clearly linked to the consideration of arguments for and against, and their relative importance to the situation. The majority of points made will be relevant and there will be a clear link to the situation in the question.
		Total Mark 6

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