Mark Scheme

November 2015 (1511)

NQF BTEC Level 1/Level 2 Firsts in Application of Science

Unit 8 (20474E)

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Item	Expected answers	Additional guidance	Marks
1 (a)(i)	measuring cylinder (1)	Accept correct label on diagram Ignore tube Accept phonetic spelling	1
1 (a) (ii)	(curved) line drawn at 6th long line up / with bottom of line at 6th line	accept straight vertical line from base to 6/horizontal line at side, with or without arrow	1
1 (b) (i)	Solution with pH value 1 / 4 / 14 (1)	(Strong) acid /(Strong) alkali solution	1
1b (ii)	Infection/disease/allergies/ (1)	Allow make you ill/ unwell/ sick Ignore 'harmful'	1
1 (c)	Any **two** control variables from: Same temperature (1) Solutions with same pH (1) Same size paper discs (1) Same bacteria/specific named bacteria (1) Same {type/ volume} of agar (1) Same time of growth (1) Same time to soak discs (1)	Allow same solutions Allow same amount of agar	2
		Total mark	**6**

Item	Expected answers	Additional guidance	Marks
2 (a)	mass (taken to break thread)	weight / force (taken to break thread)(1) ignore 'mass hanger' alone	1
2 (b)	Any six from gives a range of thicknesses/use at least three threads (1) thread made from the same material (1) same length of thread used each time (1) add the masses/weight (1) increase mass incrementally/ one at a time / add the same mass each time (1) place the masses not drop them/increase the applied force in a controlled way (1) use smaller mass increments near the thread's breaking point (1) Note/ record the mass needed to break the thread (1)	Ignore references to time	6
		Total mark	**7**

Item	Expected answers	Additional guidance	Marks
3 (a)	The temperature (of the water) has increased (1)	It goes up by 11 °C	1
3 (b)	Rows labelled time and temperature (ignore units) (1) Put numbers in correct rows (1) Puts numbers in ascending order of time across the row (1)	Labels can be in either row. Ignore 'amount of minutes'	3
3 (c)	As the mass increases the energy increases (1) Energy {increases by the same amount / 480 (J)} each time / mass (of fuel) is directly proportional to energy (transferred to water) (1)	ORA ORA	2
		Total mark	**6**

Item	Expected answers	Additional guidance	Marks
4 (a)(i)	(speed is) increasing	Allow accelerating/ getting faster	1
4 (a) (ii)	5 / -5 (2) 24 – 19 (2) OR 19 – 24 (2) OR 24 and 19 seen (1)	 Allow working on graph (1)	2
4 (b)	1080 (3) OR 600 + 480 = (1080) (3) OR 480 (2) OR 960 (1) OR Read values 40 and 24 from the graph (1) Substitution of values into triangle formula (1) Addition of 600 to area of triangle (1)	 Allow +/- 1 small square 0.5 x 40 x 24 or ecf from above Allow ecf from above	3
4 (c)	2.4 (2) $\frac{12}{5}$ = (2) 12 = 5 x R (1)		2
		Total mark	**8**

Item	Expected answers	Additional guidance	Marks
5 (a) (i)	X axis labelled blood group/type (1) Y axis labelled (number of) people (1)	Reject 50	2
5(a)(ii)	O	Allow O bar circled on graph	1
5 (b)	**Labelling:** Clear division of the remaining segments with a 3:1 ratio(1) Correct labelling of both segments (3 segments for blue, 1 segment for green) (1)	Mark point 2 is dependent on mark point 1	2
		Total mark	5

Item	Expected answers	Additional guidance	Marks
6 (a)	47.5 / 48 (2) Or $\frac{49 + 48 + 47 + 46}{4}$ (2) Or ECF ÷ 4 (1) OR 49+48+47+46 (1)	 190	2
6 (b) (i)	32 circled (1)	Allow 32 next to the question	1
6 (b) (ii)	Any **two** linked pairs: Stopped the stopwatch too early / started the stopwatch too late (1) therefore less steps recorded (1) They tripped/fell/injured (1) therefore wasted time recovering and less steps were recorded (1) They were tired/ fatigued /slowed down/did not try as hard (1) therefore had less energy (1) Miscounted/ recorded result incorrectly (1) therefore got a lower/smaller number of steps (1)	Must relate to less steps than expected. Started stepping too late / finished stepping too early (1) therefore less steps recorded during the time (1) Allow asthma If incorrect anomalous result circled, then ECF and answer relate to circled result	4
6c (i)	A single curve of best fit (1)	Reject dot to dot/ multiple lines	**1**
6(c) (ii)	Heartrate levels off at 70 / 70 is the lowest heartrate (1)	Stays at 70 /didn't rise or decrease	**1**
		Total mark	**9**

Item	Expected answers	Additional guidance	Marks
7 (a)	850	Read of graph +/- one small square Accept between 800 and 900	1
7 (b)	Any two from The resistance of the lamp decreases as voltage increases (1) After 8v the resistance stays the same (1) The line/data (is not directly proportional as) it is a curve (1)	Ignore comments that state that the hypothesis is correct. ORA ORA ORA	2
		Total mark	**3**

8	Indicative content: Ignore references to fair testing and accuracy. **Improvements** / **Explanations** Set/ record an initial temperature — So that someone else can do the same experiment Use water bath/ Bunsen burner/ immersion heater — to obtain the starting temperature {Add different/ use measured} amounts of cold water — To give a range of temperatures Stir the water — To ensure even temperature distribution Select Ohmmeter setting on multimeter — To measure resistance Repeat the experiment for a range of temperatures — So a pattern or a trend can be seen/ to see how temperature effects resistance Place the thermistor close to the thermometer — To ensure that the thermistor is at the same temperature as the water surrounding the thermometer/ at the required temperature Large difference in temperatures — To give a noticeable difference in the resistance reading of the thermistor. Thermistor should not touch the bottom of the beaker — So the reading of temperature is from the water and not from the beaker Record the reading on the thermometer and Ohmmeter at the same time — So that the temperature is correct when the resistance is measured.	6

Level	0	No rewardable material
Pass	1-2	Identifies improvements. Explains simply an improvement. e.g. record the initial temperature and stir the water OR stir the water to ensure an even temperature distribution.
Merit	3-4	Identifies some appropriate improvements and explains them. e.g. place the thermometer close to the thermistor and select the Ohmmeter setting on the multimeter so that it can measure the resistance of the thermistor.
Distinction	5-6	Identifies a range of appropriate improvements and explains them all. e.g. record the initial temperature so that someone else can do the experiment. Repeat the experiment for a range of temperatures so that a pattern or a trend can be seen. Have a large difference in the temperatures measured to give a noticeable difference in the resistance reading for the thermistor.

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