Do not write outside the box

0 7 **Table 8** shows information about some food components in cow's milk.

Table 8

	Value per 500 cm^3	Recommended Daily Allowance (RDA) for a typical adult
Energy in kJ	1046	8700
Fat in g	8.4	70.0
Salt in g	0.5	6.0
Calcium in mg	605	1000
Vitamin B-12 in µg	4.5	2.4

0 7 . 1 How much **more** milk would a typical adult have to drink to get their RDA for calcium compared with the amount of milk needed to get their RDA for vitamin B-12?

[3 marks]

Volume of milk = _____ cm^3

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0 7 . 2 Describe how a student could test cow's milk to show whether it contains protein and different types of carbohydrate.

[6 marks]

Question 7 continues on the next page

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A scientist investigated the effect of bile on the breakdown of fat in a sample of milk.

The scientist used an indicator that is colourless in solutions with a pH lower than 10, and pink in solutions with a pH above 10.

This is the method used.

1. Add 1 drop of bile to a test tube and one drop of water to a second test tube.

2. Add the following to each test tube:
   - 5 cm^3 of milk
   - 7 cm^3 of sodium carbonate solution (to make the solution above pH 10)
   - 5 drops of the indicator
   - 1 cm^3 of lipase.

3. Time how long it takes for the indicator in the solutions to become colourless.

The results are shown in **Table 9**.

Table 9

	Time taken for the indicator to become colourless in seconds
Solution with bile	65
Solution without bile	143

0 7 . 3 Explain why the indicator in both tubes became colourless.

[3 marks]

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0 7 . 4 Give the reason why the measurement of the time taken for the indicator to become colourless might be inaccurate.

[1 mark]

0 7 . 5 Explain the difference in the results for the two test tubes in **Table 9**.

[3 marks]

16

END OF QUESTIONS

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.1		an answer of 560 / 559.8 / 559.78 / 559 (cm^3) scores **3** marks an incorrect answer for one step does not prevent allocation of marks for subsequent steps		AO2 4.2.2.1
	(for calcium) $\frac{500}{605} \times 1000 = 826.446281$ (cm^3)	allow any correct rounding to minimum 3 significant figures allow alternative route with correct rounding	1	
	(for vitamin B-12) $\frac{500}{4.5} \times 2.4 = 266.67$ (cm^3)	allow alternative route with correct rounding	1	
	560 / 559.8 / 559.78 / 559 (cm^3)	allow only correct answer based on values given for vitamin B-12 and calcium	1	

07.2	**Level 2**: Scientifically relevant facts, events or processes are identified and given in detail to form an accurate account.	4–6	AO1 4.2.2.1
	Level 1: Facts, events or processes are identified and simply stated but their relevance is not clear.	1–3	
	No relevant content	0	
	Indicative content • Biuret reagent (allow $CuSO_4$ and NaOH) tests for protein • add Biuret reagent to milk • solution will turn (from blue) to lilac if positive • iodine solution tests for starch (ignore iodine unqualified) • add iodine solution to milk • solution will turn (from orange / brown) to blue / black if positive • Benedict's reagent tests for sugars • add Benedict's reagent to milk and boil / heat (allow any temperature above 60 °C) • solution will turn (from blue) to (brick) red / brown / orange / yellow / green if positive for **level 2**, reference to all three food tests is required		

Question	Answers	Extra information	Mark	AO / Spec. Ref.
07.3	lipase breaks down fat into fatty acids (and glycerol)	do **not** accept if 'glycerol' is contradicted	1	AO2 4.2.2.1
	(and) fatty acids lower the pH		1	
	(and when) fatty acids cause the pH to be below 10 (the indicator becomes colourless)		1	
07.4	observation of colour change is subjective / based on opinion	ignore human error unqualified ignore experimental error or examples of this	1	AO3 4.2.2.1
07.5	bile emulsifies fats	allow a correct description of emulsification (ie breaks fat from large droplets into smaller droplets) do **not** accept a description of chemical breakdown	1	AO1 4.2.2.1
	creates a larger surface area (of fat)		1	AO2 4.2.2.1
	(so) lipase can break down fat (to produce fatty acids) more quickly / effectively	allow fatty acids produced by action of lipase more quickly	1	AO3 4.2.2.1
Total			**16**	