

Model Answers: Medium

1

The correct answer is **D**, as to prove that starch has been digested into maltose (a reducing disaccharide), you would use Benedict's reagent. If maltose has been produced then a brick-red precipitate would form.

You would not use the iodine test for starch (**C**) as unless all of the starch is digested you would get a positive test result (which you would expect if any starch is present in the solution).

2

The correct answer is **A** because:

- A lilac (purple) observation in the Biuret test suggests the presence of protein
- The presence of a yellow precipitate in the Benedict's test suggests that some reducing sugar is present in the sample

B is incorrect as	the result of the ethanol emulsion test is negative, so no lipid can be present.
C is incorrect as	unless you are explicitly told that the Benedict's test used involved acid hydrolysis, you should assume that a positive result is indicative of a reducing sugar.
D is incorrect as	the test result for starch (iodine) is negative (a positive result would be a strong blue-black colour)

3

The correct answer is **A** because:

- Only solution **2** remains blue after mixing with Benedict's solution, suggesting a negative result for reducing sugar.
- Solutions **1** and **3** show a colour change along the spectrum of colours green to brick-red which indicates reducing sugar present.

Test 2 is distractor information not relevant to the question asked.

4

The correct answer is **C** because:

- A non-reducing sugar will not react with copper (II) sulfate ions in Benedict's reagent when gently heated.
- However, if the sample is heated with dilute hydrochloric acid, neutralised with sodium hydrogencarbonate and then gently heated with Benedict's; a non-reducing sugar will produce a positive test result (in this case orange)
 - The treatment with acid is called 'acid hydrolysis'; this reaction results in the breakage the glycosidic bond present in any non-reducing disaccharides; once broken down into monosaccharides a reaction with copper (II) sulfate can occur.

5

The correct answer is **D** because:

- An orange precipitate formed in a Benedict's test suggests the presence of reducing sugars
- A lilac biuret test result suggests the presence of protein

A & C would be incorrect because the ethanol test observation was clear (no cloudy emulsion) and **B** is incorrect - non-reducing sugars could be present but no information is given about mixing the solution with hydrochloric acid, neutralising it and then testing with Benedict's solution.

6

The correct answer is **D** because the observations show positive results for both reducing sugars (Benedict's) and protein (biuret), but a negative test result for lipids (ethanol and water).

7

The correct answer is **C** because the molecule is shown in a phospholipid; being a type of lipid and nonpolar it can dissolve in ethanol. Ethanol is miscible in water, but any lipid present in the ethanol is not able to dissolve in the water and will, therefore, be dispersed throughout it - forming a cloudy emulsion.

8

The correct answer is **D** because:

- You only need to look at the result of test 2 to identify which solutions contain non-reducing sugars
- If the non-reducing sugar is hydrolysed and forms reducing sugars (for example if sucrose \rightarrow glucose + fructose); these reducing sugars can now react with copper (II) sulfate in Benedict's solution to form coloured precipitates
- Therefore any colour change away from the blue colour of Benedict's solution suggests that a reducing sugar is **now** present
 - The most common non-reducing sugar is sucrose, a disaccharide composed of glucose and fructose (themselves reducing sugars)

9

The correct answer is **C** because the observations suggest that lipids and proteins are present in the sample, whereas starch and non-reducing sugars are not.

10

The correct answer is **D** because:

- Observing a blue colour when a solution is heated with Benedict's reagent without acid hydrolysis indicates no reducing sugar is present in the sample.
- Non-reducing sugars can undergo acid hydrolysis forming monosaccharides which can react with copper (II) sulfate in Benedict's reagent (after the solution has been neutralised). A non-reducing sugar would in this situation produce a positive test result (as copper (I) oxide is formed)
- If the solution remains blue then a non-reducing sugar cannot be present in the sample, so only option **D** can be correct.