

1. Organisms can be classified into taxa by analysing and comparing some of their molecules.

The molecules below are all involved in respiration.

Which would be the most appropriate molecule to study in order to classify organisms into taxa?

- A ATP synthase
- B Acetyl coenzyme A
- C NAD
- D FAD

Your answer

[1]

2. The following reactions all occur in mitochondria during aerobic respiration:

- 1 decarboxylation of pyruvate
- 2 reduction of NAD
- 3 substrate level phosphorylation of ATP.

Which reaction(s) take place outside the mitochondria in yeast cells?

- A 1, 2 and 3
- B Only 1 and 2
- C Only 2 and 3
- D Only 1

Your answer

[1]

3. Cellular respiration occurs in different regions of a cell.

In which region is FADH_2 produced?

- A Cytoplasm
- B Outer mitochondrial membrane
- C Inner mitochondrial membrane
- D Mitochondrial matrix

Your answer

[1]

4. Which of the options, A to D, is not a coenzyme?

- A ATP
- B FAD
- C NAD
- D NADP

Your answer

[1]

5. The statements below relate to biological characteristics of the respiratory pigments.

Which of the following statements is / are correct?

- Statement 1:** At any partial pressure of oxygen, myoglobin has a lower oxygen saturation level than adult haemoglobin.
- Statement 2:** The oxygen dissociation curves for fetal and adult haemoglobin are sigmoidal due to the cooperative binding of oxygen.
- Statement 3:** Haemoglobin releases oxygen more readily at low pH.

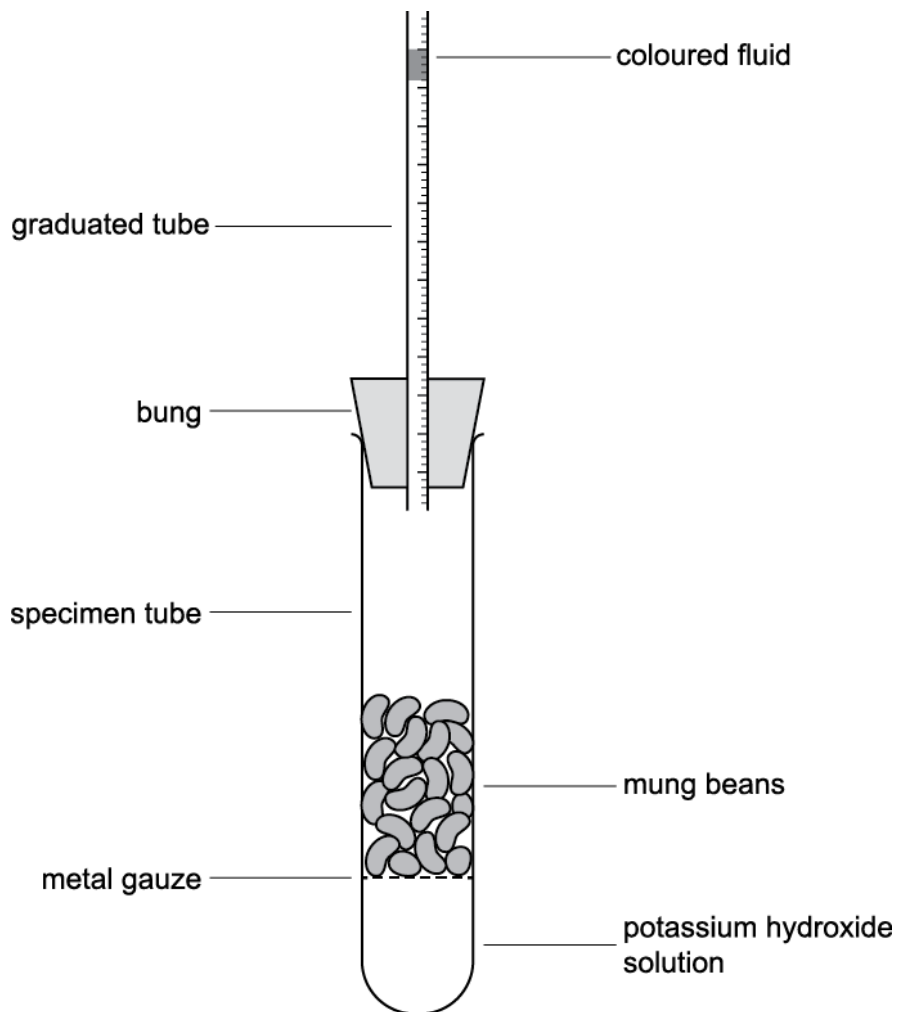
- A 1, 2 and 3 are correct
- B Only 1 and 2 are correct
- C Only 2 and 3 are correct
- D Only 1 is correct

Your answer

[1]

6. A respirometer was used to investigate the rate of respiration in germinating mung beans.

The diagram below shows how the respirometer was set up.



An identical respirometer (not shown) was set up as a control, to confirm that any movement of the coloured fluid was due to respiration.

Which of the options, A to D, should be a feature of the control respirometer?

- A absence of potassium hydroxide solution
- B dried mung beans instead of germinating mung beans
- C pure carbon dioxide inside the specimen tube
- D used in conditions with no light

Your answer

[1]

7. Acetyl coenzyme A (Acetyl CoA) combines with choline to produce acetylcholine.

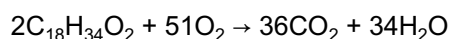
Which of the options, A to D, is an enzyme in which mutations may affect production of acetylcholine?

- A carbonic anhydrase
- B lactate dehydrogenase
- C pyruvate decarboxylase
- D ribulose biphosphate carboxylase

Your answer

[1]

8. The balanced equation for the aerobic respiration of a substrate is given below.



Which of the statements, A to D, gives the correct respiratory quotient (RQ) and identity of this substrate?

- A RQ = 0.68, and the substrate is a carbohydrate
- B RQ = 0.71, and the substrate is a fatty acid
- C RQ = 0.76, and the substrate is a carbohydrate
- D RQ = 1.00, and the substrate is a fatty acid

Your answer

[1]

9. Which of the options, A to D, correctly identifies the products of anaerobic respiration in yeast?

- A CO₂, NAD, ATP and ethanol
- B CO₂, NAD, ADP and lactic acid
- C CO₂, reduced NAD, ATP and ethanol
- D CO₂, reduced NAD, ADP and lactic acid

Your answer

[1]

10. Oxidative phosphorylation is the process in which the transfer of electrons from reduced NAD or reduced FAD to oxygen results in the production of ATP.

Which of the options, A to D, is the number of ATP molecules gained from the oxidation of **two** molecules of reduced NAD?

- A 2
- B 3
- C 4
- D 5

Your answer

[1]

11. Proton pumps establish electrochemical gradients, which are required for ATP production.

Which of the options, A to D, are regions of a plant cell into which protons are pumped?

- A chloroplast stroma and mitochondrial intermembrane space
- B chloroplast stroma and mitochondrial matrix
- C thylakoid space and mitochondrial intermembrane space
- D thylakoid space and mitochondrial matrix

Your answer

[1]

END OF QUESTION PAPER

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
1			A	1	
			Total	1	
2			A	1	
			Total	1	
3			D	1	
			Total	1	
4			A	1	
			Total	1	
5			C	1	
			Total	1	
6			B ✓	1	
			Total	1	
7			C ✓	1	
			Total	1	
8			B ✓	1	Examiner's Comments If candidates knew the equation for the respiratory quotient, this was an easy mark.
			Total	1	
9			A ✓	1	Examiner's Comments Only the candidates who understood that the reduced NAD is oxidised in anaerobic respiration could respond correctly, with option C being a very tempting distractor.
			Total	1	
10			D ✓	1	Examiner's Comments A straightforward question but most candidates did not recall the information needed for a correct response.
			Total	1	
11			C	1	
			Total	1	