

**AS Level Biology A**  
**H020/01** Breadth in Biology

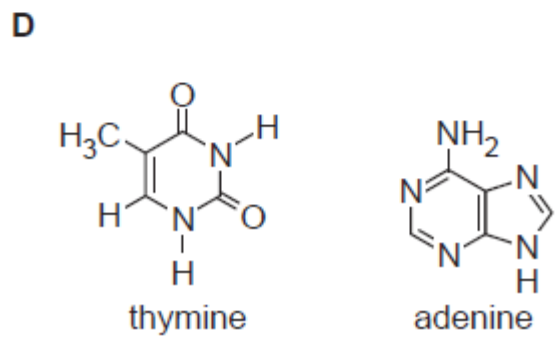
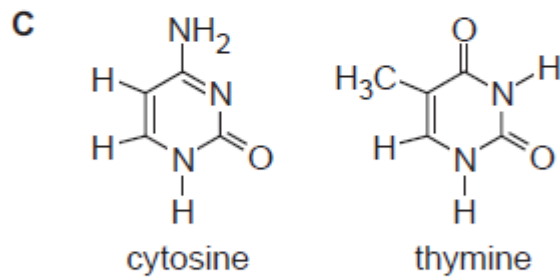
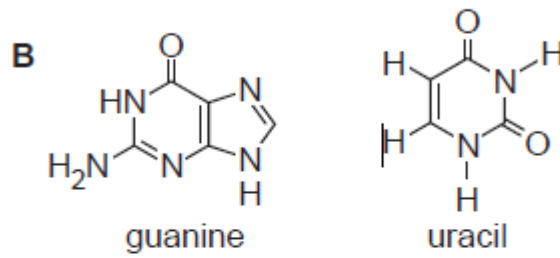
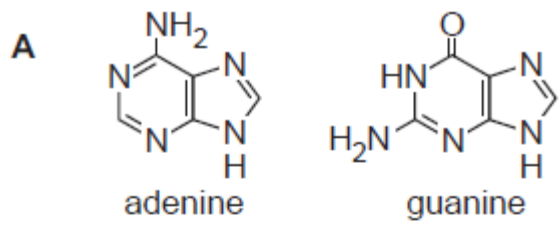
**Question Set 2**

Multiple Choice Questions

1.

DNA is formed from three main groups of molecules: pentose sugars, phosphate groups and nitrogenous bases. The bases can be divided into purines and pyrimidines.

Identify the two purines below.



Your answer

[1]

2.

A standard method can be used to extract DNA from the nuclei of cells in kiwi fruit.

The statements below list some of the steps involved in this method.

Which statement is **not** correct?

- A chop the kiwi fruit to break open cell membranes
- B add detergent to dissolve nuclear membranes
- C add protease to digest histone proteins
- D pour ice cold ethanol onto filtrate to precipitate DNA

Your answer

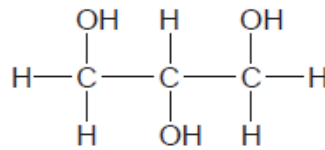
[1]

3.

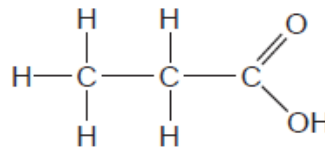
Water is known as the universal solvent as it has the ability to dissolve many ionic and covalent compounds due to its polar nature.

Which of the 3-carbon compounds will **not** form hydrogen bonds with water and will therefore **not** dissolve in water?

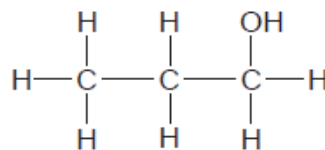
A glycerol



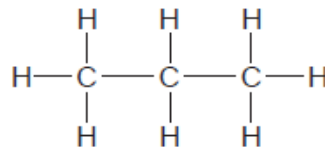
B propanoic acid



C propanol



D propane



Your answer

[1]

4. Which of the options, **A** to **D**, is a correct statement about polysaccharides of glucose?

**A** Cellulose microfibrils are formed by hydrogen bonding between adjacent chains of  $\alpha$ -glucose molecules bonded with 1,4-glycosidic bonds.

**B** Amylose is a straight chain of  $\alpha$ -glucose monomers bound by 1,6-glycosidic bonds to allow for dense packing.

**C** Glycogen has a high proportion of 1,6-glycosidic bonds to produce a highly branched molecule for rapid release of  $\alpha$ -glucose.

**D** Amylopectin has a mixture of 1,4-glycosidic and 1,6-glycosidic bonds between  $\beta$ -glucose molecules for rapid release of energy.

Your answer

**[1]**

5. A group of students was given a 1% solution of an unknown digestive enzyme. They were also given three tubes containing an identical mixture of foods. The students carried out a different biochemical test on each tube before and after adding the unknown enzyme. Their results are shown in the table below.

	Colour before	Colour after
<b>Biuret test</b>	purple	purple
<b>Iodine test</b>	blue / black	yellow / orange
<b>Benedict's test</b>	brick red	brick red

Name the type of enzyme the students used.

**A** protease

**B** carbohydrase

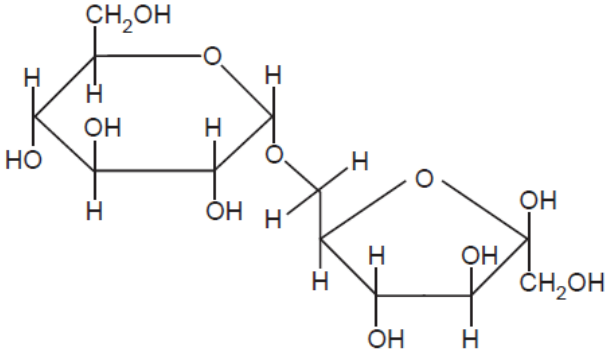
**C** lipase

**D** cellulase

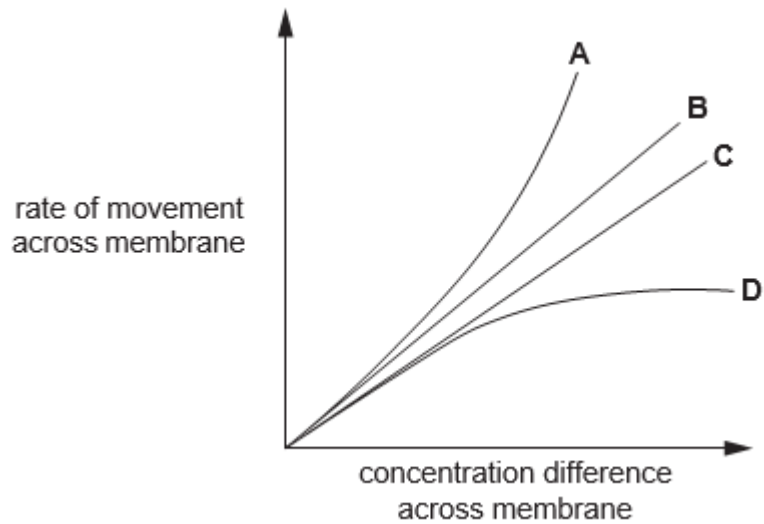
Your answer

**[1]**

<p>6.</p>	<p>DNA carries the genetic code which is non-overlapping and degenerate.</p> <p>Which of the options, <b>A</b> to <b>D</b>, contains the correct definitions for non-overlapping and degenerate code?</p> <p><b>A</b> Each nucleotide is only part of one triplet of bases and the molecule breaks down easily.</p> <p><b>B</b> The genes follow straight after each other and the molecule breaks down easily.</p> <p><b>C</b> Each nucleotide is only part of one triplet of bases and more than one triplet codes for a specific amino acid.</p> <p><b>D</b> The genes follow straight after each other and more than one triplet codes for a specific amino acid.</p> <p>Your answer <input data-bbox="571 667 651 745" type="checkbox"/></p>	<p>[1]</p>
<p>7.</p>	<p>Which option, <b>A</b> to <b>D</b>, describes the role of cholesterol in cell surface membranes in the human body?</p> <p><b>A</b> Cholesterol binds to phospholipid phosphate heads, increasing the packing of the membrane, therefore increasing the fluidity of the membrane.</p> <p><b>B</b> Cholesterol binds to phospholipid fatty-acid tails, reducing the packing of the membrane, therefore increasing the fluidity of the membrane.</p> <p><b>C</b> Cholesterol absorbs ATP, preventing active transport across the membrane.</p> <p><b>D</b> Cholesterol binds to phospholipid fatty-acid tails, increasing the packing of the membrane, therefore reducing the fluidity of the membrane.</p> <p>Your answer <input data-bbox="571 1283 651 1361" type="checkbox"/></p>	<p>[1]</p>
<p>8.</p>	<p>What is the correct definition of the term <b>coenzyme</b>?</p> <p><b>A</b> An inorganic ion that forms the centre of a globular protein.</p> <p><b>B</b> A molecule that binds to the enzyme, changing the shape of the active site, preventing an enzyme substrate complex from forming.</p> <p><b>C</b> A non-protein organic molecule, not permanently attached to an enzyme, but needed to allow the enzyme to function.</p> <p><b>D</b> A metal ion that attaches to the enzyme, changing the shape of the active site, increasing the likelihood of a reaction.</p> <p>Your answer <input data-bbox="571 1888 651 1966" type="checkbox"/></p>	<p>[1]</p>

<p>9.</p>	<p>During DNA replication, DNA polymerase can only work in one direction – from the 3' end to the 5' end. This means that the lagging strand has small gaps left in the backbone. DNA ligase works to seal these gaps.</p> <p>Which of the options, <b>A</b> to <b>D</b>, identifies the bond formed?</p> <p><b>A</b> hydrogen bond</p> <p><b>B</b> phosphodiester bond</p> <p><b>C</b> glycosidic bond</p> <p><b>D</b> peptide bond</p> <p>Your answer <input data-bbox="571 577 651 658" type="checkbox"/></p>	<p>[1]</p>
<p>10.</p>	<p>Which organelle, <b>A</b> to <b>D</b>, is <b>not</b> involved in the production and secretion of enzymes in eukaryotes?</p> <p><b>A</b> golgi apparatus</p> <p><b>B</b> ribosomes</p> <p><b>C</b> smooth endoplasmic reticulum</p> <p><b>D</b> vesicle</p> <p>Your answer <input data-bbox="571 1048 651 1128" type="checkbox"/></p>	<p>[1]</p>
<p>11.</p>	<p>The image below shows isomaltulose, a disaccharide formed from <math>\alpha</math>-glucose and fructose.</p>  <p>Name the bond that holds the <math>\alpha</math>-glucose and the fructose together.</p> <p><b>A</b> 1,6-glycosidic bond</p> <p><b>B</b> phosphodiester bond</p> <p><b>C</b> ester bond</p> <p><b>D</b> 1,4-glycosidic bond</p> <p>Your answer <input data-bbox="571 1899 651 1980" type="checkbox"/></p>	<p>[1]</p>

12. The graph shows the rate of movement of four different substances across a membrane.



The substances shown in the graph are: carbon dioxide, testosterone (a lipid-based hormone), ethanol and sodium ions.

Which of the lines, **A** to **D**, represents the pattern of movement of sodium ions across a membrane?

Your answer

[1]

13. DNA polymerase catalyses the formation of phosphodiester bonds during DNA replication.

Which of the statements, **A** to **D**, will **not** affect the rate of phosphodiester bond formation?

**A** temperature

**B** length of DNA molecule

**C** pH

**D** free nucleotide availability

Your answer

[1]

14. The hydroxyl (-OH) group of carbohydrates is polar and makes the molecule soluble in water. The greater the number of free hydroxyl groups as a proportion of the number of carbon atoms, the more soluble the carbohydrate.

Which of the rows, **A** to **D**, lists the carbohydrates in order of most soluble to least soluble?

	Most soluble	←—————→		Least soluble
<b>A</b>	glucose	ribose	amylose	amylopectin
<b>B</b>	amylose	amylopectin	glycogen	ribose
<b>C</b>	glucose	ribose	amylopectin	amylose
<b>D</b>	ribose	amylose	glucose	amylopectin

Your answer

[1]

15. The bacterium *Sorangium cellulosum* and the fungus *Armillaria mellea* are both found in soil.

Which of the rows, **A** to **D**, correctly shows the structures present in each organism?

	Free ribosomes in cytoplasm	Membrane bound nucleus	DNA in a single loop	Cell wall present
<b>A</b>	<i>S. cellulosum</i> and <i>A. mellea</i>	<i>A. mellea</i>	<i>S. cellulosum</i>	<i>S. cellulosum</i> and <i>A. mellea</i>
<b>B</b>	<i>S. cellulosum</i> and <i>A. mellea</i>	<i>A. mellea</i>	<i>S. cellulosum</i> and <i>A. mellea</i>	<i>S. cellulosum</i> and <i>A. mellea</i>
<b>C</b>	<i>S. cellulosum</i>	<i>S. cellulosum</i> and <i>A. mellea</i>	<i>S. cellulosum</i>	<i>A. mellea</i>
<b>D</b>	<i>A. mellea</i>	<i>S. cellulosum</i>	<i>S. cellulosum</i> and <i>A. mellea</i>	<i>S. cellulosum</i>

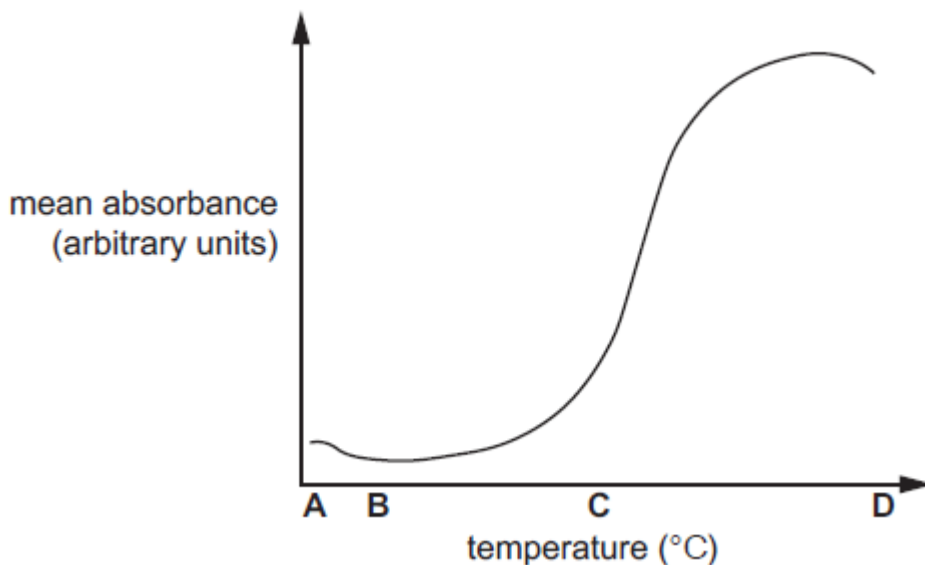
Your answer

[1]



16. Swiss chard is a leafy green vegetable related to spinach. Some varieties have yellow stalks that have vacuoles containing yellow betaxanthin pigments.

The graph below shows the effect of temperature on the release of these pigments recorded as mean absorbance, when measured with a colorimeter.



It was deduced that the betaxanthins were released from the vacuole due to the denaturing of proteins in the tonoplast (vacuolar membrane).

Which letter, **A** to **D**, shows the temperature at which the proteins denature?

Your answer

[1]

17. An investigation into how a change in sodium chloride concentration effects osmosis in potato cells concluded that the isotonic point of the potato was 0.25 M.

Which of the statements, **A** to **D**, describes what is happening at the isotonic point?

- A** there is a net movement of water from the sodium chloride solution into the potato cells
- B** there is a net movement of water from the cytoplasm of the potato cells into the sodium chloride solution
- C** there is no movement of water into or out of the potato cell cytoplasm
- D** the movement of water into the potato cells is equal to the movement of water out of the potato cells

Your answer

[1]

18. The table below shows four biological molecules and their component elements.

Which of the rows, **A** to **D**, correctly identifies the elements in each molecule?

	sucrose	cholesterol	insulin	ATP
A	C, H, O	C, H, O, N	C, H, O, N, S	C, H, O, N, P
B	C, H, O, N	C, H, O	C, H, O, N, S	C, H, O, N, S
C	C, H, O	C, H, O	C, H, O, N, S	C, H, O, N, P
D	C, H, O	C, H, O	C, H, O, N, P	C, H, O, N, P

Your answer

[1]

19. In human cells, the tumour suppressor gene *TP53* codes for a protein that interrupts the cell cycle if there is any damage to the DNA and prevents the copying of damaged DNA.

Which of the stages, **A** to **D**, could *TP53* interrupt the cell cycle?

**A** mitosis

**B** G<sub>1</sub>

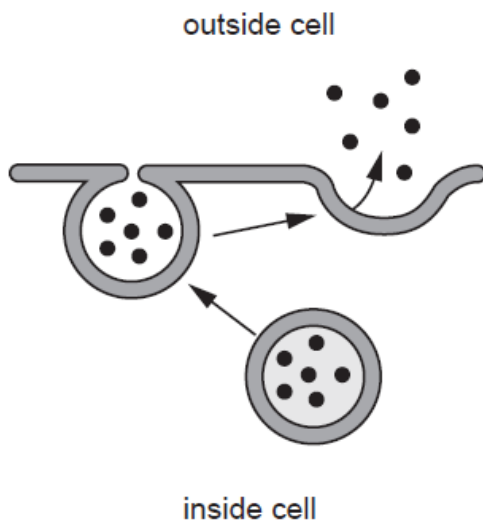
**C** S

**D** cytokinesis

Your answer

[1]

20. The diagram below shows one method of transport across a cell membrane.



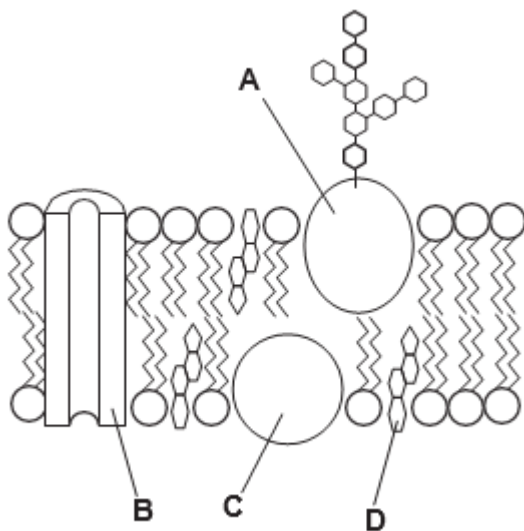
Which of the following options, **A** to **D**, is the name of this method of transport?

- A** cytokinesis
- B** endocytosis
- C** exocytosis
- D** phagocytosis

Your answer

[1]

21. The diagram below shows the structure of a plasma membrane.

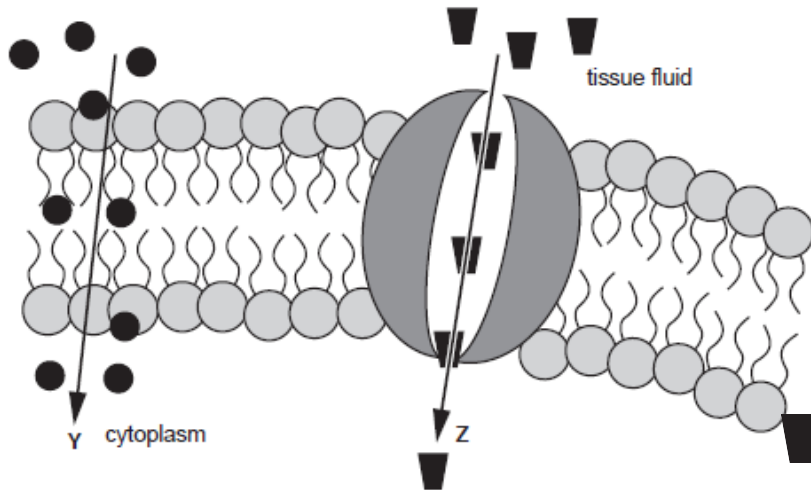


Which label, **A** to **D**, indicates the component of the membrane that can affect its fluidity?

Your answer

[1]

22. This diagram shows the transport of two molecules across a plasma membrane.



Which row, **A** to **D**, correctly identifies the molecule being transported **and** the mechanism of transport across the plasma membrane?

	<b>Y</b>	<b>Z</b>
<b>A</b>	glucose by active transport	oxygen by diffusion
<b>B</b>	glucose by diffusion	oxygen by active transport
<b>C</b>	oxygen by active transport	glucose by active transport
<b>D</b>	oxygen by diffusion	glucose by diffusion

Your answer

[1]

23. DNA is made up of two polynucleotide chains.

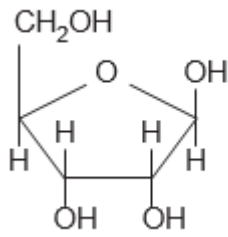
Which of the bonds, **A** to **D**, forms between two nitrogenous bases holding the two polynucleotide chains together?

- A** phosphodiester
- B** ionic
- C** covalent
- D** hydrogen

Your answer

[1]

24. The structure of a biological molecule is shown below.



Which of the following options, **A** to **D**, correctly describes the molecule?

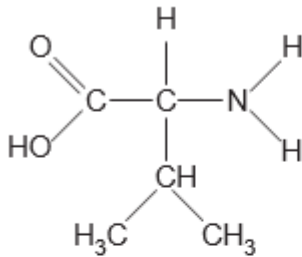
- A** hexose monosaccharide glucose
- B** hexose monosaccharide ribose
- C** pentose monosaccharide glucose
- D** pentose monosaccharide ribose

Your answer

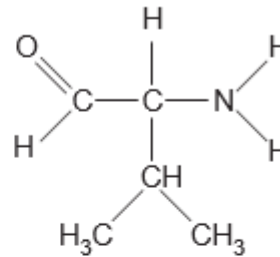
[1]

25. Which of the following molecules, **A** to **D**, could be a product of breaking a peptide bond during a hydrolysis reaction?

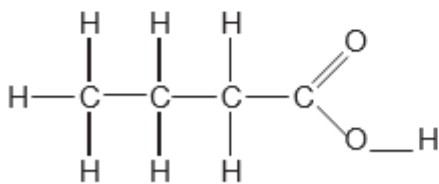
**A**



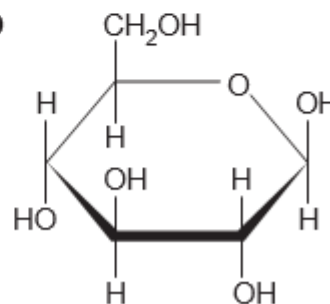
**B**



**C**



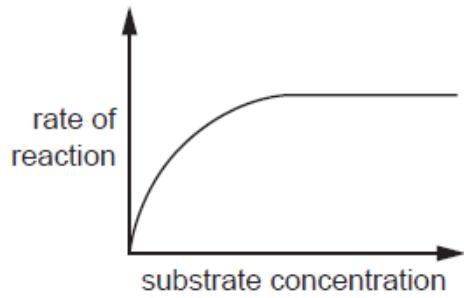
**D**



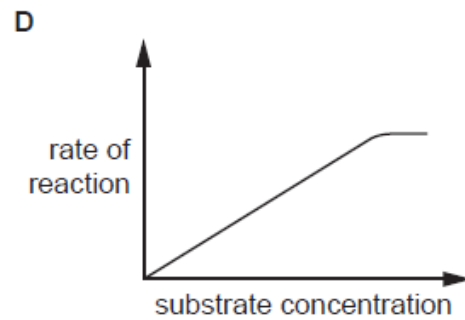
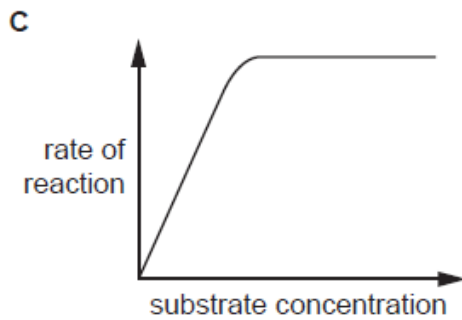
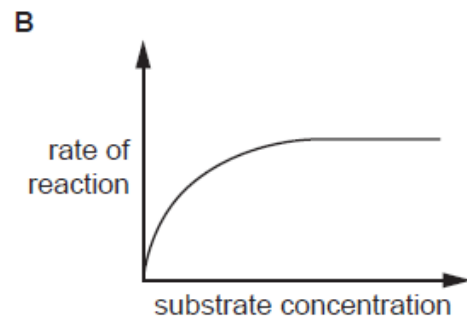
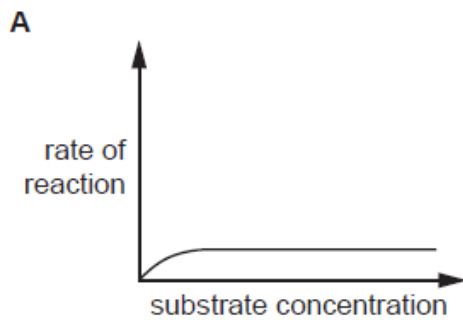
Your answer

[1]

26. The diagram below shows the effect of changing substrate concentration on the rate of an enzyme-controlled reaction.



Which of the following graphs, **A** to **D**, shows how a **non-competitive** inhibitor would affect the rate of this reaction?



Your answer

[1]

27. Which of the following ions, **A** to **D**, is required for the hydrolysis of starch by an enzyme?

- A**  $Cl^-$
- B**  $K^+$
- C**  $Na^+$
- D**  $Zn^{2+}$

Your answer

[1]

**28.** The table below shows the stages of the cell cycle.

Which row, **A** to **D**, shows the correct order of the different stages?

	<b>Cytokinesis</b>	<b>G<sub>1</sub></b>	<b>G<sub>2</sub></b>	<b>Mitosis</b>	<b>S</b>
<b>A</b>	four	two	three	one	five
<b>B</b>	five	one	three	two	four
<b>C</b>	three	four	one	two	five
<b>D</b>	four	two	five	one	three

Your answer

**[1]**

**Total Marks for Question Set 2: 28**

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