



## **GCE AS Level Biology**

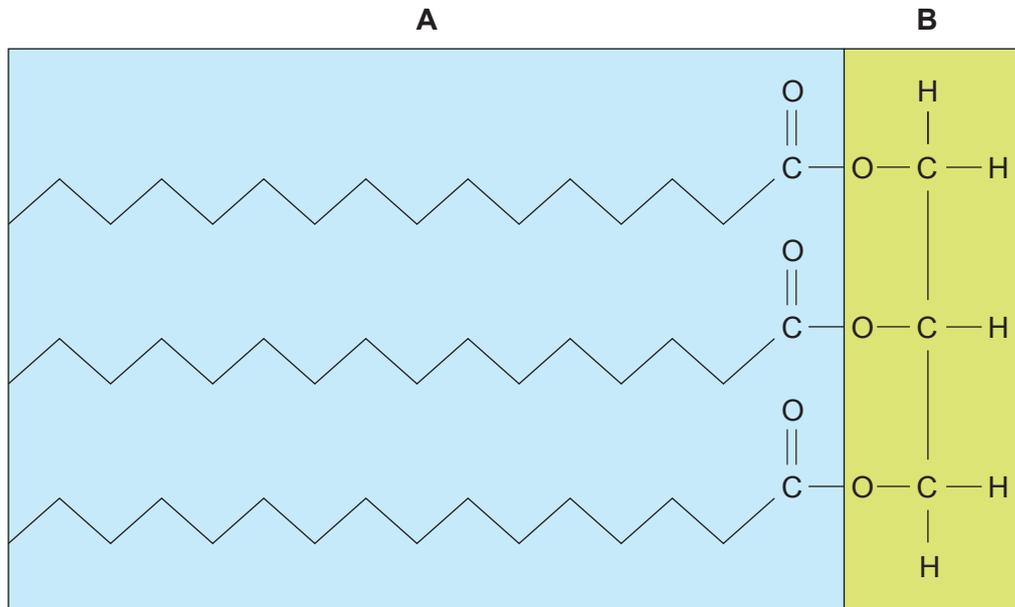
S21-B400U10-1

### **Assessment Resource 5**

Basic Biochemistry and Cell Organisation Resource E

1. Triglycerides are a class of lipids which are used for long term energy storage and thermal insulation, particularly in mammals and birds. **Image 1.1** shows the structure of a molecule of triglyceride found in a mammal.

**Image 1.1**



- (a) (i) Name the bonds in the triglyceride molecule which are hydrolysed by lipase enzymes. [1]

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- (ii) Following hydrolysis of these bonds, name the molecule that would be formed from portion **B** of the molecule in the diagram. [1]

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- (iii) Explain why it would be incorrect to refer to a triglyceride as a polymer. [1]

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- (iv) Describe a test which could be performed to detect the presence of triglyceride in a sample. [2]

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- (v) Identify the specific **type** of molecule shown in portion **A** of **image 1.1**. Explain your answer. [2]

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- (vi) Explain why a diet high in this **type** of molecule could increase the risk of heart disease. [2]

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Many seeds contain large amounts of lipid as a proportion of their mass.

During germination the new plant uses the food reserves within the seed to provide it with the energy it requires for growth. This food reserve is composed mainly of carbohydrate in the form of starch and lipid in the form of triglycerides. **Table 1.2** shows the energy made available to the germinating plant when lipids and carbohydrates are respired.

**Table 1.2**

Molecule metabolised	Oxygen consumption (dm <sup>3</sup> g <sup>-1</sup> )	Energy released (kJ g <sup>-1</sup> )
Triglyceride	1.96	38
Carbohydrate	0.81	17

- (b) With reference to the data in **table 1.2** explain the advantage to plants of using lipid as a food reserve in their seeds as opposed to carbohydrate. [3]

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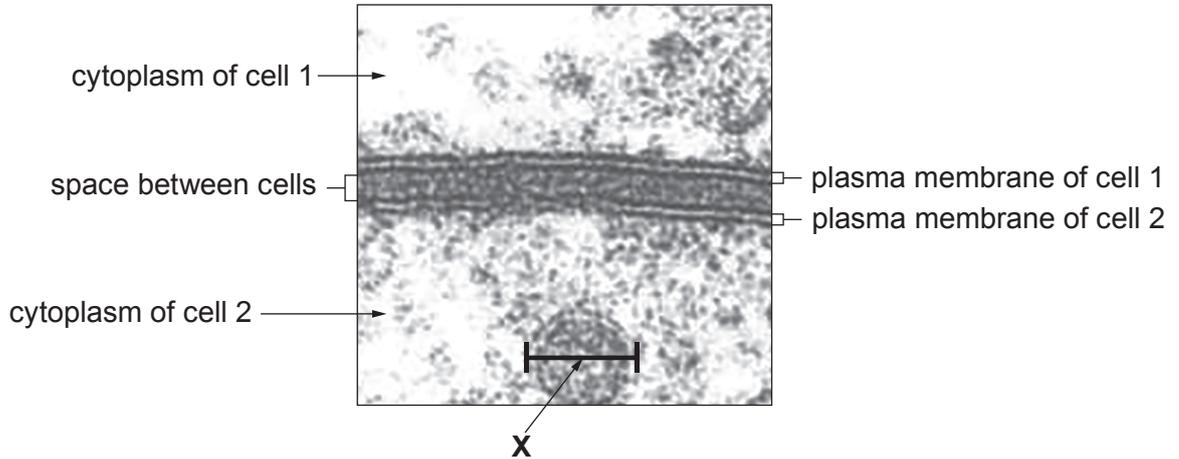
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2. **Image 2.1** is an electron micrograph which shows the plasma membranes of two adjacent cells. A stain was used to make the membranes visible with the electron microscope. The stain binds to negatively charged molecules, making the membranes appear as pairs of parallel dark lines.

**Image 2.1**



- (a) (i) Name the currently accepted model used to describe the structure of the plasma membrane. [1]

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- (ii) Explain the distribution of the staining of the membranes in **image 2.1**. [3]

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- (iii) The structure labelled **X** is a secretory vesicle. The magnification of the micrograph is  $\times 34\,000$ . Calculate the actual diameter of the secretory vesicle. **Express your answer to the nearest whole nm.** [3]

Diameter = ..... nm

(b) Many single celled organisms, such as yeast, feed by using secretory vesicles to secrete digestive enzymes onto their food. The food is digested extra-cellularly and the products of digestion are absorbed into the cell.

(i) Name the mode of nutrition seen in yeast. [1]

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(ii) Describe how the secretory vesicles are produced and how the digestive enzymes are then secreted from the cell. [3]

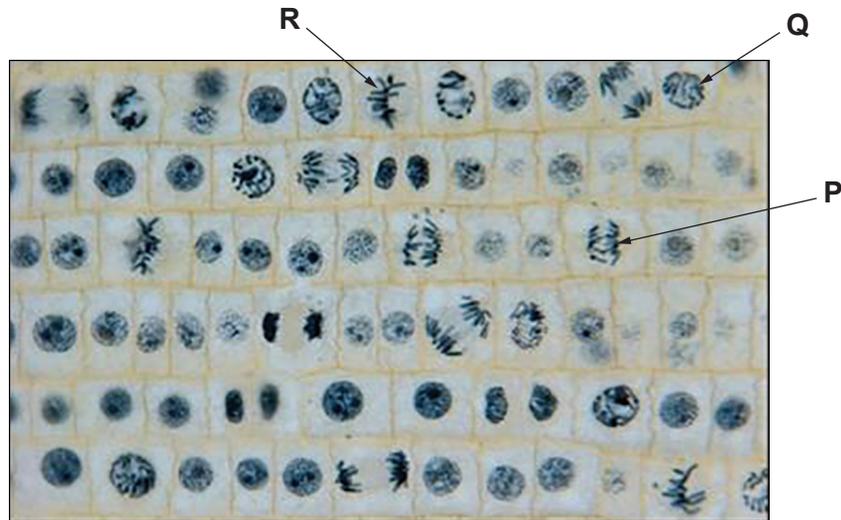
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(iii) Suggest why enzyme-secreting cells are observed to contain large numbers of mitochondria. [2]

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3. **Image 3.1** shows a section of onion root tip with cells at various stages in the cell cycle.

**Image 3.1**



(a) (i) Identify the stages of the cell cycle shown by: [1]

P .....

Q .....

R .....

(ii) Explain why the slide shown in **image 3.1** was prepared using tissue from a **root tip**. [2]

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A student counted the number of cells in each stage of the cell cycle in a section of plant tissue similar to the one shown in **image 3.1**. The results obtained are shown in **table 3.2**.

**Table 3.2**

Stage of cell cycle	Number of cells in each stage	Percentage cells in each stage
<b>Q</b>	24	21.2
<b>R</b>	8	7.1
<b>P</b>	6	5.3
<b>S</b>	7	6.2
<b>T</b>	68	60.2

- (b) With reference to the data in **table 3.2**, identify which stage of the cell cycle is represented by the letter **T** in the table. Explain your answer. [2]

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A group of herbicides (weedkiller) known as the dinitroaniline herbicides were once used commonly to control weeds. Dinitroaniline works by inhibiting the formation of the spindle microtubules during cell division.

- (c) (i) Identify which stage of mitosis would be affected by dinitroaniline. Explain your answer. [2]

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- (ii) Suggest how the herbicide would affect the growth of a plant. [2]

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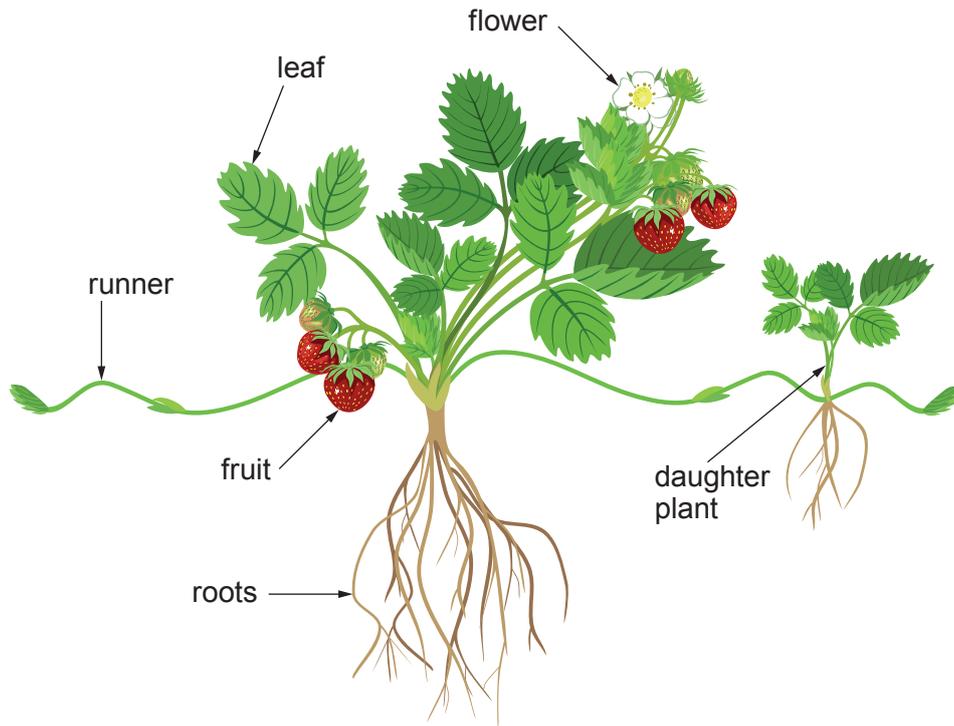
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Image 3.3 shows two methods by which strawberry plants reproduce.

- Strawberry plants can reproduce using seeds.
- Another method involves a runner growing out from the parent plant and when it touches the soil a new daughter plant will grow. In this type of reproduction the daughter plants are produced entirely through mitosis.

Image 3.3



(d) The cells in the runner of the parent plant contain 8 sets of chromosomes giving a total number of 56.

(i) State how many chromosomes there would be in a root cell in the daughter plant. [1]

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(ii) When growing plants for commercial strawberry crops, growers prefer to use runners rather than seeds to produce new plants. Explain why it is an advantage to produce new plants in this way rather than using seeds. [3]

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