# End of topic quiz

# Topic B1: Cell level systems

## Learner Activity

**Topic: B1 of J250**

**Total marks: 40**

1. Where is the genetic material in a **prokaryotic** cell? **[1 mark]**

|  |  |  |
| --- | --- | --- |
| **A** | Chloroplast |  |
| **B** | Cytoplasm |  |
| **C** | Mitochondria |  |
| **D** | Nucleus |  |

Your answer

1. Which of the following statements best describe respiration? **[1 mark]**

|  |  |
| --- | --- |
| **A** | An endothermic process which supplies ATP. |
| **B** | An endothermic process which uses up ATP. |
| **C** | An exothermic process which supplies ATP. |
| **D** | An exothermic process which uses up ATP. |

Your answer

1. Which of the following are the product(s) of anaerobic respiration in fungi? **[1 mark]**

|  |  |  |
| --- | --- | --- |
| **A** | Alcohol + carbon dioxide |  |
| **B** | Carbon dioxide + water |  |
| **C** | Lactic acid |  |
| **D** | Starch |  |

Your answer

1. How many stages are there in the process of photosynthesis? **[1 mark]**

|  |  |  |
| --- | --- | --- |
| **A** | One |  |
| **B** | Two |  |
| **C** | Three |  |
| **D** | Four |  |

Your answer

1. An investigation is done to test the effect of light intensity on photosynthesis.

With a light source 2 cm from the leaf (distance A) the light intensity is 100 cd (intensity A).

What distance would you need between the light source and leaf to get a light intensity of 50 cd (intensity B). **[1 mark]**

Use the formula to help you answer the question:

distanceB2 = distance A2 x intensity A

 intensity B

|  |  |  |
| --- | --- | --- |
| **A** | 1.41 cm |  |
| **B** | 2.83 cm |  |
| **C** | 4 cm |  |
| **D** | 8 cm |  |

Your answer

1. DNA and proteins are examples of biological polymers.

|  |  |  |  |
| --- | --- | --- | --- |
| **(a)** |  | Complete the table about biological polymers. **[3 marks]** |  |
|  |  |

|  |  |
| --- | --- |
| **polymer** | **monomer** |
| DNA |  |
|  | sugar |
| protein |  |

 |  |
|  |  |  |  |
| **(b)** | The enzyme pepsin digests proteins.When egg-white (a protein) is digested by pepsin the liquid it is in goes from cloudy to clear.The amount of egg-white left can be measured using a colorimeter.The effect of pH on pepsin can be investigated using this method.Method:1. Label 6 test tubes 1 to 6.2. In each test tube place 5.0 cm3 of egg-white.3. Into each test tube place 2.0 cm3 of the relevant buffer as shown in the table.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| test tube | 1 | 2 | 3 | 4 | 5 | 6 |
| buffer pH | 1 | 3 | 6 | 7 | 8 | 9 |

4. Add 1.0 cm3 of pepsin solution to test tubes 1 to 6.5. Immediately measure the amount of light passing through each tube using a colorimeter. 6. Every 30 seconds measure the amount of light passing through each tube until the tube is clear. |
|  | **(i)** | Pepsin only digests proteins.This is because of the shape of the active site.What is the active site? **[1 mark]** |
|  |  |  |
|  | **(ii)** | Pepsin works in the stomach.The stomach is acidic.What is the optimum pH for pepsin? **[1 mark]** |
|  |  |  |
|  | **(iii)** | Write down one way this method could be improved. **[1 mark]** |
|  |  |  |
|  | **(iv)** | How can the method above be changed to test the effect of **temperature** on pepsin? **[3 marks]** |  |
|  |  |  |

1. The diagram shows a labelled drawing of onion epidermis cells as seen through a light microscope.



cytoplasm

vacuole

**A**

nucleus

cell wall

|  |  |
| --- | --- |
| **(a)** | How do you prepare a slide to view onion epidermis cells using a light microscope? **[3 marks]** |
|  |  |
| **(b)** | Methylene blue stain can be added to slides.It stains DNA.Which structure labelled on the diagram will be stained by methylene blue? **[1 mark]** |
|  |  |
| **(c)** | The drawing is x350 magnification.Work out an estimate for the actual length of the cell labelled **A**.Show your working. **[2 marks]** |
|  |  |
| **(d)** |  | Some subcellular structures are **not** visible using a light microscope.Using an electron microscope has allowed more sub-cellular structures to be seen and studied. |  |
|  | **(i)** | Write down one sub-cellular structure that can only be seen using electron microscopy. **[1 mark]** |
|  |  |  |
|  | **(ii)** | Why can more sub-cellular structures be seen using an electron microscope? **[1 mark]** |
|  |  |  |

1. Photosynthesis takes place in chloroplasts.

|  |  |
| --- | --- |
| **(a)** | What is the role of chloroplasts in photosynthesis? **[2 marks]** |
|  |  |
| **(b)** |  | Carbon dioxide is needed for photosynthesis. |  |
|  | **(i)** | Finish the balanced symbol equation for photosynthesis. **[3 marks]**6CO2 + 6……….… ……………..… + 6…………….… |  |
| dish containing sodium hydrogencarbonate which produces carbon dioxide |  | The following experiments can be done to show that carbon dioxide is needed for photosynthesis.Two plants are destarched by leaving them in a dark cupboard for 24 hours.The two plants are then set up as shown below. Plant **A** Plant **B** dish containing soda-lime which absorbs carbon dioxideThe plants are then placed in the light for two days.PlantPlantA leaf from each plant is then tested for starch using iodine solution.The leaf from plant **A** turns blue/black when tested.The leaf from plant **B** does **not** turn blue/black. |
|  | **(ii)** | Why are both plants destarched? **[1 mark]** |
|  |  |  |
|  | **(iii)** | How does this experiment show that carbon dioxide is necessary for photosynthesis? **[3 marks]** |
|  |  |  |
|  |  |  |
| **(c)** |  | The graph shows the effect of carbon dioxide concentration on the rate of photosynthesis at high light intensity.rate of photosynthesis 0 0.02 0.04 0.06 0.08 0.10 0.12 0.14carbon dioxide concentration (%) |  |
|  | **(i)** | Why is the graph this shape? **[3 marks]** |
|  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **(ii)** | Look at the table showing the carbon dioxide concentration, mean temperature and light intensity for three different growing conditions.

|  |  |  |  |
| --- | --- | --- | --- |
| Growing condition | Carbon dioxide concentration (%) | Mean temperature (ºC) | Light intensity |
| Cool climate | 0.04 | 17 | low  |
| Hot climate  | 0.04 | 29 | high  |
| Greenhouse  | 0.10 | 28 | high |

Using information from the graph and the table, predict which growing condition will have the highest rate of photosynthesis and indicate why you have come to that conclusion. **[6 marks]** |
|  |  |  |