**End of topic quiz**

**Topic B2: Scaling up**

***Learner Activity***

**Topic: B2 of J247**

**Total marks: 40**

|  |  |  |
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| **1.** | Which of the following processes involve active transport? **[1 mark]** |  |
|  | **A** | Mineral ion uptake in root hair cells |  |
|  | **B** | Spreading of orange squash in a glass of water |  |
|  | **C** | Movement of oxygen from the lungs into the blood capillaries |  |
|  | **D** | Carbon dioxide entering the stomata of leaves |  |
|  | Your answer |  |
| **2.** | Red blood cellsSome red blood cells were placed in a test tube containing sugar solution.They burst.What does this tell you about the solution? **[1 mark]** |  |
|  | **A** | The concentration of dissolved molecules (solutes) in the solution is higher than in the red blood cell. |  |
|  | **B** | The concentration of dissolved molecules (solutes) in the solution is lower than in the red blood cell. |  |
|  | **C** | The concentration of dissolved molecules (solutes) in the solution and inside the red blood cell is the same. |  |
|  | **D** | The solution is at a lower temperature than body temperature. |  |
|  | Your answer |  |

| **3.** | An experiment is done to find out how the size of an organism affects the rate of diffusion.Three different size cubes of agar jelly that had been dyed with potassium permanganate are put into a petri dish containing hydrochloric acid.Agar cube dyed with potassium permanganate in diluted hydrochloric acidDilute hydrochloric acid**A****B****C**Agar cube dyed with potassium permanganateHydrochloric acid diffuses through agar and turns potassium permanganate colourless.Which cube will be the first to turn colourless and why? **[1 mark]** |
| --- | --- |
|  | **A** | A because it has the smallest surface area to volume ratio |
|  | **B** | A because it has the largest surface area to volume ratio |
|  | **C** | C because it has the smallest surface area to volume ratio |
|  | **D** | C because it has the largest surface area to volume ratio |
|  |  |
|  | Your answer |

| **4.** | Stem cells can be used in medicine to treat some diseases and replace some damaged tissue.There are two types of human stem cells; adult stem cells and embryonic stem cells.Which of the following statements correctly describes adult stem cells? **[1 mark]** |  |
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|  | **A** | Differentiated cells that cannot change in to a different type of cell. |  |
|  | **B** | Undifferentiated cells that can differentiate into any type of body cell. |  |
|  | **C** | Differentiated cells found in the brain stem of humans. |  |
|  | **D** | Undifferentiated cells that can only differentiate into cells found in of their tissue of origin. |  |
|  |  |  |
|  | Your answer |  |
| **5.** | Translocation is a process that occurs in plants.Which of the following statements gives a correct definition of translocation? **[1 mark]** |  |
|  | **A** | The movement of substances produced in the leaves such as glucose to other areas of the plant that require those substances. |  |
|  | **B** | The evaporation of water from the stomata of the leaves. |  |
|  | **C** | The movement of water from the root through the xylem vessels to the leaves. |  |
|  | **D** | The movement of substances such as mineral ions and salts from the roots to the leaves. |  |
|  |  |  |
|  | Your answer |  |

| **6** | Xylem is a specialist tissue found in plants. |
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|  | **(a)** | **(i)** | What is the function of xylem in plants? **[2 marks]** |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  | **(ii)** | Give **two** ways xylem is specialised to carry out its function. **[2 marks]** |  |
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|  |  |  |  |  |
|  | **(b)** | **(i)** | The phloem is a tissue found in the veins of plants, what is its function? **[1 mark]** |  |
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| **7** | Blood is transported around the body in tubes called blood vessels. There are three main types of blood vessel.

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| **Diagram of blood vessel** | **Name of blood vessel** |
| Artery | Artery |
| Vein | Vein |
| Capillary | Capillary |

 |
|  |  |  | How do the properties of the blood vessels related to their function? |  |
|  | **(a)** | **(i)** | Strong, elastic walls of arteries. **[2 marks]** |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  | **(ii)** | Thin walls, only one cell thick in capillaries. **[2 marks]** |  |
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|  |  |  |  |  |
| **8** | Heart diagramThe diagram shows a section through the heart.**A****C****D****B** |
|  | **(a)** | **(i)** | Name the chambers of the heart that receive blood from the lungs or body. **[1 mark]** |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  | **(ii)** | Name the chamber of the heart that pumps blood out of the heart to the lungs. **[1 mark]** |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  | **(iii)** | Which letter represents the left ventricle? **[1 mark]****A****C****B****D****A****C****B****D** |  |
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|  |  |  |  |  |
| **9** | Blood transports oxygen, carbon dioxide, water and other substances around the body.Oxygen is transported by red blood cells.Red cells |
|  | **(a)** | **(i)** | State three ways that a red blood cell is adapted to carry out this function. **[3 marks]** |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  | **(ii)** | Which part of the blood transports antibodies? **[1 mark]** |  |
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| **10** | Mitosis is a form of cell division where a parent cell divides to produce two daughter cells.The steps below describe the stages that occur when a body cell grows and divides by mitosis.A Growth of cell and DNA is replicatedMitosis B Chromosomes are now visible as two chromatids joined by a centromereC D E The cell divides in two |
| --- | --- |
|  | **(a)** | **(i)** | Fill in the two missing stages in description of mitosis  **[2 marks]** |  |
|  | **(b)** | **(i)** | Why must the amount of DNA be doubled before cell division occurs? **[1 mark]** |  |
|  |  |  |  |  |
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|  |  | **(ii)** | What do organisms use mitosis for? **[1 mark]** |  |
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| **11** | An experiment was done to find out how osmosis affected potato cells when placed in various concentrations of sucrose solution.A cork borer was used to cut cylinders of potato tissue and these were trimmed with a scalpel to 30 mm lengths.Each cylinder was weighed and the mass recorded.Six boiling tubes were half-filled with a different concentration of sucrose solution and three cylinders placed in each solution.After 24 hours each cylinder was removed and weighed.The average percentage change in mass of the potato cylinders was calculated from each concentration of solution.11_v2Below is a graph of the results:0+5+10-10-5-150.511.522.53Concentration of sugar solution (m) |
|  | **(a)** | **(i)** | Why did the potato cylinders lose mass in solutions 1.5 M, 2 M and 2.5 M? **[2 marks]** |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  | **(ii)** | Which concentration of sugar solution would likely have caused the potato cells to become plasmolysed? **[1 mark]** |  |
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|  |  | **(iii)** | Using the graph, suggest what concentration of sucrose the potato contained. Why did you choose this answer? **[2 marks]** |  |
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|  |  |  |  |  |
|  | **(b)** | **(i)** | Why were three cylinders of potato used for each solution? **[1 mark]** |  |
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|  |  | **(ii)** | State two ways you could improve the method to increase the accuracy of the results. **[2 marks]** |  |
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| **12** | A student used a potometer to measure the rate of transpiration by a plant shoot in three different environmental conditions.Potometercapillary tubebeaker of watervolume scaleair bubblereservoircut shootThe three environmental conditions were:1. no air movement
2. slow air movement
3. fast air movement

Throughout the experiment, the shoots were left on a windowsill at 20 oC and the distance the air bubble moved after one hour was recorded.The results are shown on the graph below:Time (min)ABC  |
|  | **(a)** | **(i)** | Why did the rate of transcription increase when the flow of air over a shoot gets faster? **[2 marks]** |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  | **(ii)** | Why did the rate of transpiration increase when the surrounding temperature was increased from 20 oC to 30 oC? **[2 marks]** |  |
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|  |  | **(iii)** | What factor could also affect the rate of transpiration? **[1 mark]** |  |
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|  | **(b)** | **(i)** | Suggest why a plant cutting is more likely to survive and grow successfully if some of its leaves are removed before it is planted. **[2 marks]** |  |
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