

# SCIENCE

## INTERACTIVE ASSESSMENT QUESTIONS BASED ON STANDARD PRACTICAL EXERCISES FOR REVISION AND EXAMINATION PRACTICE

### Biology Part I

#### LEARNING VERSION

IN THIS LEARNING VERSION ANSWERS ARE IMMEDIATELY AND VISIBLY MARKED, CORRECT ANSWERS ARE INDICATED ON REQUEST, AND END OF SECTION TOTALS AND PERCENTAGES SHOWN ON SCREEN.

SOME OF THE MORE DIFFICULT QUESTIONS HAVE DROP DOWN HELP BOXES WHICH REVEAL INFORMATION WHEN THE CURSOR IS PASSED OVER THE QUESTION MARK. WHEN PRINTED OUT ONLY THE QUESTIONS SHOW, THEREFORE THIS CAN BE USED AS A PAPER VERSION FOR TESTS IF REQUIRED.

The questions are of the Multiple Choice style, where the phrase “Which ONE of the following ...” is implied, but is not always stated.

So that students are reminded of the type of question that requires short written answers, which unfortunately cannot be automatically marked, each topic has one short passage with missing words, which must be identified in their correct sequence.

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**NB** The practical work presented should be familiar to students, either as demonstrations demonstration, or as an experiment they might have carried out themselves in the lab.

The material is NOT presented as a practical guide, and while the methods followed safety guidelines, specific safety issues are NOT dealt with. Visit [www.cleapps.org.uk](http://www.cleapps.org.uk)

## CONTENTS

The following practical topics have been selected according to exam question frequency to form the basis of revision and examination practice.

**FOR THE CORRECT FINAL TOTAL AND PERCENTAGE THE ENTER BUTTON AT THE BOTTOM LEFT OF EACH PAGE MUST BE CLICKED ON.**

### Part 1

Diffusion and Osmosis

Heart, Lungs & Smoking

### Part 2

Enzyme Reactions

Respiration

Fermentation

### Part 3

Leaf Structure and Function

Photosynthesis

Tropisms

## ● Diffusion and Osmosis

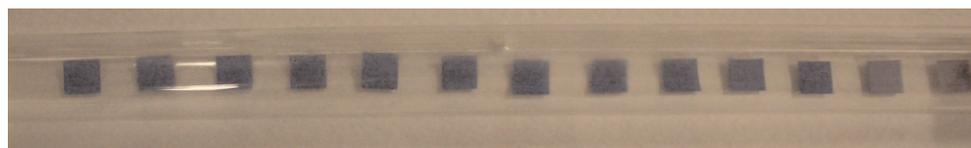
Diffusion is very important in the transport of substances within and between the cells of organisms, and between organisms and their surroundings. Osmosis is a term used when discussing the special case of the 'diffusion' of water.

**Practical** - Thirteen small pieces of red litmus paper were carefully positioned at equal intervals along the length of a long glass tube with a rubber bung at one end. Cotton wool dipped in ammonia solution was introduced at the open end of the tube and sealed in with a rubber bung. The time it took for each piece of litmus paper to turn completely blue was recorded.

Ammonia  
cotton  
wool plug



Ammonia  
cotton  
wool plug



Time in secs and mins for gas to reach pieces of red litmus paper							
Piece no. from left	1	3	5	7	9	11	13
Time taken for each piece to turn blue	4s	15s	55s	1m54s	3m38s	7m12s	12m14s

1. Referring to the photographs of the diffusion tube, and the data obtained from it during the experiment set out in the table, which one of the following best matches your observations?

- A** - The rate of diffusion of ammonia gas down the tube proceeds at a constant rate away from the cotton wool plug soaked in ammonia.
- B** - The rate of diffusion of ammonia gas down the tube slows as the distance from the cotton wool plug increases.
- C** - The rate of diffusion of ammonia gas down the tube increases as the distance away from the cotton wool plug increases.
- D** - The rate of diffusion of ammonia gas is fastest in the middle of the tube as the particles have got up speed.



● Diffusion and Osmosis

2. Which one of the following correctly describes the direction of diffusion of particles?

- A** - From regions of their **higher concentration** to regions of their **lower concentration**.
- B** - From regions of their lower concentration to regions of their higher concentration.
- C** - From regions of higher temperature to regions of lower temperature.
- D** - From regions of their **lower pressure** to regions of their **higher pressure**.

**HELP BOX**

PASS CURSOR OVER  
QUESTION MARK  
FOR HELP WITH  
QUESTION  
NUMBER **3**



Only very small particles, much too small to be seen even under a microscope, move by diffusion. Coloured substances can be seen diffusing, but not the particles themselves.

3. Which one of the following occurs by diffusion in mammals?

- A** - Movement of **bile** from the **liver down the bile duct into the gut**.
- B** - Movement of food through the digestive tract.
- C** - Movement of blood through the capillaries.
- D** - Movement of **oxygen from the blood to the tissues**

4. Which one of the following occurs by diffusion in green plants?

- A** - Movement of water into the leaves on a rainy day.
- B** - Movement of sugars from the leaves to the roots.
- C** - Movement of water from the roots to the leaves.
- D** - Movement of oxygen from the soil into the roots.

● Diffusion and Osmosis

**Practical** - Cylinders of tissue were cut from a potato with a cork borer and trimmed to exactly the same size. One cylinder was placed in each of 4 tubes containing one of the following sucrose solutions, 1 Molar (1 M), 0.75 M, 0.5 M, 0.25 M; and one in deionised water.



5. Which one of the following best explains why the cylinders of potato tissue in tubes A and B are floating?

- A** - Osmosis has occurred in tubes A and B.  
**B** - The cylinders in tubes A and B are denser than the sucrose solutions.  
**C** - Tubes A and B contain the more concentrated (and dense) sucrose solutions.  
**D** - The cells in these potato cylinders are dead.

6. In which of the solutions in the pairs of tubes listed below will the cylinders of potato tissue increase in length and mass?

- A** - Tubes A and B  
**B** - Tubes A and C  
**C** - Tubes B and D  
**D** - Tubes D and E

7. In which of the following pairs of tubes listed below will water move from the potato tissue into the surrounding fluid?

- A** - Tubes A and B  
**B** - Tubes B and C  
**C** - Tubes C and D  
**D** - Tubes D and E

Diffusion and Osmosis

**HELP BOX**

PASS CURSOR OVER QUESTION MARK FOR HELP WITH QUESTION NUMBER 8



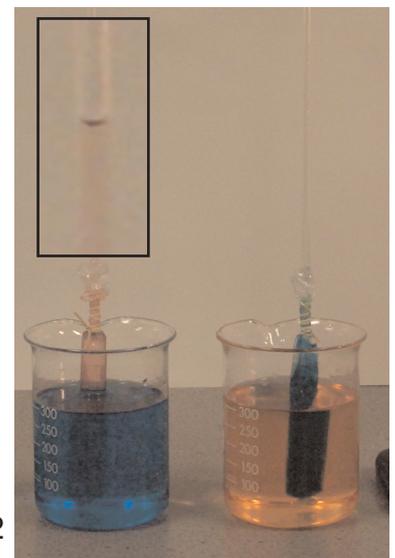
Capillary action is involved in the movement of fluids up inside narrow (capillary) tubing, but in this experiment it is not significant when compared to the other force involved.

**Practical** - Some 1 M sucrose solution was coloured orange/red, and some deionised water was coloured blue. One beaker and a sealed length of visking tubing (a partially permeable membrane) were then filled with the orange/red 1M sucrose solution, and the other beaker and tubing filled with the blue deionised water. They were arranged as shown in Photo I, and then the two filled lengths of visking tubing were lowered into the liquids in the beakers and left for several minutes.

PHOTO 1



PHOTO 2



8. Which of the following best explains why the level of fluid has risen up inside the tube shown magnified on the left of Photo 2.

- A - Gravity has stopped the fluid rising up the same amount in the tube on the right.
- B - Water has left the solution inside the visking tubing by osmosis into the deionised water in the beaker.
- C - Capillary action results in the fluid moving up in the tube.
- D - Water has entered the visking tubing by osmosis from the beaker into the sucrose solution inside the tubing.

9. Why has the visking tubing on the right of Photo 2 become more flaccid (soft) than that on the left.

- A - Water has moved by osmosis from inside the visking tubing.
- B - Water has entered the solution inside the visking tubing by osmosis from the deionised water surrounding the tubing.
- C - Sucrose from the sucrose solution in the beaker has moved by diffusion into the the visking tubing.
- D - Gravity has caused the solution to seep out of the visking tubing on the right.

## ● Diffusion and Osmosis

**HELP BOX**

PASS CURSOR OVER  
QUESTION MARK  
FOR HELP WITH  
QUESTION  
NUMBER **10**



Osmosis is the special case of the diffusion of water. In which water molecules diffuse from a high water concentration (pure water or a more dilute solution) to a lower water concentration (more concentrated solution) through a partially permeable membrane.

**10.** The following passage has four missing words.

*If you drink tap water, the contents of your stomach are \_\_\_ and water passes by osmosis from the \_\_\_ into the blood. If you swallow sea water the contents of your stomach are \_\_\_ and water passes by osmosis from the \_\_\_ into the stomach.*

Which of the following has the correct missing words in the sequence as they should appear in the passage.

- A** - concentrated - stomach - diluted - blood
- B** - diluted - kidneys - concentrated - blood
- C** - diluted - stomach - concentrated - kidneys
- D** - diluted - stomach - concentrated - blood



● The Heart, Lungs and Smoking

**HELP BOX**

PASS CURSOR OVER QUESTION MARK FOR HELP WITH QUESTION NUMBER **11**



Anatomical diagrams are labelled right and left as if you were looking at somebody in front of you, ie their right is on your left, and their left is on your right.

**Practical** - The heart and lungs in humans are contained in the chest or thoracic cavity. The two lungs surround the heart, as shown in Photo 1 of a model thorax.

The heart is a four chambered muscular pump, which by contracting and relaxing, pumps blood around the lungs, and the body. Photo 2 shows a model of a partially dissected heart showing some of the chambers in section, the valves and the major blood vessels entering and leaving the heart.

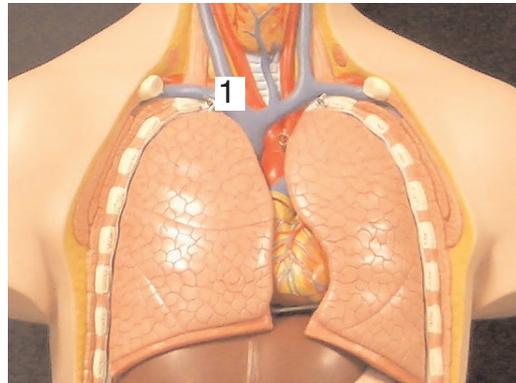


PHOTO 1

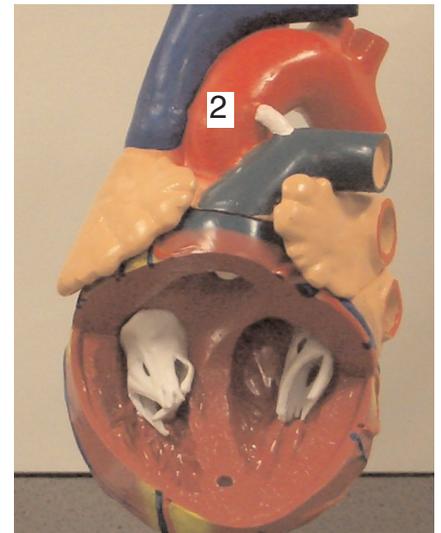


PHOTO 2

**11.** The large blood vessel shown blue and labelled 1 in Photo 1 carries blood into which chamber of the heart?

- A** - Right Ventricle
- B** - Left atrium
- C** - Right atrium
- D** - Left ventricle

**12.** Which chamber of the heart pumps blood into the large blood vessel shown red and labelled 2 in Photo 2?

- A** - Right ventricle
- B** - Left Ventricle
- C** - Right atrium
- D** - Left atrium

● The Heart, Lungs and Smoking

**HELP BOX**

PASS CURSOR OVER  
QUESTION MARK  
FOR HELP WITH  
QUESTION  
NUMBER **13**



Blood passes through the heart twice on each complete circulation of the body. After entering the heart it goes to the lungs to get rid of carbon dioxide and pick up oxygen. From the lungs blood then returns to the heart and is pumped around the body.

**13.** The following passage has four missing words.

*The heart pumps the blood around the body. In its passage through the heart, the blood from the main veins of the body enters the \_\_\_\_ atrium, from here it passes to the right ventricle, from where it is pumped to the \_\_\_\_\_. It returns to the \_\_\_\_ atrium, passes to the left ventricle, and is then pumped around the \_\_\_\_\_.*

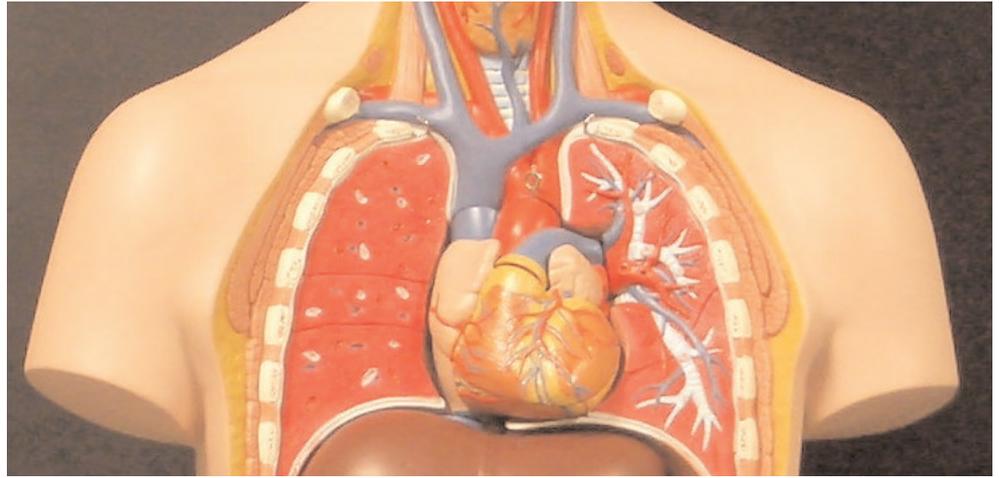
Which of the following has the correct missing words in the sequence as they should appear in the passage.

- A** - left - lungs - right - body.
- B** - right - body - left - lungs.
- C** - right - lungs - left - body.
- D** - left - body - right - lungs.



● The Heart, Lungs and Smoking

**Practical** - The lungs consist of millions of small air sacs or alveoli which give the lungs a huge surface area over which gas exchange occurs between the bloodstream and the air in the air sacs. The lungs are well supplied with blood vessels to carry oxygen **away** from and carbon dioxide to, the air sacs. In the photograph shown below the right lung of the model is shown in section, and the air tubes appear as circles as if cut across.



**14.** What is the name of the smaller tubes carrying air deep into each lung?

- A** - Trachea.
- B** - Bronchioles.
- C** - Capillaries.
- D** - Pulmonary tubes.

**15.** What is the name of the large blood vessels shown blue that can be seen running through the left lung in the Photo?

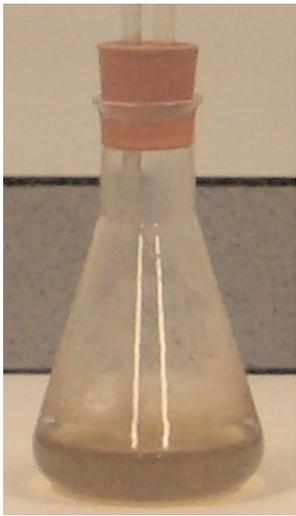
- A** - Pulmonary arteries.
- B** - Pulmonary veins.
- C** - Capillaries.
- D** - Arterioles.

**16.** Which one of the following is a correct description of the movement of the ribs when breathing in?

- A** - They move downwards and inwards decreasing the volume of the chest cavity.
- B** - They move inwards keeping the volume of the chest cavity the same.
- C** - They move sideways keeping the volume of the chest cavity the same.
- D** - They move upwards and outwards increasing the volume of the chest cavity.

● The Heart, Lungs and Smoking

**Practical** - The following photos are of water and cotton wool taken from a 'smoking machine' in which smoke from a lit cigarette was drawn through them to trap some of the components of cigarette smoke.



**17.** In which part of the lungs are these components of cigarette smoke most likely to accumulate?

- A** - air sacs (alveoli)
- B** - trachea
- C** - bronchi
- D** - bronchioles

**18.** Which of the following components of cigarette smoke causes the addiction to smoking.

- A** - smoke
- B** - nicotine
- C** - tars
- D** - cancer causing chemicals

**19.** Which of the following diseases does NOT have smoking as a possible cause?

- A** - bronchitis
- B** - cancer
- C** - influenza
- D** - heart disease

- Diffusion and Osmosis
- The Heart, Lungs and Smoking

**SECTION TOTAL**

**SECTION PERCENTAGE**