
TIME: 2 ½ HOURS

P A P E R 1

MARKS: 150

INSTRUCTIONS

- o Answer ALL questions
- o Answer ALL sections on the foolscap provided
- o Start each main question on a new page
- o Write your NAME on the Question Paper and hand in separately
- o Make sure your numbering is precise and clear
- o Make sure your answers are concise, logical and NEAT!

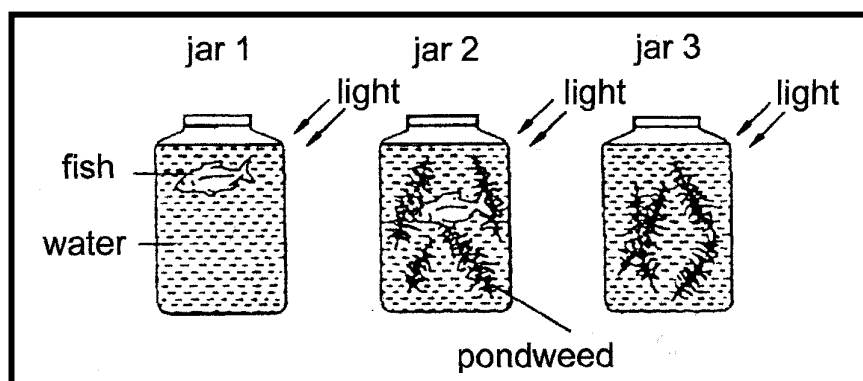
THIS EXAMINATION PAPER CONSISTS OF 14 PAGES INCLUDING THE COVER SHEET

SECTION A

QUESTION 1

- 1.1 Various possibilities are given as answers to the following questions. Indicate the correct answer by writing only the LETTER of the most correct answer on your answer sheet.

- 1.1.1. Three jars were set up as shown in the diagram.



How will the concentration of dissolved oxygen in the water change after four hours in the sunlight?

	JAR 1	JAR 2	JAR 3
A.	decrease	no change	no change
B.	Decrease	increase	no change
C.	no change	decrease	decrease
D.	decrease	no change	increase

- 1.1.2. Which of the following shows the correct path of air movement during exhalation?

- A Alveoli → bronchiole → trachea → bronchus
 B Alveoli → bronchiole → bronchus → trachea
 C Trachea → alveoli → bronchiole → bronchus
 D Bronchus → bronchiole → trachea → alveoli

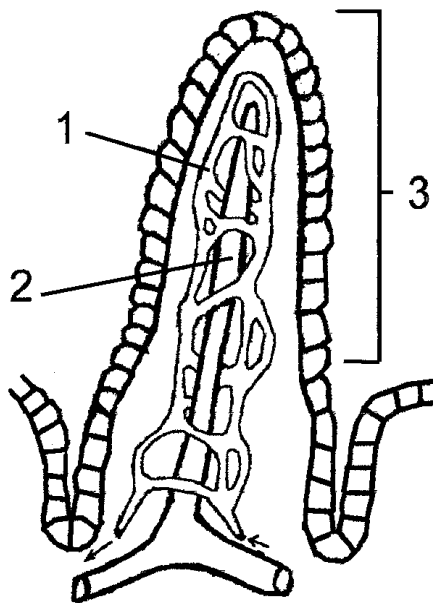
1.1.3. The following are involved in the process of cellular respiration:

- 1 Energy
- 2 Carbohydrates
- 3 Carbon Dioxide
- 4 Water
- 5 Oxygen

Which of the following correctly represent their involvement in the process?

- A $1 + 2 = 3 + 4 + 5$
- B $2 + 5 = 1 + 3 + 4$
- C $2 + 3 = 1 + 4 + 5$
- D $2 + 4 = 1 + 3 + 5$

1.1.4. The structure numbered 3 is most probably found in the



- A ileum.
- B stomach.
- C colon
- D oesophagus.

1.1.5. The following statements are all true regarding peristalsis except:

- A Circular muscles above the bolus relax.
- B Longitudinal muscles are involved in the process
- C It occurs in the esophagus and intestines of the digestive system
- D Peristalsis is a voluntary action.

1.1.6. The table shows the death rates from lung cancer amongst smokers and non-smokers.

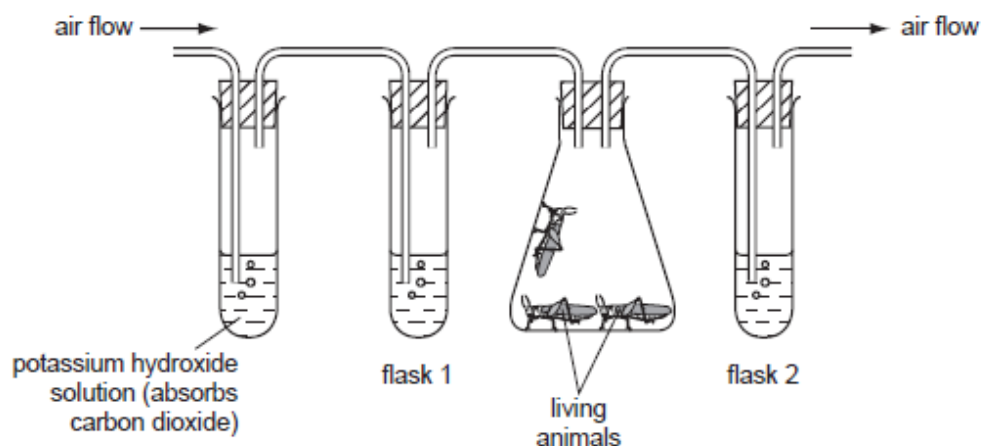
average number of cigarettes smoked per day	deaths from lung cancer per year per 100 000 people
0	10
1-14	78
15-25	127
26 or more	251

What can be concluded from the data?

- A People who get lung cancer are likely to be smokers of 26 or more cigarettes per day.
- B People who do not smoke will not get lung cancer.
- C People who smoke have a higher chance of getting lung cancer.
- D Smoking causes lung cancer.

1.1.7. An experiment is set up as shown.

Flasks 1 and 2 contain lime water. Lime water turns cloudy when exposed to Carbon Dioxide and remains clear in the absence of Carbon Dioxide. Air is pumped through the flasks.

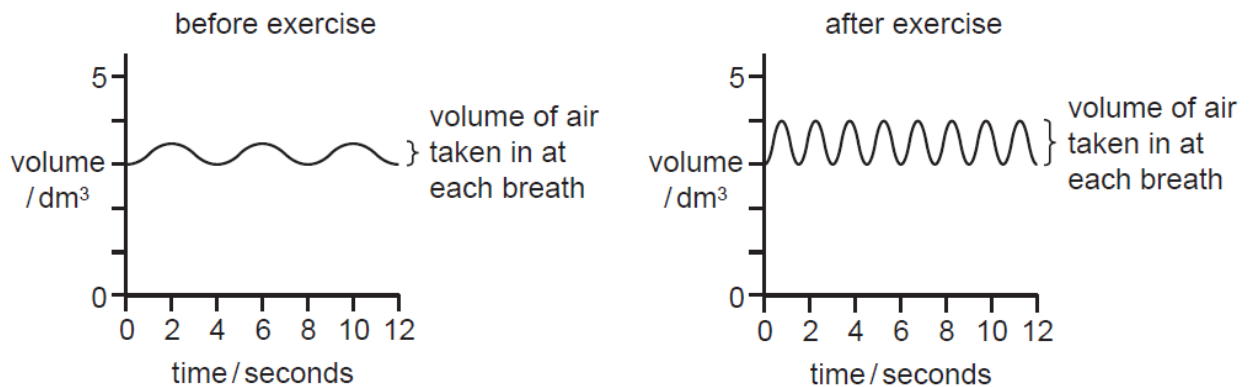


What is the appearance of limewater in flasks 1 and 2 after a period of ten minutes?

	flask 1	flask 2
A	clear	clear
B	clear	white/cloudy
C	white/cloudy	clear
D	white/cloudy	white/cloudy

1.1.8. A student's rate and depth of breathing are measured before exercise and then after exercise.

The results are plotted on two graphs showing the volume of air breathed in and out in 12 seconds.



After exercise, how much air does the student take in during 12 seconds?

- A 0.5 dm³
- B 1 dm³
- C 1.5 dm³
- D 8 dm³

1.1.9. A man has 5 litres of blood in his body. In one day, his kidneys filter out 180 litres of liquid from the blood and he produces 1,5 litres of urine. What percentage of the filtered liquid is reabsorbed?

- A 30%
- B 99.1%
- C 0.89%
- D 99.9%

- 1.1.10. The man mentioned above became ill with a chronic kidney disease and his kidneys would not reabsorb as much of the filtered liquid. Which of the following would he soon experience?
- A Dehydration and low volumes of urine
 - B High blood pressure and large volumes of urine
 - C Thirst and low volumes of urine
 - D Thirst and high quantities of urine

10 x 2 /20/

1.2 WRITE THE CORRECT BIOLOGICAL TERM FOR EACH OF THE FOLLOWING NEXT TO THE CORRESPONDING NUMBER ON THE ANSWER SHEET

- 1.2.1 The part of a plant where the light independent reactions (dark phase) of photosynthesis takes place
- 1.2.2 The structure formed by bile salts and fatty acids
- 1.2.3 The protein substances which act as catalysts and control the rate of reactions in the alimentary canal, generally speeding them up.
- 1.2.4 A vestigial organ in the large intestine.
- 1.2.5 A condition in which the body receives too little food.
- 1.2.6 The region of the kidney in which the Malpighian bodies are located.

(6)

1.3 Each of the following questions consists of a STATEMENT in the first column and two ITEMS (A and B) in the second column. Decide which item/s relate/s to the statement. Write your choice on the ANSWER SHEET by using the following codes:

- A** if only item A relates to the statement
- B** if only item B relates to the statement
- A & B** if both items, A and B relate to the statement
- NONE** if neither of the items relates to the statement

STATEMENT

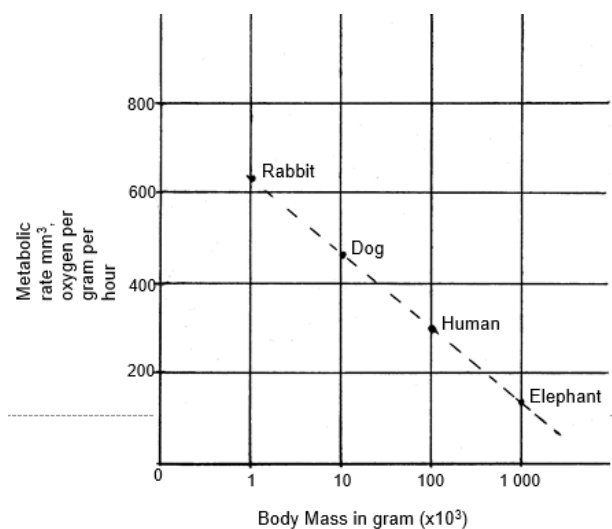
ITEMS

1.3.1	The name given to food mixed with stomach acid	<ul style="list-style-type: none"> A Chyle B Chyme
1.3.2	Constipation	<ul style="list-style-type: none"> A Too much water absorbed B Too little water absorbed

1.3.3 A desert dwelling animal	A Long ureter B Long loop of Henle
1.3.4 Name for the dark phase of photosynthesis	A Calvin cycle B Krebs cycle

5 x 2 (8)

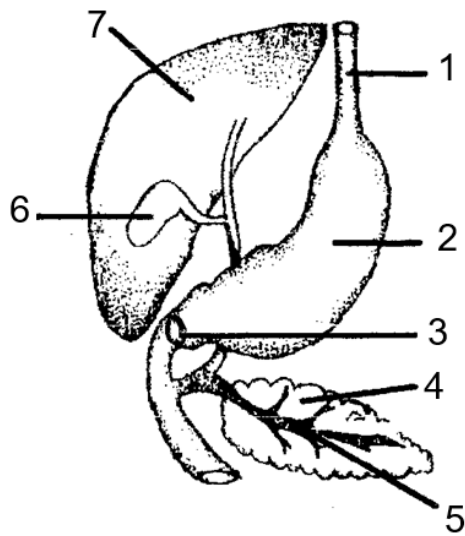
1.4. Dr Mlityalwa is a vet currently doing research. She has investigated the respiration rate of different mammals and her data is shown below. The respiration rate is shown as a relative rate per unit of body mass in grams.



- 1.4.1. What is the body mass of the dog? (1)
- 1.4.2. Which animal has the lowest metabolic rate according to the graph? (1)
- 1.4.3. What is the body mass of the animal with the highest metabolic rate? (1)
- 1.4.4. Give a hypothesis for the data shown above. (3)

/6/

1.5. Observe the diagram below and answer the questions which follow:



- 1.5.1. Identify the parts numbered 1, 2, 3, 6 and 7. (5)
 - 1.5.2. What is the purpose of structure 6? (1)
 - 1.5.3. List FOUR functions of the liver. (4)
- /10/

Total Section A [50]

SECTION B

QUESTION 2

- 2.1.1. An experiment was carried out on a 35 year old man with healthy kidneys. The experiment lasted for 2 days. On the first day he was made to drink 1 litre of pure water. His rate of urine production, both beforehand and over the next four hours was carefully measured by collecting his urine at 30 minute intervals. On the second day he was given 1 litre of 0.9% sodium chloride (salt) solution to drink. Again, his urine output was measured in the same way.

In both cases, after drinking the 1 liter of water or salt solution, he was not allowed to take in any more liquid for four hours. On the first day only, the quantity of sodium chloride per 100ml of urine produced was also measured every half an hour. The results of the investigation are shown below.

Time when urine collected	First day		Second day
	Urine produced (ml)	Salt content (mg/100ml)	
30 minutes before drinking	55	230	30
At time of drinking	45	287	40
30 minutes after drinking	330	38	45
60 minutes after drinking	470	27	47
90 minutes after drinking	180	75	50
120 minutes after drinking	50	264	55
150 minutes after drinking	73	182	51
180 minutes after drinking	55	228	48
210 minutes after drinking	20	635	50
240 minutes after drinking	32	401	55

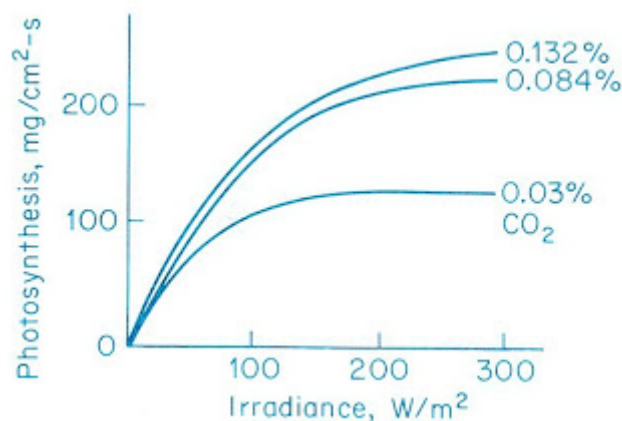
- 2.1.1. Draw a line graph of the effect of urine production of drinking 1L of water solution and 1L of salt solution on the same set of axes. (8)
- 2.1.2. How long did it take after the drink of pure water for the mans urine output to become maximum? (1)
- 2.1.3. The litre of water which the man drank on his first day affected the water balance of his body. How long did it take for the excess water to be removed so that he was in balance again? (2)
- 2.1.4. Would you expect the urine produced at the time of maximal urine flow to be greater than, equal to or less than the water potential of the tissue fluid of the body? (1)
- 2.1.5. The human kidneys produce about 125 ml of glomerular filtrate per minute when drinking pure water.

- a. How much glomerular filtrate would be produced in the first 30 minutes after drinking water? (2)
 - b. Draw a labelled diagram of the Malpighian body, taking care to label where the podocytes would be found. (5)
 - c. Explain how the Malpighian body is well suited to its function. Give TWO ways. (4)
 - 2.1.6. Draw a flow diagram of the control of homeostasis using aldosterone in the kidney when the level of salt is too high in the blood. (4)
 - 2.1.7. In the above experiment, how can we increase the reliability? Name TWO ways. (2)
 - 2.1.8. In the above experiment, how can we increase validity? Name TWO ways. (2)
- /31/

2.2. Below is a diagram of an experiment done by Professors Glanz and Utian. They took three groups of plants and exposed them to various levels of carbon dioxide.

Note that Irradiance refers to the light intensity. As it increases, the light intensity increases.

Observe the graph, and answer the questions which follow:



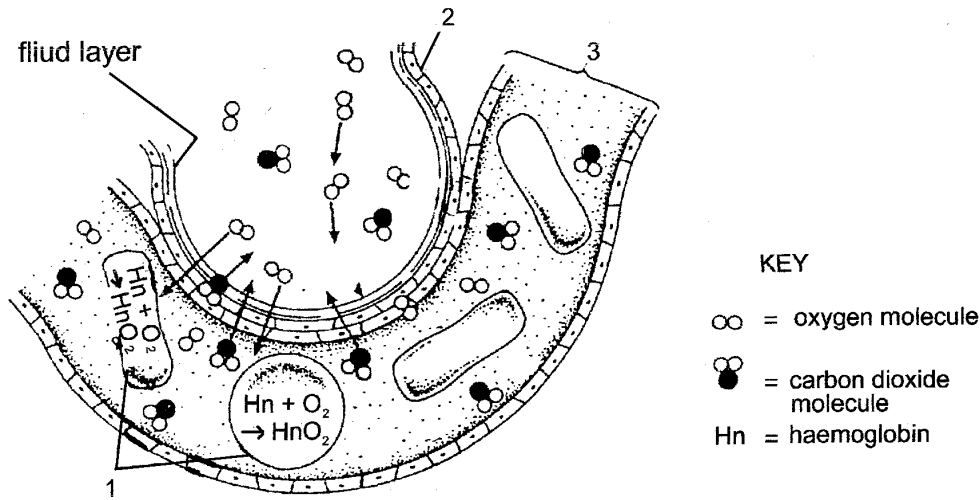
- 2.2.1. Provide a hypothesis for the above experiment. (3)
- 2.2.2. Explain why the photosynthetic rate increases with each experiment. (1)
- 2.2.3. What other factors may be limiting? Name TWO. (2)
- 2.2.4. Name three PLANNING STEPS which Prof Utian and Glanz would take before starting this experiment. (3)

/9/

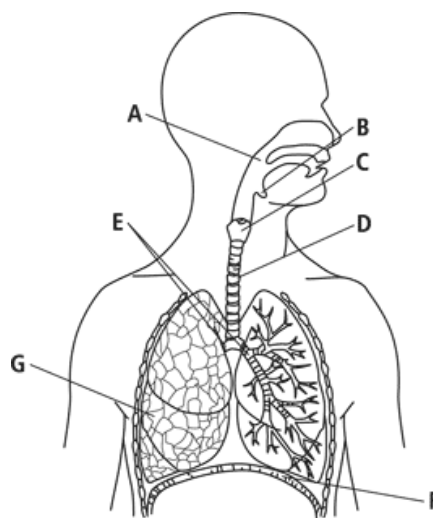
Total question 2 /40/

QUESTION 3

3.1. Observe the diagram below and answer the questions which follow:



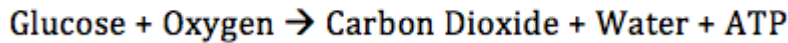
- 3.1.1. Identify the parts numbered 1 and 3. (2)
 - 3.1.2. Give ONE function of the fluid layer. (1)
 - 3.1.3. Give FOUR ways in which structure number 2 is adapted for its function. (4)
 - 3.1.4. List THREE ways in which carbon dioxide is transported in the blood. (6)
 - 3.1.5. The above is not the only surface in the body where gaseous exchange takes place. Name ONE other place (2)
- 3.2 Below is a diagram of the respiratory system of the human. Observe it, and answer the questions which follow: /15/



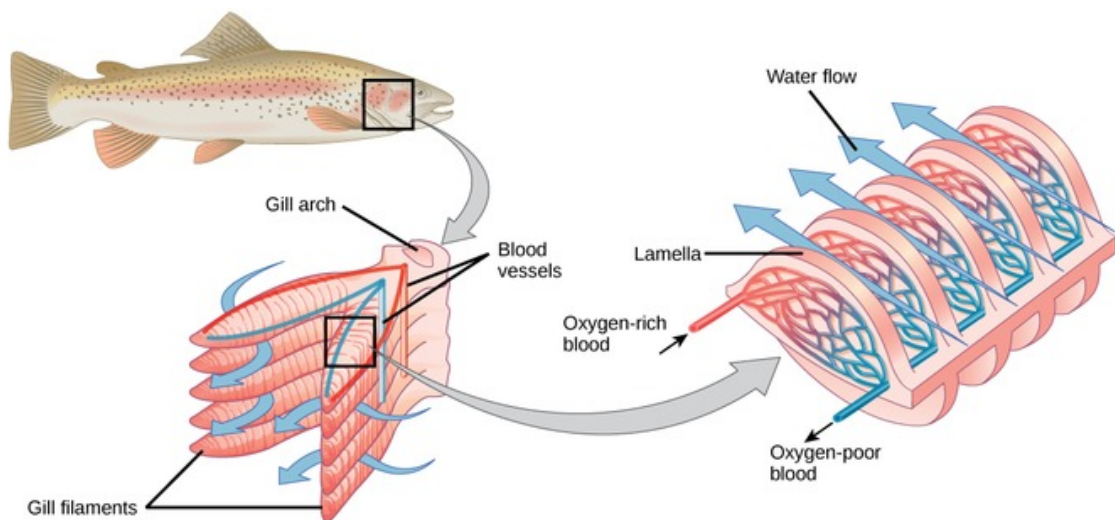
- 3.2.1 Provide a name for the structures A-E. (5)

Grade 11 Life sciences November Paper 1

- 3.2.2. Name the TWO structures which protect the breathing system. (2)
- 3.2.3. Provide a function for the part labelled C. (1)
- 3.2.4. Tabulate THREE differences between inspiration and expiration. (7)
- 3.3. Below is the equation for cellular respiration: /15/



- 3.3.1. Where specifically in the cell is oxygen used in the process of cellular respiration? Explain its function. (2)
 - 3.3.2. Provide the name for the process by which ATP is formed from ADP and P. (1)
 - 3.3.3. Urea is also produced from this equation. Give ONE other way, apart from the kidneys, that urea is released from the body. (1)
- /4/
- 3.4.1. Below is a diagram of the gaseous exchange system of a fish. Observe it, and list in point form how a fishes system is adapted to its function. (6)



/10/

SECTION C

QUESTION 4

As food is taken in by the body, it starts the process of being digested and assimilated by the alimentary canal/gastrointestinal tract.

Write an essay in which you describe the **absorption** of substances into the body (i.e. the pathway through which protein, sugars and fats are absorbed through the small intestine wall) as well as the three key stages of cellular respiration when glucose is in the body itself.

Content: 17

Synthesis: 3