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Biology **IGCSE AQA Past Papers**

Key skills

INTERNATIONAL IGCSE

BIOLOGY

9201/1 PAPER 1

Specimen material 1 hour 30 minutes

Materials

For this paper you must have:

- a ruler with millimetre measurements
- a calculator.

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the bottom of this page.
- Answer all questions.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 90.

Please write clearly, in block capitals, to allow character computer recognition.

Centre number ☐☐☐☐☐ Candidate number ☐☐☐☐

Surname ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Forename(s) ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Candidate signature _____

Answer all questions in the spaces provided.

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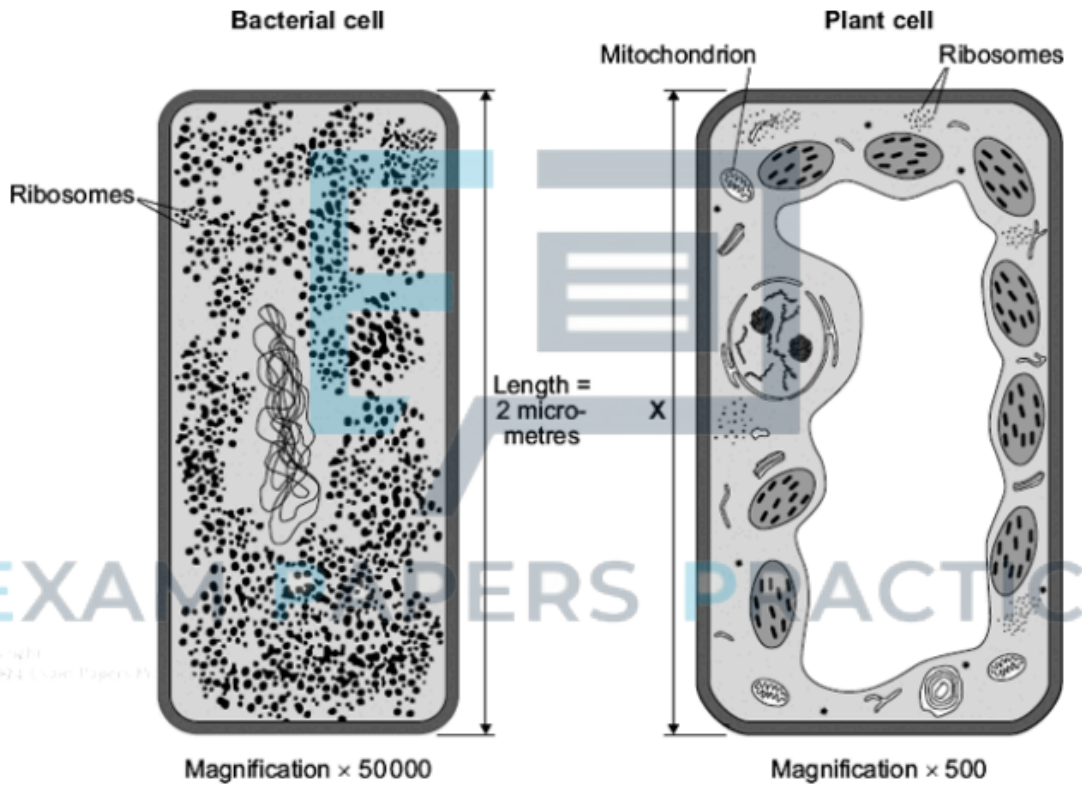
1 **Figure 1** shows two cells, a bacterial cell and a plant cell.

Figure 1



0 1 . 1 Both the bacterial cell and the plant cell contain ribosomes.

What is the function of a ribosome?

[1 mark]

0 1 . 2 The plant cell contains mitochondria but the bacterial cell does not contain mitochondria.

Give **one** other way in which the plant cell is different from the bacterial cell.

[1 mark]

0 1 . 3 Both cells are drawn the same length, but the magnification of each cell is different.

The real length of the bacterial cell is 2 micrometres.

Calculate the real length, **X**, of the plant cell.

Give your answer in micrometres.

Show clearly how you work out your answer.

[2 marks]

X= _____ micrometres

0 1 . 4 Most mitochondria are about 3 micrometres in length.

The plant cell contains mitochondria but the bacterial cell does not contain mitochondria.

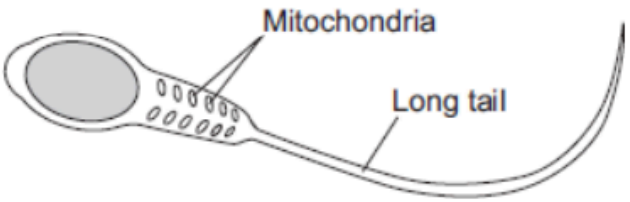
Use your answer to part 1.3 and the information in the diagram to suggest why.

[1 mark]

Cells can be specialised for a particular job.

Figure 2 shows the structure of a human sperm cell.

Figure 2



0 1 . 5 Describe how the long tail and the mitochondria help the sperm to do its job.

[4 marks]

Long tail _____

_____

_____

Mitochondria _____

_____

_____

0 1 . 6 The nucleus of the sperm cell is different from the nucleus of body cells.

Give **one** way in which the nucleus is different.

[1 mark]

_____

2 Scientists investigated a food chain in a desert.

The food chain for the desert is:

Plant → Reptile → Bird

0 2 . 1 The reptiles gain energy transferred from the:

Tick **one** box.

[1 mark]

air ☐

food molecules in birds ☐

food molecules in plants ☐

Table 1 shows the data the scientists collected.

Table 1

Organism	Estimated number in the desert area	Biomass of one organism in kg	Total biomass for desert area in kg
Plant	40 000	0.0006	24.0
Bird	2	1.0	_____
Reptile	200	0.04	_____

0 2 . 2 Complete **Table 1** by calculating the total biomass of birds and of reptiles.

Write your answers in the table.

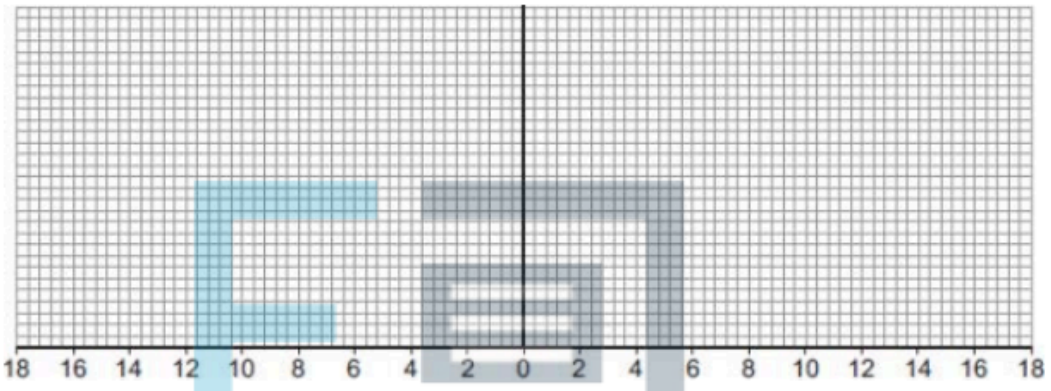
[2 marks]

0 2 . 3 Use data from **Table 1** to draw a pyramid of biomass for the food chain shown in the table.

You should label each layer of your pyramid.

[3 marks]

Figure 3



0 2 . 4 Give **two** reasons why the total biomass of the bird is less than the total biomass of the reptile.

[2 marks]

0 2 . 5 Suggest **two** reasons why the scientists could **not** find the exact number of organisms in the desert area.

[2 marks]

3 The leaves of most plants have stomata.

0 3 . 1 Which of the following control the size of the stomata?

Tick **one** box.

[1 mark]

- Epidermal cells ☐
- Guard cells ☐
- Palisade cells ☐

0 3 . 2 State **one** function of stomata.

[1 mark]

Water loss by evaporation from leaves is part of the transpiration stream.

A student set up an experiment to investigate water loss from leaves.

The student:

- took two leaves, **A** and **B**, from a plant
- put Vaseline (grease) on both sides of **Leaf B**; did nothing to **Leaf A**
- wrote down the mass of each leaf
- attached the leaves onto a string as shown in **Figure 4**.

Figure 4

Leaf A
(no treatment)

Leaf B
(both surfaces covered in Vaseline)

- left the leaves for 48 hours
- wrote down the mass of each leaf again
- calculated the percentage (%) change in mass for each leaf.

0 3 . 3 Give **one** variable that the student controlled in this investigation.

[1 mark]

0 3 . 4 The mass of **Leaf A** was 1.60 g at the start of the investigation. After 48 hours it was 1.28 g.

Calculate the percentage (%) decrease in mass over 48 hours.

[2 marks]

% decrease = _____

0 3 . 5 The percentage (%) change in mass of **Leaf B** was less than **Leaf A** after 48 hours.

Explain why.

[2 marks]

0 3 . 6 Give **three** environmental conditions that would increase water loss.

[3 marks]

1. _____
2. _____
3. _____

4 **Figure 5** shows four ways in which molecules may move into and out of a cell. The dots show the concentration of molecules.

Figure 5

The cell is respiring aerobically.

Which arrow, **A**, **B**, **C** or **D**, represents:

0 4 . 1 Movement of oxygen molecules.

[1 mark]

0 4 . 2 Name the process by which the oxygen moves.

[1 mark]

0 4 . 3 Which arrow, **A**, **B**, **C** or **D**, represents the active transport of sugar molecules by the cell?

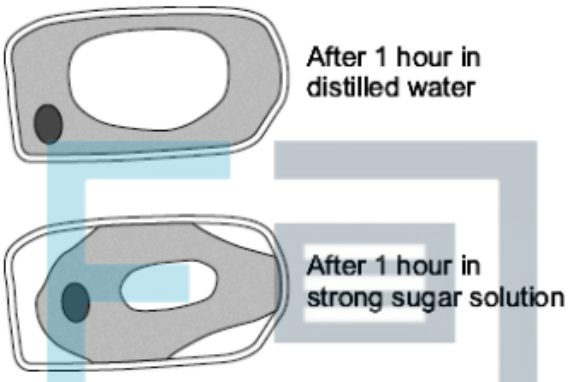
[2 marks]

Explain the reason for your answer.

Figure 6 shows a plant cell:

- after one hour in distilled water
- after one hour in strong sugar solution.

Figure 6

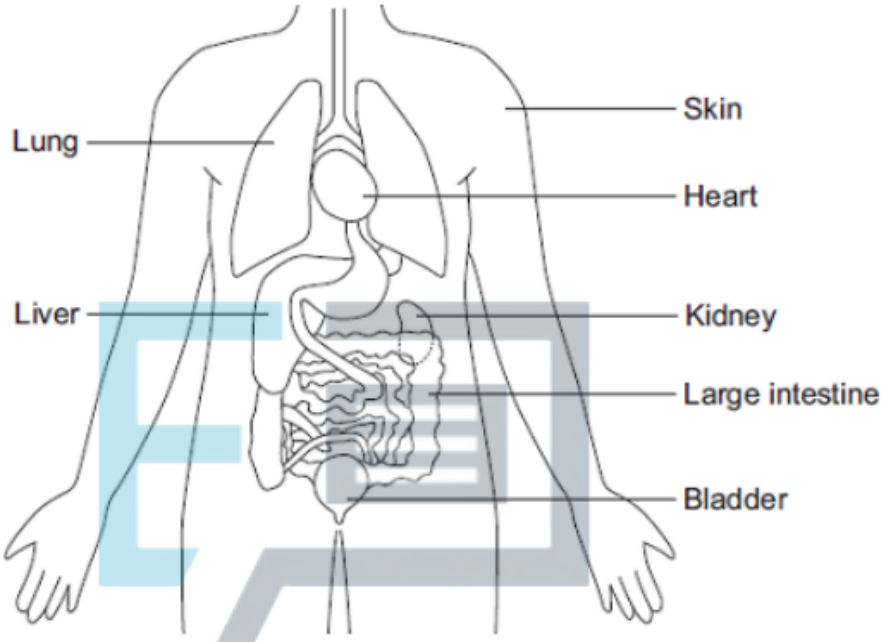


0 4 . 4 Explain in detail, using specialist terms, what has happened to the plant cell after an hour in each liquid and why.

[6 marks]

5 **Figure 7** shows some of the organs of the human body.

Figure 7



0 5 . 1 Which organ labelled on the diagram: **[2 marks]**

stores urine _____

produces urea _____

Table 2 shows the composition of a sample of urine from one person.

Table 2

Substance	Percentage
Ions	1.4
Urea	1.9
Water	

0 5 . 2 Calculate the percentage of water in this sample of urine.

Show clearly how you work out your answer.

[2 marks]

Percentage of water = _____ %

Table 3 shows the concentrations of some substances in human blood plasma, in the filtrate produced by the kidney and in the urine.

Table 3

	Concentration in grams per dm^3		
Substance	**Blood plasma**	**Filtrate**	**Urine**
Glucose	1.0	1.0	0.0
Amino acids	0.5	0.5	0.0
Urea	0.3	0.3	20.0
Protein	80.0	0.0	0.0
Ions	7.2	7.2	15.0
Water	912.0	990.0	970.0

0 5 . 3 Explain why:

[2 marks]

the concentration of glucose in the filtrate is the same as in the blood plasma;

_____

_____

there is no glucose present in the urine.

_____

_____

0 5 . 4 Suggest why there is no protein present in either the filtrate or the urine.

[1 mark]

_____

_____

0 5 . 5 The volume of water removed in the urine is variable.

Explain how the human body reduces the volume of urine produced when less water is consumed.

[3 marks]

6 Information is passed to target organs in the body by hormones.

0 6 . 1 How do hormones travel around the body?

[1 mark]

0 6 . 2 What name is given to the organs that secrete hormones?

[1 mark]

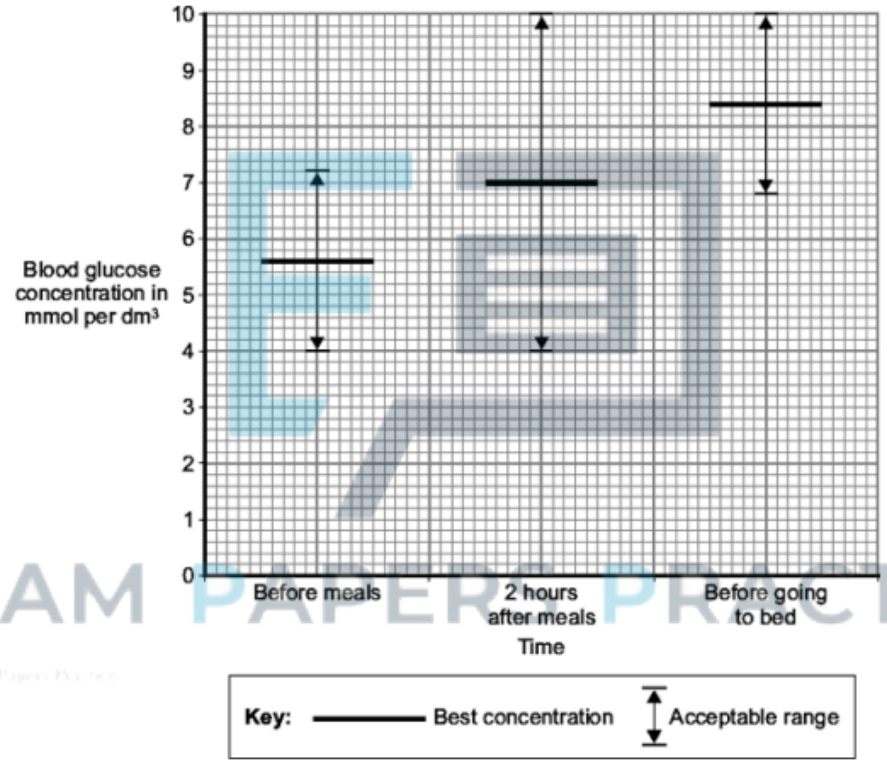
0 6 . 3 In people with diabetes blood glucose concentrations are sometimes abnormal. Name the organ that monitors the concentration of glucose in the blood.

[1 mark]

People with diabetes need to measure their blood glucose concentration.

Figure 8 shows the best blood glucose concentration and the acceptable range of blood glucose concentration at different times.

Figure 8



0 6 . 4 What is the acceptable range for the blood glucose concentration before meals?

[1 mark]

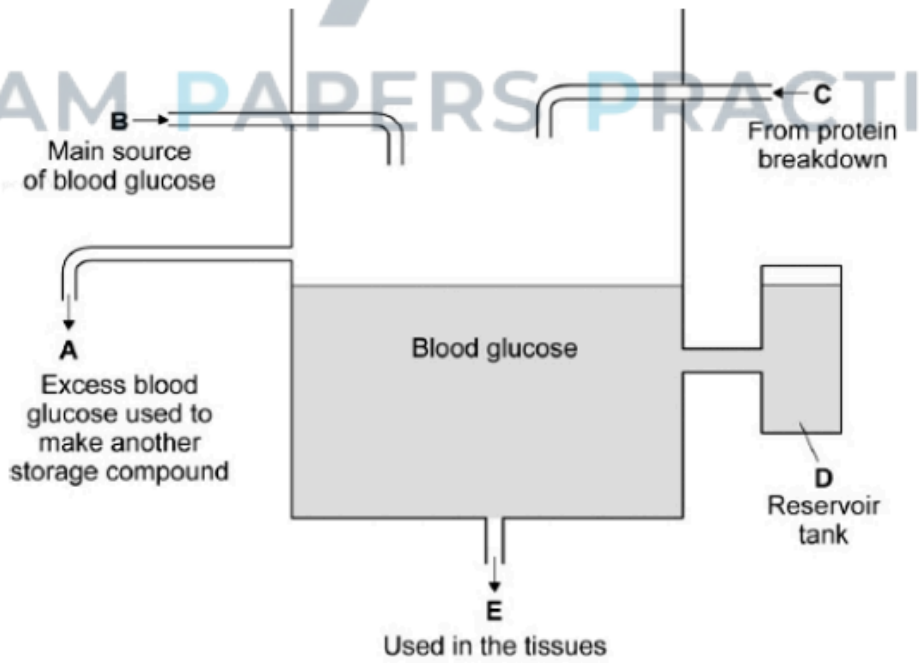
From _____ to _____ mmol per dm^3

Figure 9 shows a model for the control of blood glucose. The blood glucose is represented as a tank of fluid.

In this model:

- the pipes on the diagram represent 'routes' by which glucose may be added or removed
- the main source of glucose to the tank is through **B**
- a smaller amount of glucose enters through **C**, from protein breakdown
- there is an outflow from the tank to the tissues through **E**
- the reservoir tank, **D**, contains a carbohydrate that can be reconverted into blood glucose
- through **A**, any excess glucose can be used to produce another type of storage compound, which is different from the compound stored in **D**.

Figure 9



0 6 . 5 What is the 'main source of blood glucose' entering through **B**?

[1 mark]

0 6 . 6 Name the carbohydrate stored in reservoir **D**.

[1 mark]

0 6 . 7 Name the storage compound into which glucose is converted at **A**.

[1 mark]

The hormones insulin and glucagon are both involved in the regulation of blood sugar concentration.

0 6 . 8 Tick the appropriate boxes in **Table 4** that match descriptions of likely effects of the two hormones.

[3 marks]

Table 4

Effect of hormone	Insulin	Glucagon
Reduces the amount of storage carbohydrate in reservoir **D**		
Promotes the loss of blood glucose through **A** if reservoir **D** is full		
Increases the rate that glucose is transferred into cells at **E**		

7 The brain and the skin are involved in monitoring and controlling body temperature.

Describe the parts played by the brain and the skin in monitoring body temperature:

0 7 . 1 the brain

[2 marks]

0 7 . 2 the skin.

[1 mark]

0 7 . 3 An athlete can run a marathon in 2 hours 15 minutes on a dry day in outside temperatures up to 35 °C.

If the air is dry, his body will **not** overheat.

In humid conditions the same athlete can run the marathon in the same time.

However, in humid conditions, if the outside temperature goes over 18 °C then his body **will** overheat.

Suggest an explanation for the athlete overheating in humid conditions.

[3 marks]

0 7 . 4 The athlete's skin feels hotter after the marathon than it did before the marathon.

Describe what happened to the blood circulation in his skin to cause this change in temperature.

[2 marks]

0 7 . 5 After the race the athlete has a cold shower. This makes the athlete shiver.

Shivering helps to stop the core body temperature falling too quickly.

Explain how.

[2 marks]

0 8 . 1 State which structure is found in a white blood cell but is not found in a red blood cell?

Tick **one** box.

[1 mark]

- plasmid ☐
- nucleus ☐
- cell membrane ☐
- cytoplasm ☐

0 8 . 2 One way white blood cells protect us against pathogens is by making antibodies.

Give **two** other ways that white blood cells protect us against pathogens.

[2 marks]

1. _____

_____

2. _____

_____

0 8 . 3 Measles is a disease caused by a virus.

State what is injected in a measles vaccine.

[2 marks]

_____

_____

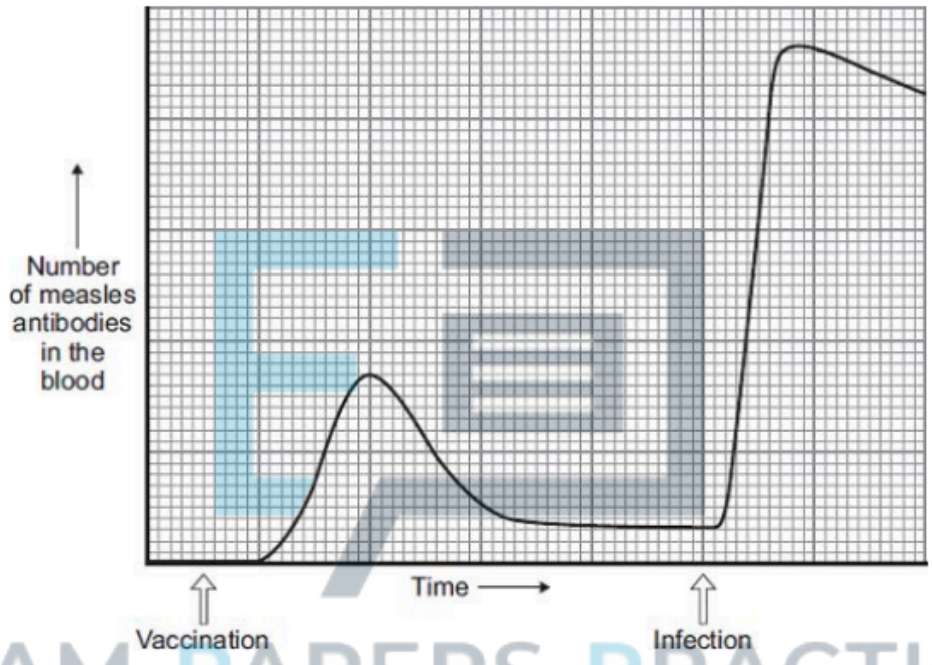
_____

_____

A person catches measles after being vaccinated.

Figure 10 shows the number of measles antibodies in the person's blood from before the vaccination until after the infection.

Figure 10



More measles antibodies are produced after the infection than after the vaccination.

0 8 . 4 Describe other differences in antibody production after infection compared with after vaccination.

[3 marks]

0 8 . 5 Suggest why the vaccination against the measles virus will not protect the person against the rubella virus.

[1 mark]

---

0 8 . 6 State the advantage of vaccinating a large proportion of the population against measles.

[1 mark]

---

9 Giraffes feed on the leaves of trees and other plants in areas of Africa.

They are adapted, through evolution, to survive in their environment.

Figure 11

0 9 . 1 Use the information in **Figure 11** to give one way in which the giraffe is adapted to its environment.

[1 mark]

0 9 . 2 Explain how Jean-Baptiste Lamarck (1744–1829) accounted for the evolution of the long neck in giraffes.

[3 marks]

0 9 . 3 Another scientist, August Weismann (1834 -1914) wanted to check Lamarck's explanation.

To do this he cut off the tails of a number of generations of mice and looked at the offspring.

Suggest why his results did not support Lamarck's theory.

[2 marks]

0 9 . 4 Explain how Charles Darwin (1809–1882) accounted for the evolution of the long neck in giraffes.

[4 marks]

END OF QUESTIONS