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1. The photograph is of a cat.



(a) Describe **two** ways, seen in the photograph, that show that the cat is communicating.

1

2

(2)

(b) Suggest what this cat is communicating to others.

.....

(1)

(c) Describe **two** ways, other than speaking or writing, in which humans communicate.

1

.....

2

.....

(2)

(Total 5 marks)

Q1



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2. Draw **one** straight line from each product to the organism used in its production.

product

organism

citric acid (used in fizzy drinks) ●

● seaweed

carrageen extract (used as a gelling agent) ●

● *Aspergillus*

invertase (enzyme used in the manufacture of sweets) ●

● *Acetobacter*

vitamin C ●

● *Saccharomyces* (yeast)

Q2

(Total 3 marks)

3. Use words from the box to complete the following sentences.

conditioning learned instinctive selection thinking

Michael accidentally touches a hot object. He pulls his hand away

without This is an example of behaviour.

Michael's dog knows that it is going for a walk, when Michael picks up its lead.

The dog's behaviour is an example of This

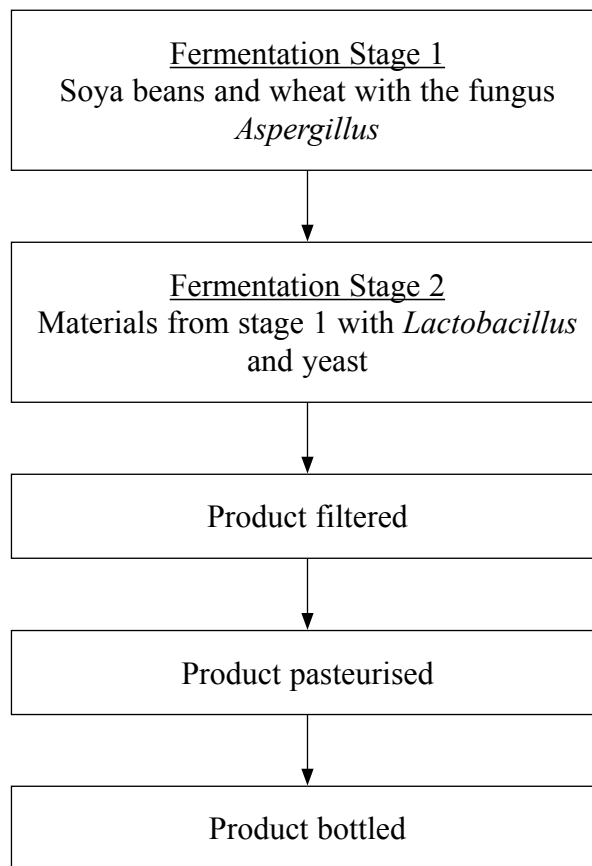
is behaviour.

Q3

(Total 4 marks)



4. The diagram shows the two fermentation stages in the production of soy sauce.



(a) The fungus *Aspergillus* secretes enzymes.

(i) Name **one** substance that is broken down by these enzymes.

..... (1)

(ii) Name **two** substances produced during stage 1 that are used in stage 2.

1

2

(2)



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- (b) The bacterium *Lactobacillus* is added at fermentation stage 2.
What effect does this have on the *Aspergillus* fungus?

.....
(1)

- (c) Towards the end of the process the soy sauce is pasteurised.
Why is it pasteurised?

.....
.....
(1)

Q4

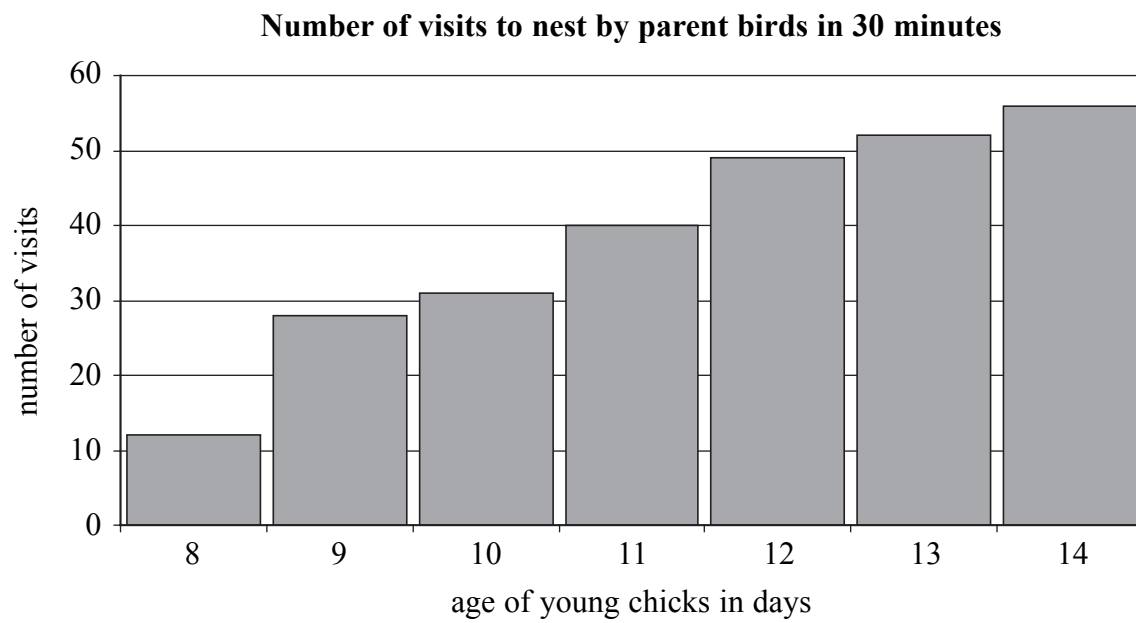
(Total 5 marks)



5. Some students set up a webcam in a birds nesting box.



Every day the students counted the number of visits made by the parent birds, to feed their young, in 30 minutes.
The bar chart shows their results.



(a) How many visits were made by the parents in 30 minutes when the chicks were 11 days old?

..... (1)



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(b) (i) Describe the pattern of visits by the parents from day 8 to day 14.

.....
.....
(1)

(ii) Suggest **one** reason for this pattern.

.....
.....
(1)

(c) What should the students do to ensure their data is reliable?

.....
.....
(1)

(d) Suggest **one** reason why using a webcam is the best way of carrying out these observations.

.....
.....
(1)

(Total 5 marks)

Q5



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6. Chymosin is an enzyme used in cheese production. In the past the enzyme came from the stomach of calves. Now the enzyme is made using genetically modified (GM) yeast.

(a) Give **one** advantage of using chymosin made by GM yeast rather than from calves.

.....
.....

(1)

(b) What effect does chymosin have on milk during cheese production?

.....
.....

(1)

(c) Suggest **one** reason why cheese made with chymosin from GM yeast is acceptable to people who are against GM products.

.....
.....

(1)

Q6

(Total 3 marks)



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7. (a) Doctors can now help parents to ensure that their baby will be the sex they want. However, this is illegal in many countries.

Describe **two** techniques a doctor could use to select the sex of a future baby.

1

.....

2

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(2)

- (b) Give **one** advantage and **one** disadvantage of being able to choose the sex of a baby.

advantage

.....

disadvantage

.....

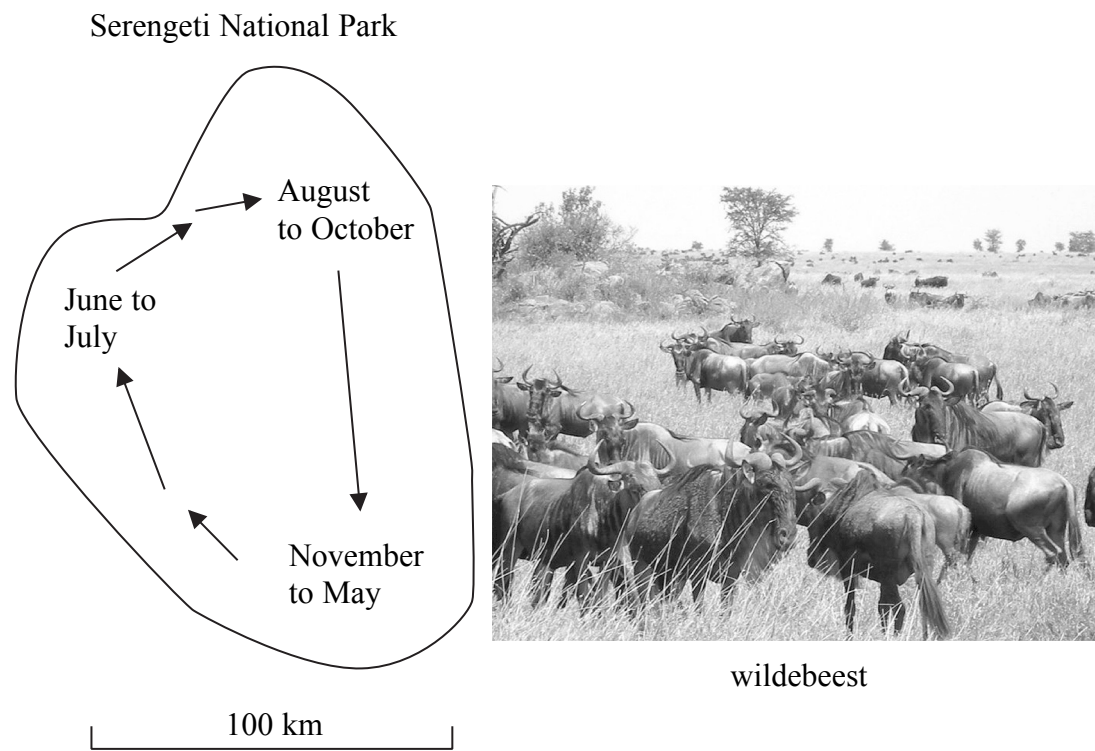
(2)

Q7

(Total 4 marks)



8. The Serengeti National Park is the largest protected area in Africa and is famous for its herds of herbivores (wildebeest, zebras and gazelles). Each year the herds follow a migration around the Serengeti as shown on this sketch map.



- (a) Suggest why the herds of herbivores have to move to new areas throughout the year.

.....
.....

(1)

Predators such as lions follow the herds.
Lions spend a lot less time eating than the wildebeest, zebras and gazelles.

- (b) Explain why lions spend less time eating compared to wildebeest.

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(3)



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Lions hunt wildebeest. Both are well adapted to this relationship.

(c) (i) State **one** adaptation that lions have that make them good predators.

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(1)

(ii) State **one** adaptation that wildebeest have that help them avoid being preyed on by lions.

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(1)

Q8

(Total 6 marks)

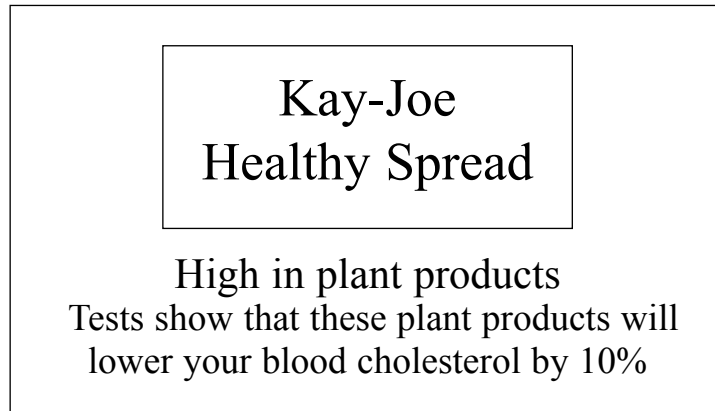


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9. This label comes from a new spread for use on bread.



(a) Name a 'plant product' that scientists claim will lower blood cholesterol levels.

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(1)

(b) Suggest how lowering blood cholesterol is beneficial to a person's health.

.....
.....
.....
.....
.....
.....
(2)

(c) Suggest what manufacturers should do, when trialing the spread, to justify their claim that it reduces cholesterol by 10%.

.....
.....
(1)

(Total 4 marks)

Q9



10. Barn swallows are small birds with long forked tails.
Barn swallows are found in many parts of Europe.



Long tails make it harder for the swallows to fly.
Females are more likely to select males with long tails.
Shorter tailed males are likely to breed with less fit females and produce fewer chicks.

- (a) Suggest why females select males with longer tails as mates.

.....
.....
(1)

- (b) The genes for tail length are inherited.
Suggest why the tails of barn swallows do not keep growing longer and longer over successive generations.

.....
.....
.....
(1)

- (c) In an experiment, tails of some short-tailed barn swallows were made longer by sticking some artificial feathers on to their existing tails.

- (i) Suggest the effect that making the tails longer had on the courtship of these barn swallows.

.....
.....
(1)



(ii) The barn swallows with artificially lengthened tails fathered larger numbers of chicks.
Explain why many of these chicks were less than average weight when they left the nests.

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.....

(1)

(Total 4 marks)

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Q10



H 3 4 0 6 1 A 0 1 5 2 0

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11. Julie had a bad throat and needed some medicine to help her recover.
The doctor asked Julie if she was allergic to penicillin.

(a) Explain why some people are allergic to penicillin.

.....
.....

(1)

(b) Trials are taking place where a person's genome will be used to help a doctor prescribe medicine for them. These medicines are called genomic medicines.

Explain how knowledge of the human genome can be used to make medicines safer and more effective.

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(3)

(c) Suggest why these 'genomic medicines' will not be available for general use for many years.

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(2)

(Total 6 marks)

Q11



13. The Bushmen of the Kalahari desert are one of the last groups of people that exist by following a hunter-gatherer way of life.



(a) Explain what is meant by ‘hunter-gatherer’.

.....
.....
.....
.....

(2)

(b) Some people have suggested that this way of life is similar to the way other groups of primates such as bonobos (pygmy chimpanzees) live.

State **two** ways that the bushmen’s way of life is different from bonobos.

1
.....
2
.....

(2)



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- (c) Archaeologists have analysed bones found in areas of human habitation in Iraq dated from 13 000 to 9000 years ago. Excavations of the younger areas have revealed houses and towns.

The table shows some of their results

| number of years ago | % of wild gazelle bones | % of domesticated sheep and goat bones |
|---------------------|-------------------------|--|
| 13 000 | 60 | 3 |
| 12 500 | 75 | 1 |
| 12 000 | 80 | 2 |
| 11 500 | 80 | 2 |
| 11 000 | 60 | 2 |
| 10 500 | 15 | 62 |
| 10 000 | 20 | 58 |
| 9 500 | 8 | 82 |
| 9 000 | 15 | 62 |

What does the data suggest about the way of life of people in this area from 13 000 to 9000 years ago?

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(2)

Q13

(Total 6 marks)

TOTAL FOR PAPER: 60 MARKS

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