N5

National Qualifications 2015

X707/75/02

Biology
Section 1—Questions

WEDNESDAY, 13 MAY
9:00 AM – 11:00 AM

Instructions for the completion of Section 1 are given on Page two of your question and answer booklet X707/75/01.

Record your answers on the answer grid on Page three of your question and answer booklet
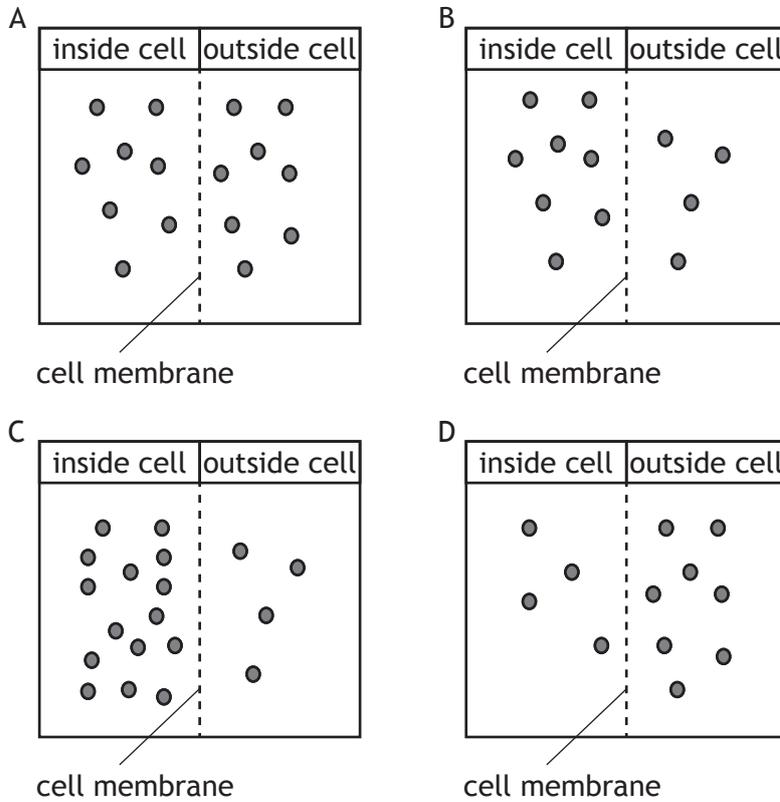
Before leaving the examination room you must give your question and answer booklet to the Invigilator; if you do not, you may lose all the marks for this paper.

SQA ©

PB

SECTION 1

1. In the diagrams below, the circles represent molecules on either side of a cell membrane. In which of these diagrams would the molecules move into a cell by diffusion?

A

| inside cell | outside cell |

cell membrane

B

| inside cell | outside cell |

cell membrane

C

| inside cell | outside cell |

cell membrane

D

| inside cell | outside cell |

cell membrane

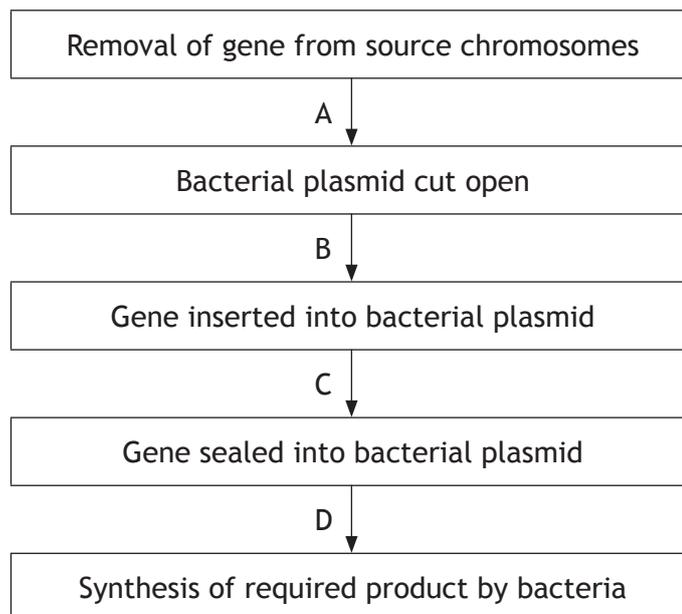2. Which of the following does **not** involve mitosis?

    A   Synthesis of proteins

    B   Growth of tissue

    C   Maintenance of the diploid chromosome complement

    D   Repair of tissue

3. The graph below shows changes in the enzyme and substrate concentrations in a seed over a period of time.

Enzyme concentration (units) ———

Substrate concentration (units) - - - - -

Time (days)
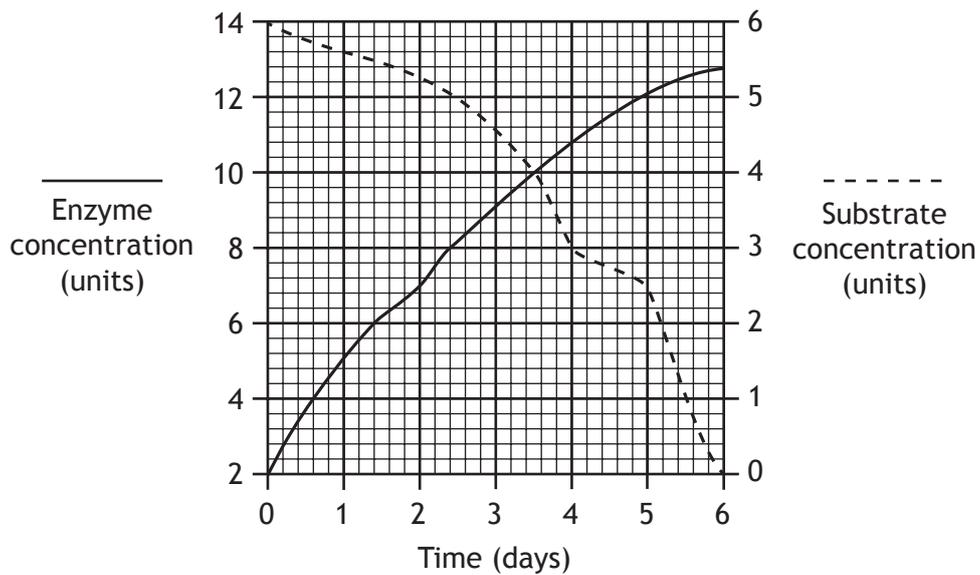
How many days does it take for the substrate concentration to decrease by 50%?

A   2

B   3

C   4

D   5

4. Some stages of genetic engineering are shown below.

Removal of gene from source chromosomes

A ↓

Bacterial plasmid cut open

B ↓

Gene inserted into bacterial plasmid

C ↓

Gene sealed into bacterial plasmid

D ↓

Synthesis of required product by bacteria

Which letter indicates the stage where the plasmid is inserted into a bacterial cell?

5. The effect of light intensity on the rate of photosynthesis was measured for two species of plants, L and M.

The results are shown in the graph below.
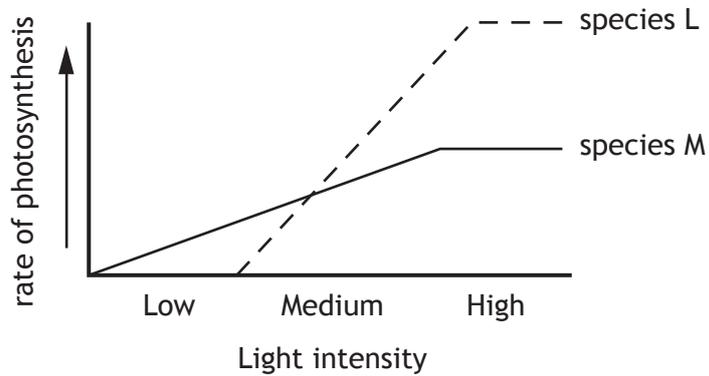
The rate of photosynthesis of species M is

A   slower than L in low light intensities

B   slower than L in high light intensities

C   faster than L in medium light intensities

D   faster than L in high light intensities.

6. The diagrams below show four different types of cell.

Which cell was produced by a meristem?
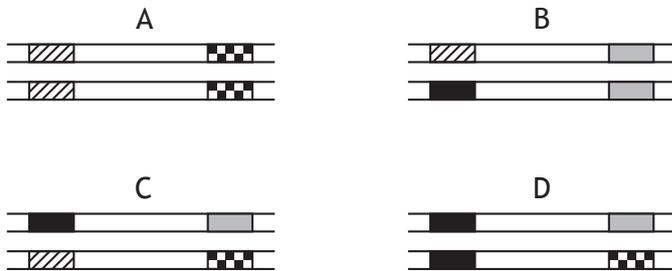
A

B

C

D
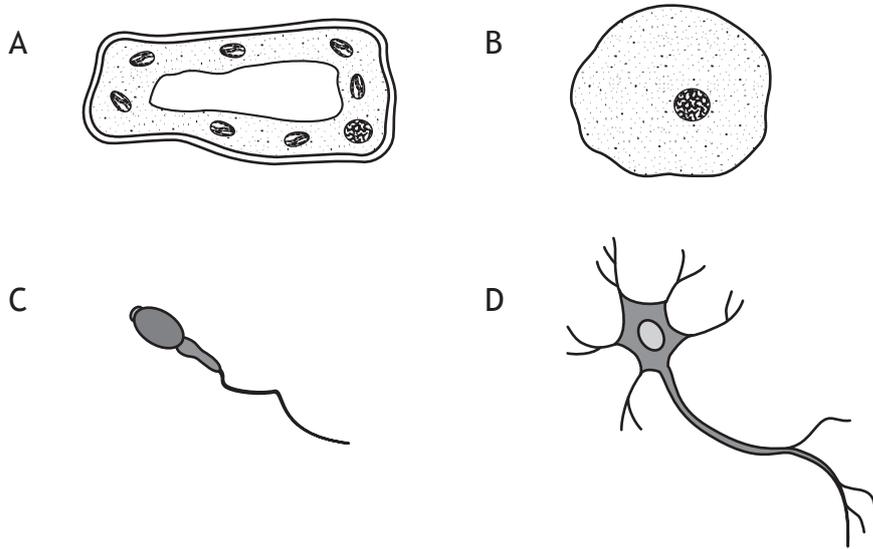
7. The diploid number of chromosomes in a cell from a kangaroo is 12.

Which line in the table below identifies the number of chromosomes for the cell type shown?

	Kangaroo Cell Type	Number of chromosomes
A	sperm	12
B	skin	6
C	nerve	6
D	zygote	12

8. The diagrams below show the same sections of matching chromosomes found in four flies, A, B, C and D.

The alleles shown on the chromosomes can be identified using the following key.

 allele for striped body
 allele for unstriped body
 allele for normal antennae
 allele for abnormal antennae

Which fly is homozygous for body pattern and heterozygous for antennae type?

[Turn over

9. The diagram below shows an alveolus and an associated blood capillary.
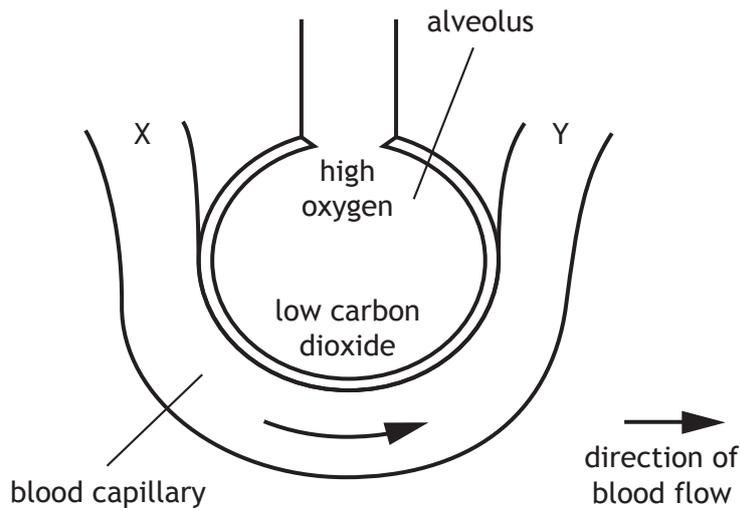
As blood flows from X to Y gases are exchanged with the alveolus.

Which line in the table below identifies the concentrations of gases at X and Y?

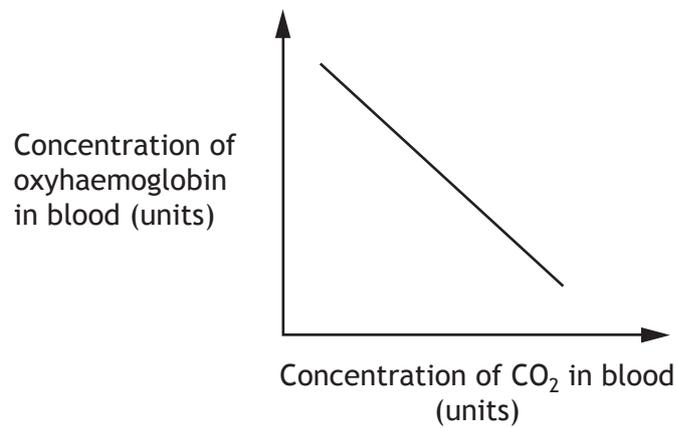|	Concentration at X	Concentration at Y
A	high oxygen	high carbon dioxide
B	low oxygen	high carbon dioxide
C	low oxygen	low carbon dioxide
D	high oxygen	low carbon dioxide

10. The following sequence shows part of the blood flow through the body.
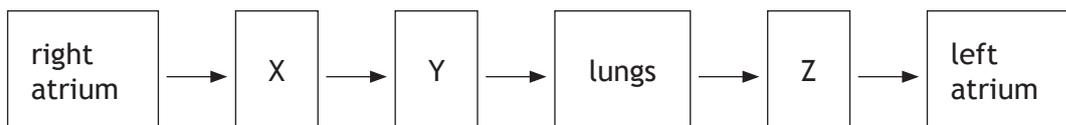
Which line in the table below identifies X, Y and Z?

	X	Y	Z
A	right ventricle	pulmonary vein	pulmonary artery
B	right ventricle	pulmonary artery	pulmonary vein
C	pulmonary vein	pulmonary artery	right ventricle
D	pulmonary artery	right ventricle	pulmonary vein

11. The graph below shows the relationship between the concentration of carbon dioxide and oxyhaemoglobin in the blood.

Concentration of oxyhaemoglobin in blood (units)

Concentration of CO_2 in blood (units)

Which of the following statements describes this relationship?

A As the carbon dioxide concentration increases the concentration of oxyhaemoglobin decreases.

B As the carbon dioxide concentration decreases the concentration of oxyhaemoglobin decreases.

C As the carbon dioxide concentration increases the concentration of oxyhaemoglobin increases.

D Increasing carbon dioxide concentration has no effect upon the concentration of oxyhaemoglobin.

[Turn over

12. The chart below shows the percentage of men and women with obesity at different ages, in a population.
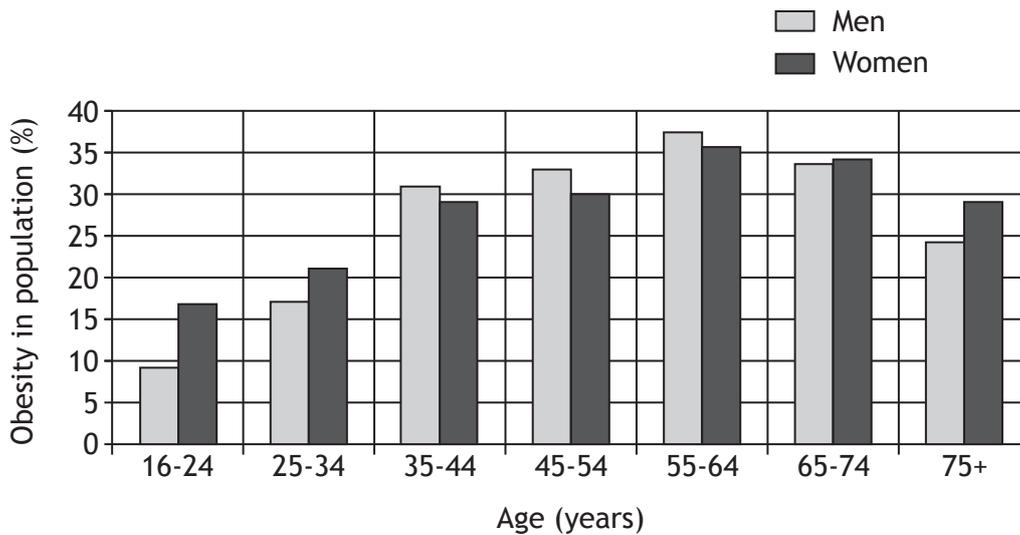
Which of the following statements is true?

A   For each age group there is a higher percentage of obese men than obese women.

B   For each age group there is a higher percentage of obese women than obese men.

C   Obesity in men and women increases with age up to 64 years.

D   Obesity in men and women decreases with age up to 64 years.

13. Which of the following statements best describes a biome?

A   All the organisms in an area and their habitat.

B   The role that an organism plays within a community.

C   A living factor which affects biodiversity in an ecosystem.

D   A region of our planet as distinguished by its climate, fauna and flora.

14. The size of a population of snails can be estimated using the following formula.

$$\text{Population} = \frac{\text{Number collected on 1st day} \times \text{Number collected on 2nd day}}{\text{Number of marked individuals found on 2nd day}}$$

A student investigated the population of snails in a garden. He collected 40 snails, marked their shells and released them. Next day, 35 snails were collected and 14 of these were found to be marked.

The snail population was estimated to be

A   16

B   100

C   560

D   1400.

15. Which of the following describes interspecific competition?

    A   Individuals of different species requiring different resources.

    B   Individuals of different species requiring similar resources.

    C   Individuals of the same species requiring different resources.

    D   Individuals of the same species requiring similar resources.

16. The diagram below represents four populations of animals P, Q, R and S and areas of interbreeding. Interbreeding takes place in the shaded areas.
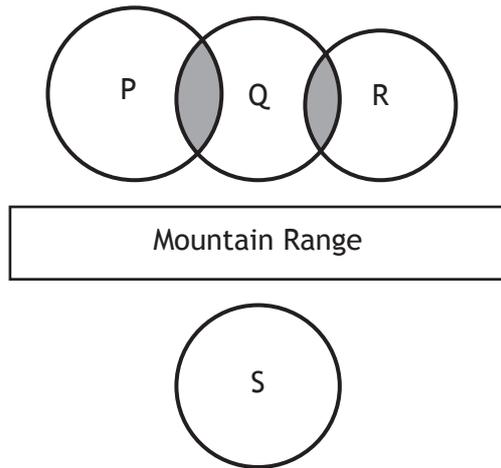

How many species may evolve over time?

    A   1

    B   2

    C   3

    D   4

17. Antibiotic resistance in bacteria is an example of evolution. Which of the following shows the sequence of events leading to this?

    A   Natural selection ⟶ mutation ⟶ use of antibiotic

    B   Mutation ⟶ natural selection ⟶ use of antibiotic

    C   Mutation ⟶ use of antibiotic ⟶ natural selection

    D   Natural selection ⟶ use of antibiotic ⟶ mutation

[Turn over

18. The graph below shows information about the growth of the human population.
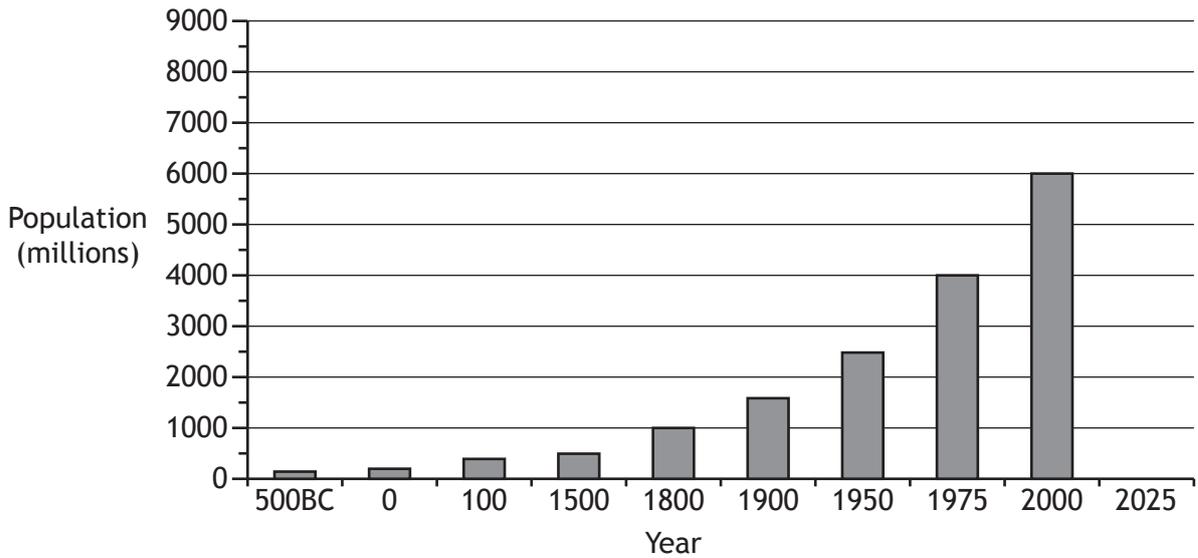
If the population continues to increase at the same rate as between 1975 and 2000, predict the population size in 2025.

A   7000

B   7500

C   8000

D   8500

19. DDT can be sprayed onto crops to kill insects. It can be washed off the crops by rainwater and flow into rivers where it accumulates in food chains.

A typical freshwater food chain and the concentration of DDT in each organism is shown below.

Food chain: algae ⟶ stickleback ⟶ trout ⟶ osprey

DDT concentration: 0·001   2·0   5·0   20·0

The percentage increase in DDT concentration between the trout and osprey is

A   15

B   100

C   300

D   400.

20. Which of the following statements describes the sequence of events when fertiliser leaches into a loch?

A   Algal bloom develops ⟶ algae die ⟶ oxygen concentration increases

B   Algal bloom develops ⟶ algae die ⟶ oxygen concentration decreases

C   Oxygen concentration increases ⟶ algal bloom develops ⟶ algae die

D   Algae die ⟶ oxygen concentration decreases ⟶ algal bloom develops

[END OF SECTION 1. NOW ATTEMPT THE QUESTIONS IN SECTION 2 OF YOUR QUESTION AND ANSWER BOOKLET]

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