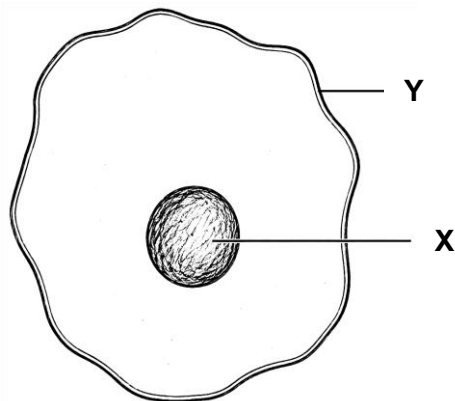


**BIOLOGY
PAPER II**

Question 1

1. Fig. 1.1 shows a stained human cheek cell observed under a light microscope.

[1]



- a. Identify the structure labelled **X** in Fig.1.1.

- b. State **one** function of the structure labelled **Y** in the Fig.1.1.

[1]

2. Fig. 1.2 shows some environmental application of prokaryotes.

[3]

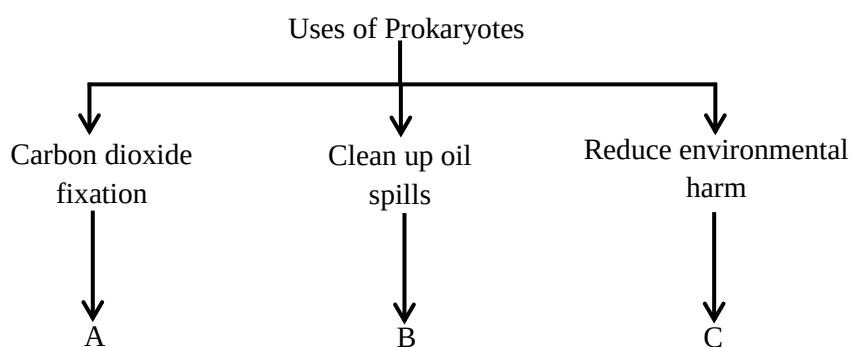


Fig.1.2

Complete the flow chart by filling the missing information.

3. Fig. 1.3 shows a part of the fluid-mosaic model of a cell membrane.

[2]

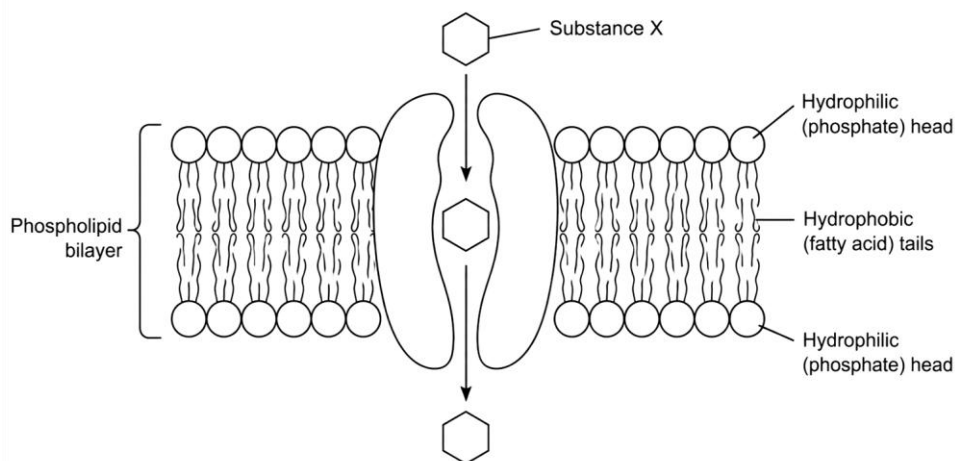


Fig. 1.3

Substance **X** is a large polar molecule attempting to cross the membrane.

Use Fig.1.3 to explain why substance **X** passes through the carrier protein instead of the phospholipid bilayer.

4. A student decides **not** to receive a recommended vaccination because a student believes it is unnecessary. Explain why receiving the vaccination is important for protecting health.

[3]

Question 2

1. Fig. 2.1 shows the rate of transpiration of a plant under different environmental conditions.

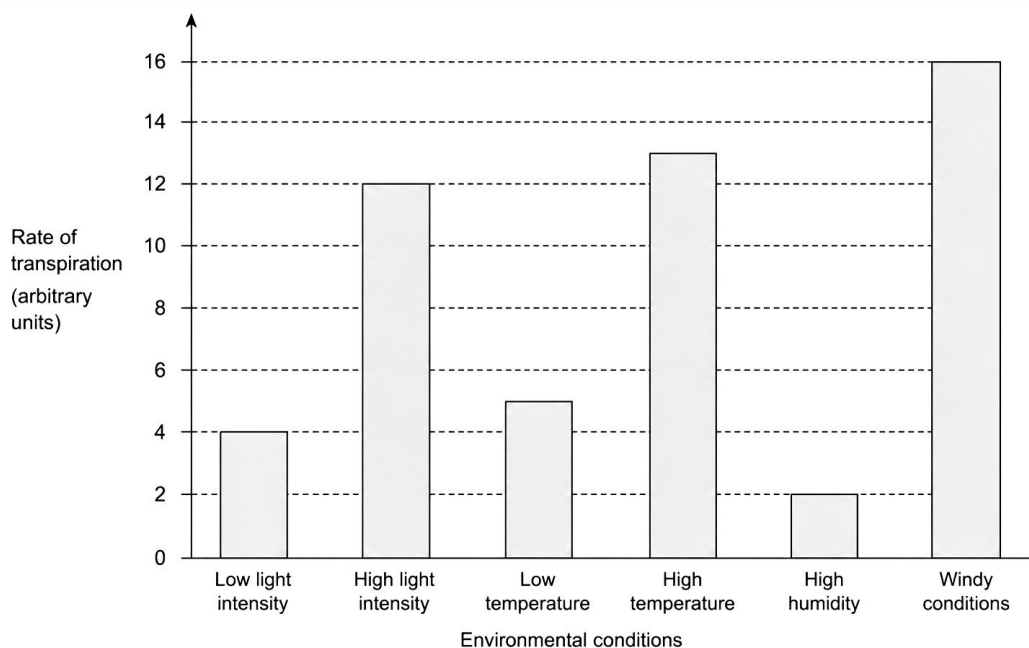


Fig. 2.1

- a. State the environmental condition in which the rate of transpiration is highest in Fig.2.1. **[1]**

- b. Identify the environmental factor in which the transpiration rate is lowest. **[1]**

- c. State one environmental factor in Fig.2.1 that increases the rate of transpiration. **[1]**

2. Table 2.1 shows the conditions in two greenhouses in which a farmer grows tomato plants.

Table 2.1

Conditions	Greenhouse A	Greenhouse B
Light intensity	High	High
Carbon dioxide concentration	High	Low
Temperature	Optimum	Optimum
Soil water	Adequate	Adequate

Explain which greenhouse is likely to produce a higher crop yield.

[3]

3. Fig. 2.1 shows the pathway for water movement through a plant.

[1]

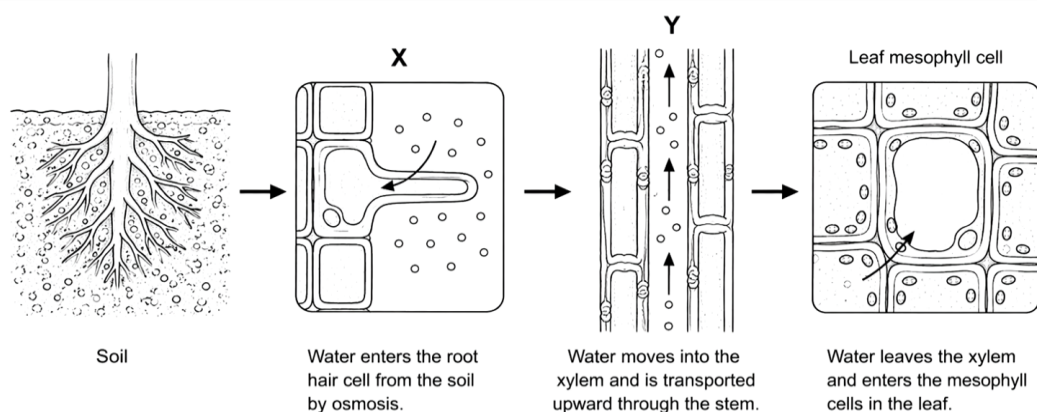


Fig. 2.1

- a. Identify the structure labelled X in Fig. 2.1.

b. State the function of the tissue labelled **Y** in Fig. 2.1.

[1]

4. Table 2.2 shows tidal volume of a person at rest and during exercises.

Table 2.2

Conditions	Tidal volume (cm ³)
At rest	500
During exercises	1200

Explain why the tidal volume changes during exercises in Table 2.2.

[2]

Question 3

1. Figure 3.1 shows an incomplete flow chart of an embryo development.

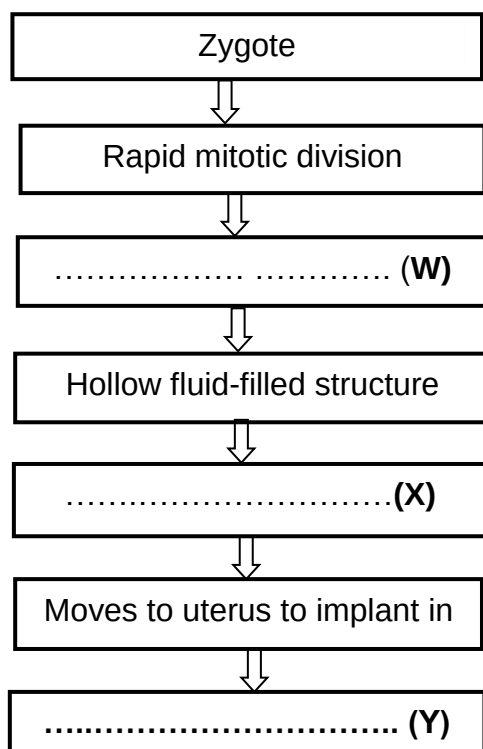


Fig.3.1

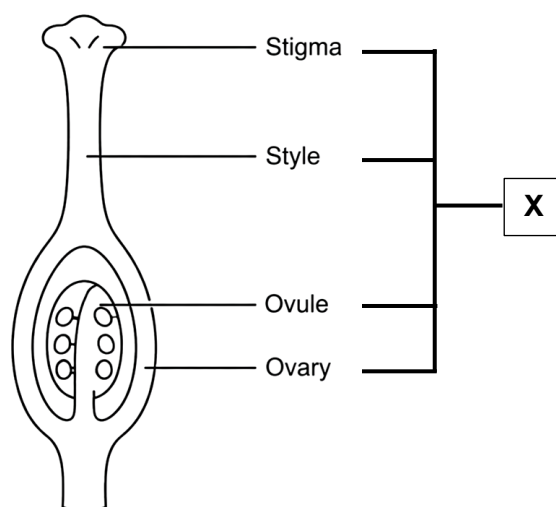
Complete the flow chart in Fig. 3.1.

[3]

2. A doctor recommends a contraceptive patch to a woman who wants to avoid pregnancy.
Explain how the hormone released by the contraceptive patch reduces the chances of pregnancy.

[2]

3. Fig. 3.2 shows the main parts of a flower.



- a. Identify the reproductive part labelled X in Fig. 3.2.

[1]

- b. State one function of the sepal.

[1]

4. Fig. 3.3 shows a diploid parent cell undergoing meiosis to produce four haploid gametes.

[3]

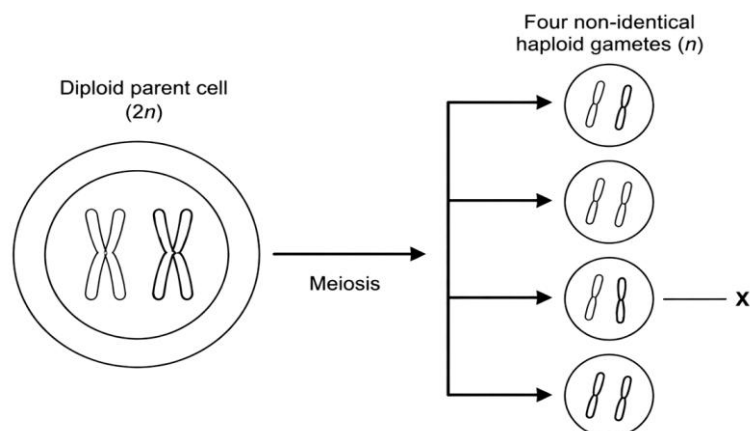


Fig. 3.3

Use information in Fig.3.3 to explain why the cell labelled **X** is suitable for fertilization.

Question 4

1. A student accidentally touches a hot kettle. The student quickly withdraw hand before fully aware of the pain.

a. Identify the organ that processes the sensation of the pain.

[1]

b. State one function of the spinal cord in this response.

[1]

c. Identify the nervous system that carries impulse between the hand and the central nervous system.

[1]

2. Table 4.1 shows different events that occurs during food processing in the human digestive system.

Complete Table 4.1 by identifying the process that occurs in each event.

[3]

Table 4.1

Event	Description	Process	
A	Bread is chewed into smaller pieces	_____	
B	Amylase break starch into maltose	_____	
C	Undigested food leaves the body	_____	

3. A student accidentally steps on a sharp object and immediately lift foot without thinking.

- a. Identify the neuron that carries the impulse from the receptor to the spinal cord.

[1]

- b. State the role of the effector in this reflex action.

[1]

4. A doctor examined a patient who complained of fatigue, confusion and swelling of the feet. The patient's medical report is given in Table 4.2

Table 4.2

Test	Normal range	Patient's result
Blood urea	2.5 – 7.5 mmol/L	18.2 mmol/L
Kidney function	Normal	Reduced
Urine output	Normal	Low

Explain why the patient is experiencing these symptoms based on the report in Table 4.2.

[2]

Question 5

1. A group of students investigated two grassland ecosystems. Ecosystem **A** had many different species of plants, insects and birds while ecosystem **B** had only a few species. The students recorded the ecosystem functions observed in each ecosystem in Table 5.1

- a. Complete Table 5.1 by putting tick (✓) to show the ecosystem that has high biodiversity.

Table 5.1

Ecosystem function	Ecosystem A	Ecosystem B
Pollination		
Stable food web		
Nutrient cycling		

[1]

- b. State one ecosystem function that is supported by biodiversity.

[1]

2. Light, water and temperature are important abiotic factors that affect the survival of organisms in an ecosystem.

Complete the sentences by circling the correct words in bold.

The first sentence has been done for you.

Plants growing in **bright light** are likely to photosynthesis at a **(higher)** **lower / same** rate than plants growing in shade.

- a. A decrease in soil water causes plant growth to **increase / decrease / stay the same** and the chances of wilting to **increase/ decrease/ stay the same**. [1]
- b. A rise in **temperature** (within the optimum temperature) causes the activity of an enzyme in plants to **increase/ decrease/ stay the same**. [1]

3. The list shows same examples of factors that affect the carrying capacity of an ecosystem.

(food availability, competition, predation, sunlight, disease, space)

Complete Table 5.2 to show which are examples of biotic and abiotic limiting factors.

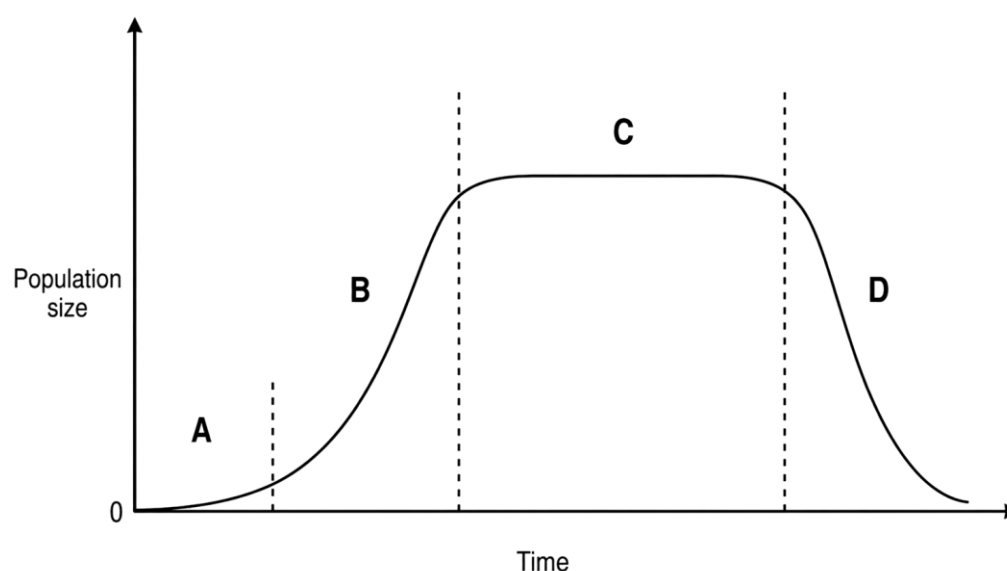
Each word can be used **once, more than once or not at all.**

[3]

Table 5.2

Biotic limiting factor	Abiotic factors

4. Figure 5.1 shows the population growth of a rabbit population over the time.



- a. State the name of the phase labelled B in Fig. 5.1.

[1]

- b. State the phase in which the population reaches its carrying capacity.

[1]

- c. Use the information in Fig.5.1 to identify the phase where the population begin to decrease.

[1]

Question 6

1. Two pea plants with **round seed** were crossed. Round seed shape is controlled by a **dominant allele**, while wrinkled seed shape is controlled by **recessive allele**. The cross produced 75 offsprings with round seeds and 25 offsprings with wrinkled seed.
Complete the genetic diagram to show this cross. Select a suitable letter to represent the alleles and decide which allele should be written as upper case and in lower case.
 - a. Letter representing the allele for round seed _____ and allele for wrinkled seed _____. [1]
 - b. The parental phenotype of heterozygous round seed plant is **Rr**. When two such plants are crossed, the gametes produced are _____, _____, _____, and _____. [1]
 - c. The offsprings produced when two round seeded plants crossed are RR, Rr, Rr and rr. The expected phenotypic ratio of the offsprings is _____. [1]
2. Fig. 6.1 shows the changes to the population of light-colored and dark-colored peppered moths in an industrial area before and after industrial pollution.

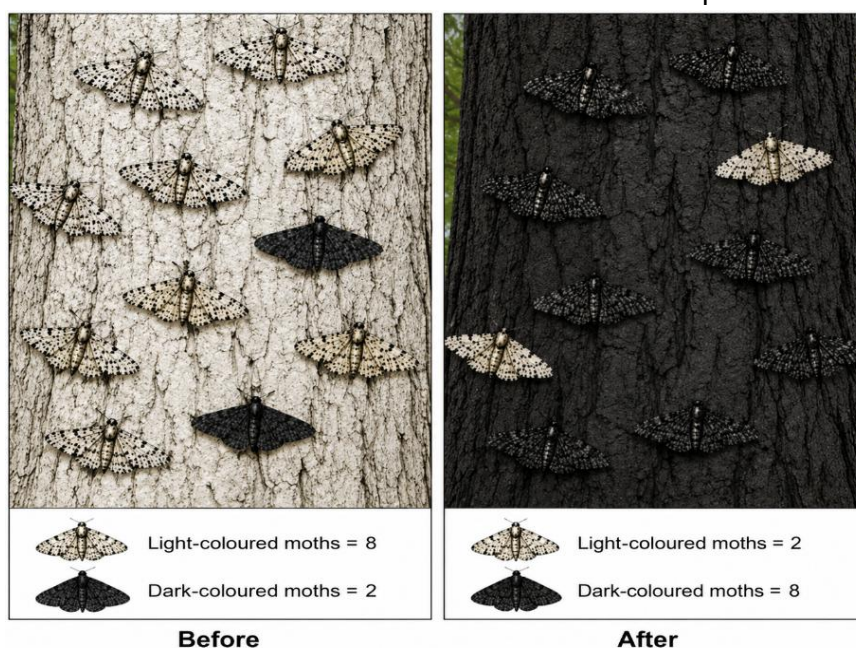


Fig. 6.1

- a. Suggest why the population of dark-coloured peppered moth decreased during the period of industrial pollution. [1]

- b. Explain why the population of the light-coloured peppered moth decreased during the same period.

[2]

3. Table 6.1 shows the step used to improve milk production in cattle by selective breeding.

The stages are **not** in the correct order.

Table 6.1

Letter	Stages
F	The best offsprings are selected
G	Farmers choose cows with high milk yield.
H	The selected cows are breed.
I	The desired characteristic becomes more common in the future generation
J	The offsprings are assessed for milk productions.

Arrange the stages into the correct sequence by writing the letter in correct order of the stages.

[2]

4. Speciation increases biodiversity and helps to maintain stable ecosystem.

The column **A** shows the ecological term and column **B** shows their description. Write the correct matching pairs.

[2]

Ecological term (column A)	Description (Column B)
Speciation	Introduce new species into an ecosystem
Biodiversity	Increase the stability of an ecosystem
Food web	Shows feeding relationship between organisms
Ecosystem resilience	Is the ability of an ecosystem to recover after disturbance.
