Classification & evolution

Question Paper 3

Level	A Level
Subject	Biology
Exam Board	OCR
Module	Biodiversity, evolution and disease
Topic	Classification & evolution
Booklet	Question Paper 3

Time allowed: **58 minutes**

Score: **/43**

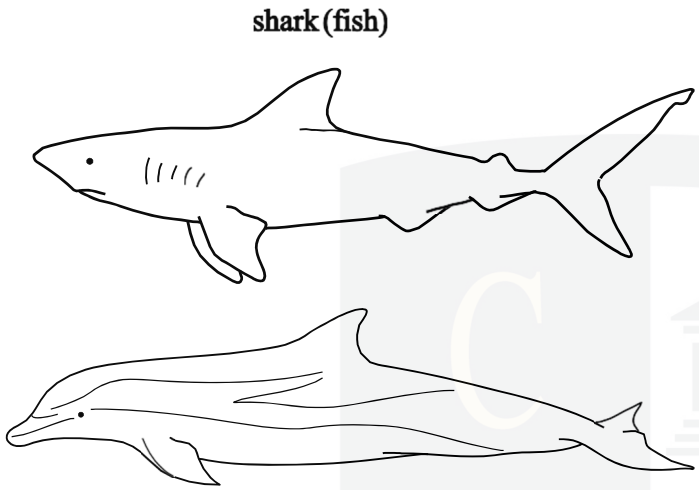
Percentage: **/100**

Grade Boundaries:

A*	A	B	C	D	E
>69%	56%	50%	42%	34%	26%

Question 1

These two organisms show very similar anatomical adaptations but are classified in different taxonomic groups.



What is this an example of?

A convergent evolution

B divergent evolution

C disruptive selection

D stabilising selection

[1]

Question 2

A number of events occur for a new species to emerge in a population.

Which of the following statements correspond to events that are involved in the formation of a new species?

Statement 1: Gene mutation.

Statement 2: Selection pressure.

Statement 3: A change in the environment.

A 1, 2 and 3

B Only 1 and 2

C Only 2 and 3

D Only 1

[1]

Question 3

(a) Fig. 6.1 shows two species of trilobites, a group of arthropods that became extinct about 240 million years ago. Species **A** is 20 million years older than species **B**.

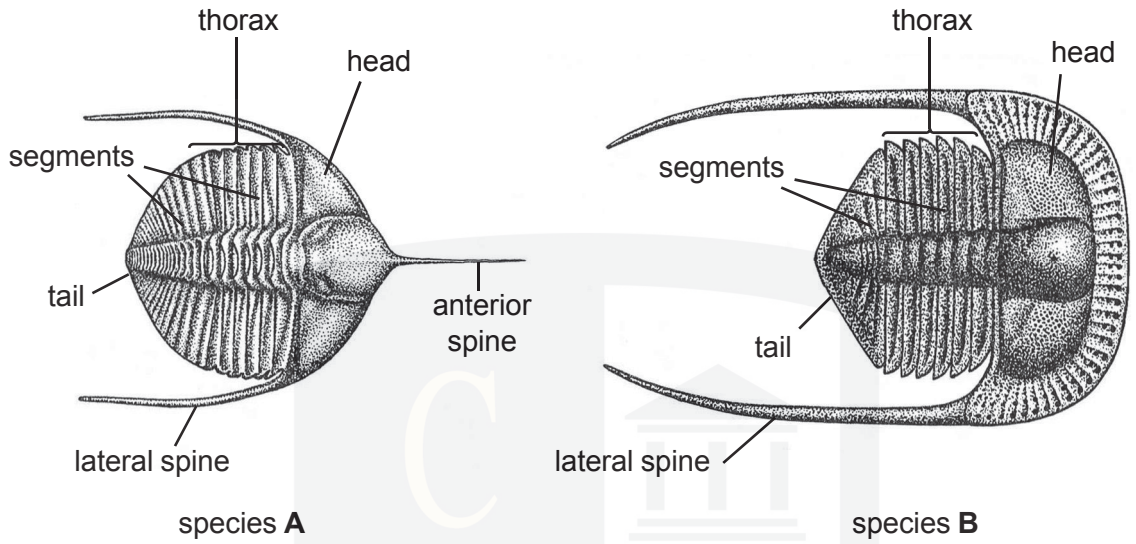


Fig. 6.1

(i) List **three** observable features from Fig. 6.1 that suggest the two species are related. **[3]**

(ii) List **two** observable features from Fig. 6.1, **other than size**, that could suggest they are **different** species. **[2]**

(b) Explain how fossils provide evidence for the theory of evolution. **[2]**

[Total: 7]

Question 4

(a) Fig. 5.1 shows a section of a leaf from a pear tree that is infected by the mildew fungus.

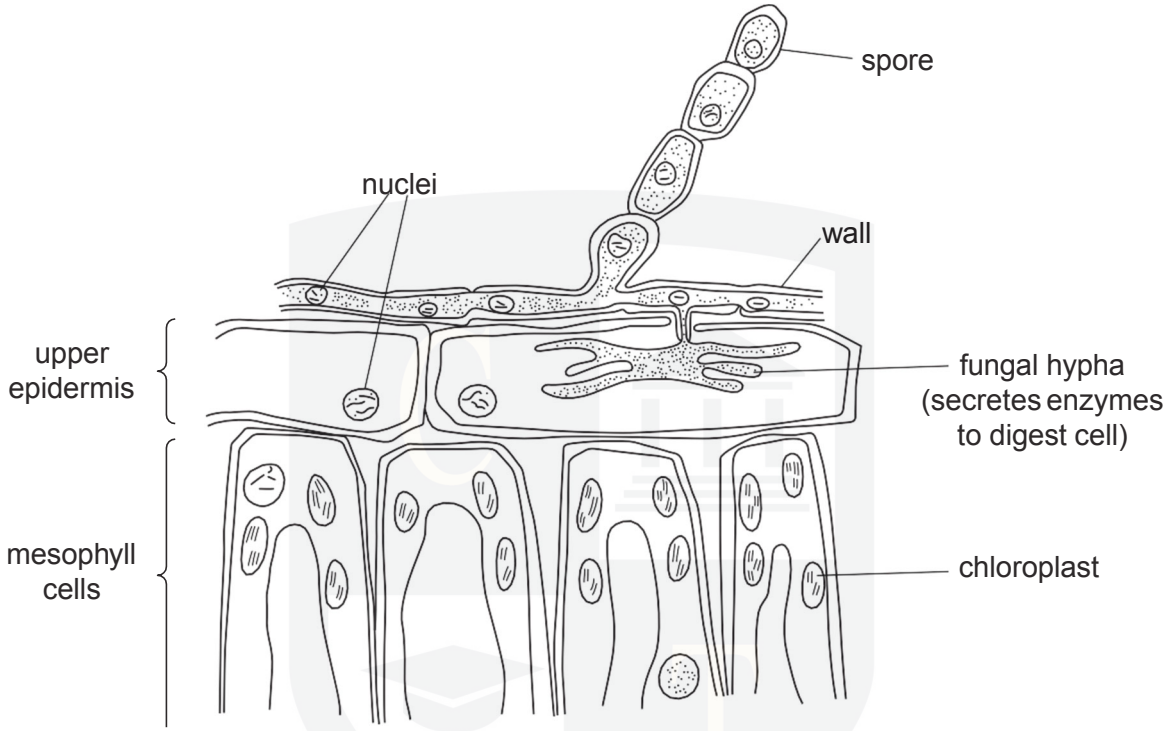


Fig. 5.1

(i) State **one** feature, **shown in Fig. 5.1**, that excludes **both** the pear tree and mildew from the kingdom Prokaryotae. **[1]**

(ii) State **two** reasons why mildew should be placed in the kingdom Fungi. **[2]**

(iii) State **two** reasons why the pear tree should be placed in the kingdom Plantae. **[2]**

(iv) Name **two** kingdoms other than Prokaryotae, Fungi and Plantae. **[2]**

(b) The mildew fungus also infects wheat plants, causing disease.

- Most wheat plants in the UK show little resistance to this disease.
- Some Iranian wheat plants are resistant.
- The yield from these resistant wheat plants is very low.

(i) An investigation into the resistance of the Iranian wheat plants to mildew produced the results shown in Fig. 5.2.

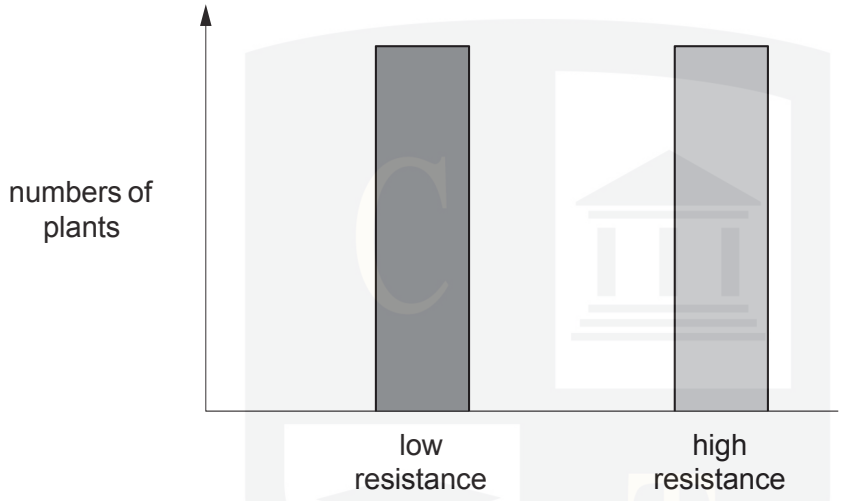


Fig. 5.2

State the type of variation that is shown in Fig. 5.2 **and** describe its characteristics.

type of variation .....

characteristics of this type of variation **[3]**

(ii) Outline how a breeding programme could be carried out to produce wheat plants which have both high yield **and** resistance to mildew.

[3]

(c) Over a period of time, mildew can overcome the resistance bred into the wheat.

Use the theory of natural selection to explain how the mildew fungus adapts to overcome this resistance.

[4]

[Total: 17]

Question 5

In 1990, Carl Woese suggested a new top level taxon to the current system of classification of living organisms, which he termed a domain. He used his results from studying RNA to organise organisms into three distinct groups.

(a) **(i)** Name the cell component that appears in organisms of all three domains that Woese suggested. **[1]**

(ii) One of the domains he suggested is called Eukarya.

Name the other **two** domains. **[2]**

(iii) State **two** defining features of all members of the domain Eukarya.

[2]

(b) Woese carried out a detailed study of RNA molecules in order to draw his conclusions.

Suggest **two** ways in which the scientific community are likely to have validated Woese's research. **[2]**

[Total: 7]

Question 6

Fig. 8.1

Fig. 8.1, **on the insert**, shows an electron micrograph of an invertebrate known as a 'water bear'.

(a) Complete the following passage about the classification of water bears using the most appropriate terms.

The water bear, *Echiniscus trisetosus* is a member of the genus .....

and the family *Echiniscidae*. This family belongs to the .....

Echiniscoidea, which forms part of the class *Heterotardigrada*. Water bears, also known as tardigrades, are classified into a ..... of their own called the *Tardigrada*. Tardigrades form part of the kingdom ..... within the domain ..... . **[5]**

(b) State the meaning of the term *phylogeny* **and** explain how phylogeny is related to classification.

[3]

(c) Water bears are extremely common in many habitats, including household gardens. However, they were not discovered until approximately 300 years ago.

Suggest reasons why they were not known before this time. **[2]**

[Total: 10]