

AS Level Biology A
H020/01 Breadth in Biology

Question Set 4

Multiple Choice Questions

1. The genetic diversity of a population can be estimated using the following formula:

$$\text{proportion of polymorphic gene loci} = \frac{\text{number of polymorphic gene loci}}{\text{total number of loci}}$$

In 1992 a study estimated the genetic diversity of four isolated populations of lions. They recorded the number of gene variants at a selection of gene loci in each population.

Which of the following populations of lions has the greatest proportion of polymorphic gene loci?

- A Asiatic Lion: 73 polymorphic loci out of 1927. **0.0379**
- B Transvaal Lion: 1110 polymorphic loci out of 2156. **0.5148**
- C Masai Lion: 1030 polymorphic loci out of 2315. **0.4449**
- D West African Lion: 1004 polymorphic loci out of 2008. **0.5000**

Your answer

B

[1]

2. Tropical rainforests have a very high biodiversity of plant species.

Which of the statements, **A** to **D**, is an economic benefit of high biodiversity?

- A High plant biodiversity decreases the animal biodiversity in the rainforest.
- B High plant biodiversity increases the organic matter in rainforest soils.
- C High plant biodiversity supports drug discovery and development.
- D High plant biodiversity protects the ecosystem from environmental changes.

Your answer

C

[1]

3. Lupus is an autoimmune disease. One symptom is a facial rash, typically in a butterfly shape across the cheeks.

Following a blood test, which of the following would indicate the patient has Lupus?

- A the presence of antibodies for the cell surface antigens of connective tissue
- B the presence of herpes antibodies
- C the presence of high levels of antihistamines
- D the absence of B lymphocytes

Your answer

A

[1]

4. Biologists use both phylogeny and classification to understand how different species are related.

Which of the options, **A** to **D**, is a statement about phylogeny?

- A** There are 21 species of ladybird in the UK that belong to the sub-family Coccinellinae.
- B** *Homo sapiens* and *Pan bonobo* share a common ancestor.
- C** The lily family, Liliaceae, consists of fifteen genera.
- D** The great white shark, *Carcharodon carcharias*, is a member of the class Chondrichthyes.

Your answer

B

[1]

5. An individual bitten by a rabid dog can be treated by an injection of human rabies antibodies.

Which option, **A** to **D**, describes the type of immunity provided by this treatment?

- A** natural passive
- B** natural active
- C** artificial passive
- D** artificial active

Your answer

C

[1]

6. Autoimmune diseases are often treated with a course of antibody injections.

Which of the following statements, **A** to **D**, describes the immunity arising from this treatment?

- A** active natural immunity
- B** active artificial immunity
- C** passive natural immunity
- D** passive artificial immunity

Your answer

D

[1]

7. Which of the following types of cells is not involved in a primary immune response?

- A T-memory cells
- B T-helper cells
- C T-killer cells
- D plasma cells

Your answer [1]

A

[1]

8. The Millennium Seed Bank has over two billion seeds in storage.

Which of the options, **A** to **D**, describes the type of conservation carried out at the MillenniumSeed Bank?

- A in-situ conservation of species biodiversity
- B in-situ conservation of habitat biodiversity
- C ex-situ conservation of species biodiversity
- D ex-situ conservation of habitat biodiversity

Your answer

C

[1]

9. Plants such as the soybean have a number of defence strategies to prevent infection by pathogens.

Which of the following strategies is a chemical defence against pathogen infection?

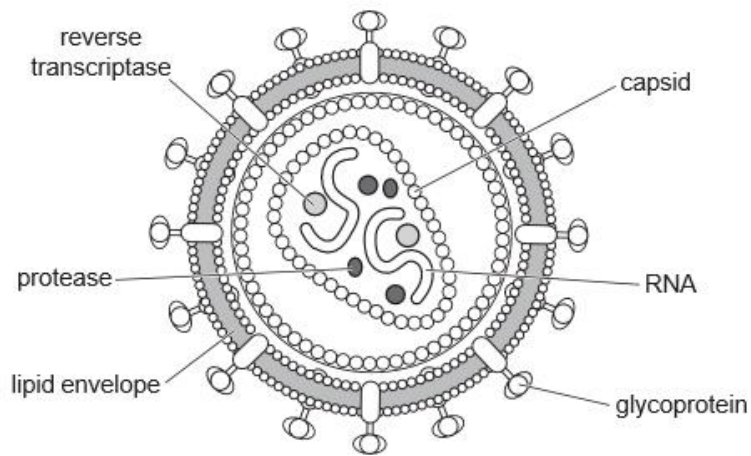
- A callose deposits at sieve tube ends that prevent pathogen movement in phloem
- B hydrolytic enzymes such as chitinase found between cells
- C stomata can be closed by guard cells if pathogens are detected
- D cell walls can be thickened by lignin, making cell entry very difficult for pathogens

Your answer

B

[1]

10. The diagram below shows a pathogen.



Which of the options, **A** to **D**, is the disease caused by this pathogen?

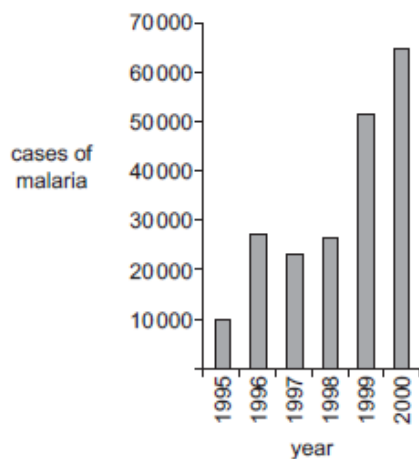
- A** HIV/AIDS
- B** potato blight
- C** ringworm
- D** tuberculosis

Your answer

A

[1]

11. The chart shows the number of reported cases of malaria in South Africa between 1995 and 2000.



Which of the following statements, **A** to **D**, could explain the data shown for 1999–2000?

- A** the malarial parasite had developed resistance to insecticides
- B** the vector had developed resistance to antibiotics
- C** the malarial parasite had developed resistance to antiviral drugs
- D** the vector had developed resistance to insecticides

Your answer

D

[1]

12. The sea marigold, *Calendula maritima*, is a rare species that is critically endangered and has been included in an *ex situ* conservation project.

Which of the following options, **A** to **D**, is a disadvantage of conserving the sea marigold *ex situ*?

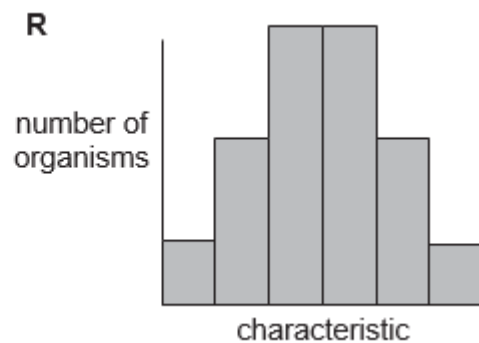
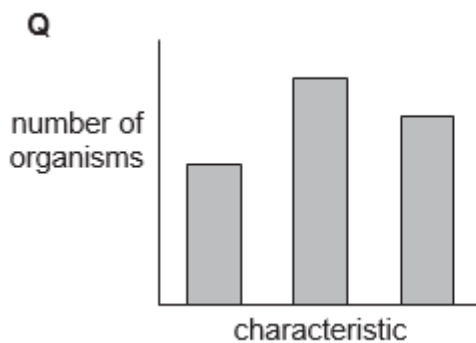
- A** it could reduce genetic diversity in sea marigolds
- B** sea marigolds are collected from the wild as seeds
- C** sea marigold seeds are stored in large numbers
- D** sea marigolds will be at risk from grazing by herbivores

Your answer

A

[1]

13. The two histograms represent the frequency distribution for the two different types of variation.



Which of the statements, **A** to **D**, about characteristic **Q** is correct?

- A** controlled by many genes and unaffected by the environment
- B** controlled by one or two genes and unaffected by the environment
- C** controlled by many genes and influenced by the environment
- D** controlled by one or two genes and influenced by the environment

Your answer

B

[1]

14. Some of the taxonomic groups for the beach sunflower, *Helianthus debilis*, are shown in the table below.

Kingdom	Plantae
Phylum	Magnoliophyta
W	Magnoliopsida
Order	Asterales
X	Asteraceae
Y	Helianthus

Which of the following rows, **A** to **D**, correctly identifies the missing taxonomic groups from the classification of *Helianthus debilis*?

	W	X	Y
A	class	genus	species
B	class	family	genus
C	family	genus	species
D	family	class	genus

Your answer

B

[1]

Total Marks for Question Set 4: 14

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