5.2 Classification & Cladistics

Question Paper

Course	DP IB Biology
Section	5. Evolution & Biodiversity
Topic	5.2 Classification & Cladistics
Difficulty	Easy

Time allowed: 50

Score: /34

Percentage: /100

Question 1a

a)
The gray wolf (*Canis lupus*) and the coyote (*Canis latrans*) are both predators occurring across large parts of North America. Coyotes are smaller than gray wolves and its diet consists of a variety of smaller prey animals, such as hares, rodents, birds and reptiles, while gray wolves hunt larger prey such as deer, elk and moose.

State the genus and species name of the gray wolf and the coyote.

[2 marks]

[2 marks]

Question 1b

b)
Organisms are grouped into different taxonomic groups, the largest of which is known as the domain.

Identify the domain to which the gray wolf and coyote belong to.

[1 mark]

[1 mark]

Question 1c

c)
List **two** features of all organisms that belong to the domain identified in part b).

[2 marks]

[2 marks]

Question 1d

d)
The grouping of the gray wolf and coyote is an example of natural classification which can be challenging to carry out accurately.

State **one** technological development that has enabled natural classification to be done more accurately.

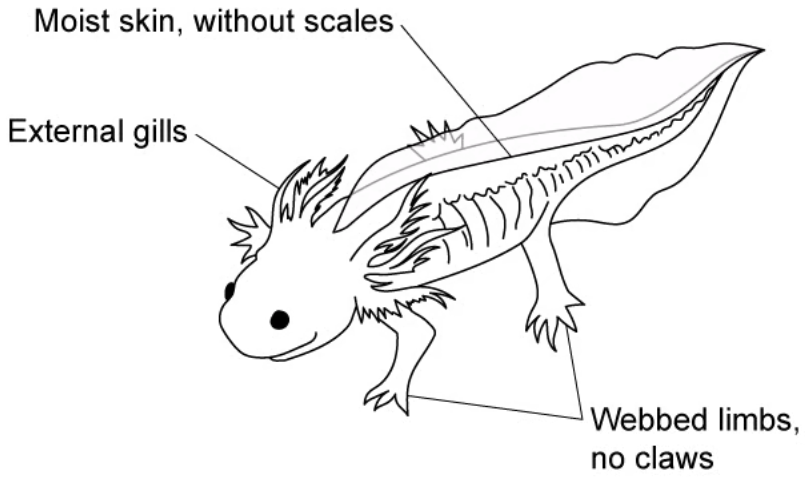
[1 mark]

[1 mark]

Question 2a

a)

Study the following diagram showing some features of specimen **A**.



Use the dichotomous key below to identify the class that specimen **A** belongs to.

1	Four limbs are present.....	Go to 2
	Four limbs are absent.....	Go to 3
2	External ear flap is absent.....	Go to 3
	External ear flap is present.....	Mammalia
3	Gills are present.....	Go to 4
	Gills are absent, lungs are present.....	Go to 5
4	Dorsal fins are present.....	Fish
	Dorsal fins are absent.....	Go to 6
5	Feathers and a beak are present.....	Birds
	Feathers and a beak are absent.....	Go to 6
6	Moist, smooth skin.....	Amphibian
	Dry, scaly skin.....	Reptile

[1 mark]

[1 mark]

Question 2b

b)
Specimen **A** is classified by using a natural classification system.

Define the term 'natural classification'.

[2 marks]

[2 marks]

Question 2c

c)
Natural classification can be very useful in conducting research in the field of biodiversity.

List **two** advantages of natural classification systems.

[2 marks]

[2 marks]

Question 2d

d)
Sometimes developments in cladistics will lead to the reclassification of organisms.

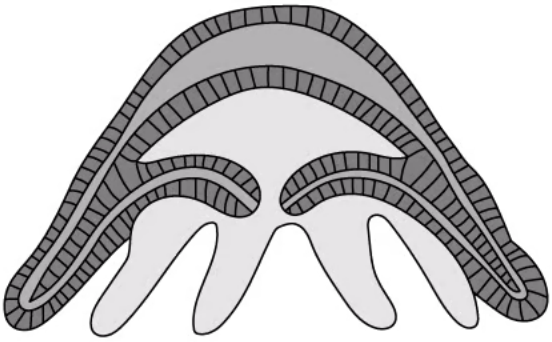
State **one** example of reclassification.

[1 mark]

[1 mark]

Question 3a

a)
The following diagram shows an organism that belongs to the phylum *Cnidaria*.



i)
State the type of symmetry that is demonstrated by this organism.

[1 mark]

ii)
List **one other** visible feature that is unique to phylum *Cnidaria*.

[1 mark]

[2 marks]

Question 3b

b)
The phylum *Cnidaria* includes a wide range of different organisms.

List **two** examples of organisms that would belong to this phylum.

[2 marks]

[2 marks]

Question 3c

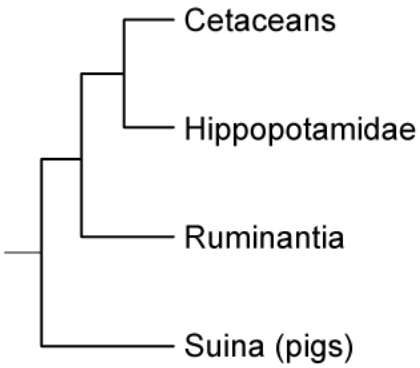
c)
State the way in which the organism shown in the diagram at part a) would be able to obtain food.

[1 mark]

[1 mark]

Question 4a

a)
Study the following cladogram showing the evolutionary relationship between different mammalians.



Identify the mammalians that are the most closely related according to this cladogram.

[1 mark]

[1 mark]

Question 4b

b)
State the purpose of the nodes in the cladogram.

[2 marks]

[2 marks]

Question 4c

c)
Identify the mammalian group that were the first to branch off and form an independent group from the others.

[1 mark]

[1 mark]

Question 5a

One mark is available for clarity of communication throughout this question.

a)
State the conventions that should be used when writing binomial names.

[3 marks]

[3 marks]

Question 5b

b)
Differences in the base sequences of DNA and amino acid sequences of proteins can be used by scientists as a molecular clock.

Outline how differences in the base sequences of DNA can be used as a molecular clock.

[3 marks]

[3 marks]

Question 5c

c)
Coniferophytes are commonly known as conifers and are usually tall trees.

List the main features of Coniferophytes.

[7 marks]

[7 marks]