5.2 Classification & Cladistics

Question Paper

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

To be used by all students preparing for DP IB Biology HL
Students of other boards may also find this useful

Question 1

Which of the following is **not** an important reason for the binomial system of naming organisms?

A. Scientists need to be able to communicate clearly with each other about their work.

B. The common names of many species are outdated and should no longer be used.

C. Different countries may use the same common name for different species.

D. Woodlice are known by more than 50 different common names.

[1 mark]

Question 2

Which of the following are reasons for the development of the three domain system of classification?

I. The prokaryote family was too large and needed to be divided into smaller taxa.
II. The ribosomes of the archaea are distinct from those of the rest of the prokaryotes.
III. The archaea share a similar cell structure to the rest of the prokaryotes.

A. I and II only

B. II only

C. II and III only

D. I, II, and III

[1 mark]

Question 3

Which of the following species are most closely related?

I. Marsh tit (*Poecile palustris*)
II. Coal tit (*Periparus ater*)
III. Marsh warbler (*Acrocephalus palustris*)
IV. Willow tit (*Poecile montanus*)

A. I and II

B. I and III

C. I and IV

D. II and IV

[1 mark]

Question 4

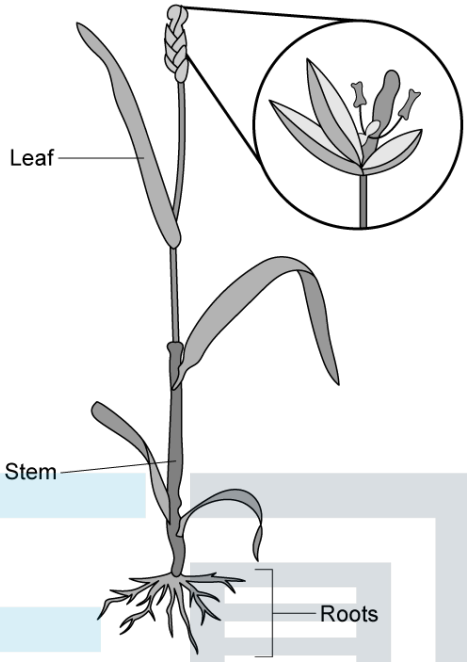
Which of the following apply to natural classification?

A	Members of a natural group are descended from a common ancestor	Members of a natural group always have similar characteristics	Natural classification can be easily carried out using observation alone
B	Members of a natural group must have a recent common ancestor	Members of a natural group are likely to have similar characteristics	Natural classification is made easier by DNA sequencing technology
C	Members of a natural group are descended from a common ancestor	Members of a natural group are likely to have similar characteristics	Natural classification is made easier by DNA sequencing technology
D	Members of a natural group must have a recent common ancestor	Members of a natural group always have similar characteristics	Natural classification is made easier by DNA sequencing technology

[1 mark]

Question 5

To which plant phylum does the plant in the diagram belong, and why?



	Phylum	Reason
A	Coniferophytes	Reproduction takes place via pollen and ovules located in cones
B	Filicinophytes	Leaves are divided structures known as fronds
C	Angiospermophytes	Roots, stems, and leaves are present
D	Angiospermophytes	Reproduction takes place via pollen and ovules located in flowers

[1 mark]

Question 6

Which of the following animals can be classified in the phylum annelida?

A. *Arenicola marina*, a worm with a cylindrical body that has bristles along its sides.

B. *Bipalium kewense*, an unsegmented worm with a distinctive hammer-shaped 'head' and mouth/anus located in the middle of its body.

C. *Boettgerilla pallens*, also known as the worm slug, has a long, narrow body, and a yellow-grey coloured muscular foot. It can dig burrows to a depth of up to 60cm.

D. *Schistosoma haematobium*, a parasitic fluke. The body of males is leaf-like in shape, and can roll up to gain a cylindrical appearance. Humans are the primary host.

[1 mark]

Question 7

Which of the following is **not** a feature of a clade?

A. All members of a clade descend from a common ancestor.

B. Clades are formed on the basis of evolutionary relationships.

C. Clades are usually identified by observing homologous characteristics.

D. Clades must include **all** the descendents of a common ancestor, living and extinct.

[1 mark]

Question 8

The data below shows the number of DNA base sequence matches found between four species of marine mammal when a short section of their DNA is sequenced.

	Humpback whale	Sperm whale	Harbour porpoise	Bottlenose dolphin
Humpback whale				
Sperm whale	62			
Harbour porpoise	59	59		
Bottlenose dolphin	56	53	62	

What can be concluded from the data?

A. Sperm whales are more closely related to humpback whales than they are to harbour porpoises or bottlenose dolphins.

B. Harbour porpoises are more closely related to humpback whales than they are to sperm whales.

C. All four species are more closely related to each other than they are to other marine mammals.

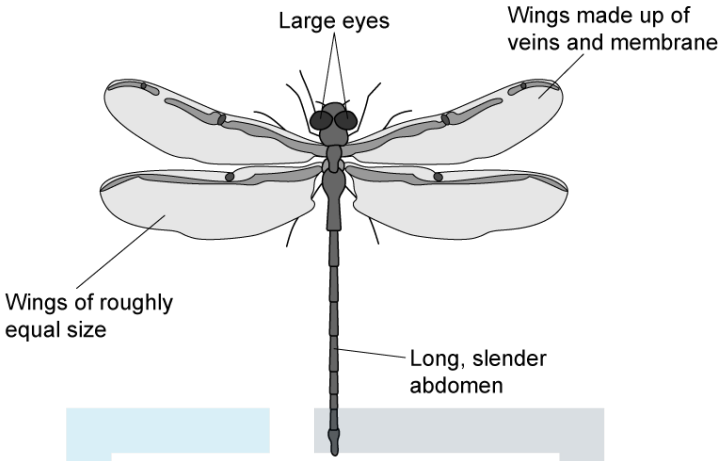
D. All four species together form a clade.

[1 mark]

Question 9

Dichotomous keys can be used to identify species from their observable features.

To which order of insects does the insect below belong? Note that the insect is shown at rest and not in flight.



1	Hard wing cases are present.....	Coleoptera
	Hard wing cases are not present.....	Go to 2
2	Wings are not membranous (not thin and translucent).....	Go to 3
	Wings are membranous (thin and translucent).....	Go to 4
3	Wings are leathery.....	Orthoptera
	Wings are scaly.....	Lepidoptera
4	Only one pair of wings used to fly (the second pair is very small)..	Diptera
	Two equal-sized pairs of wings are used to fly.....	Go to 5
5	Wings held out at right-angle to body when resting.....	Odonata
	Wings are folded over the body when resting.....	Hemiptera

A. Lepidoptera

B. Odonata

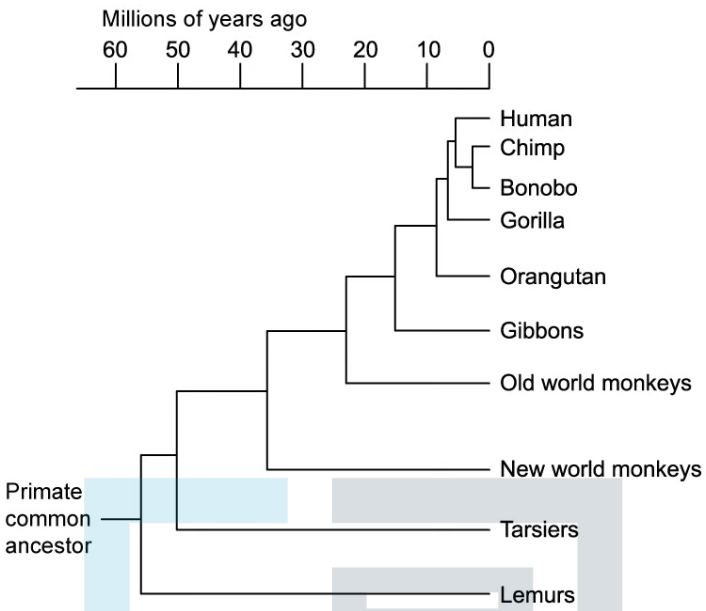
C. Coleoptera

D. Hemiptera

[1 mark]

Question 10

Which of the following **cannot** be concluded from the cladogram below?



A. Chimps and bonobos are more closely related to each other than to any other species of primate.

B. Chimps, bonobos, humans, and gorillas form a clade.

C. Lemurs diverged from the rest of the primates around 56 million years ago.

D. Chimps, bonobos, humans, and orangutans form a clade.

[1 mark]