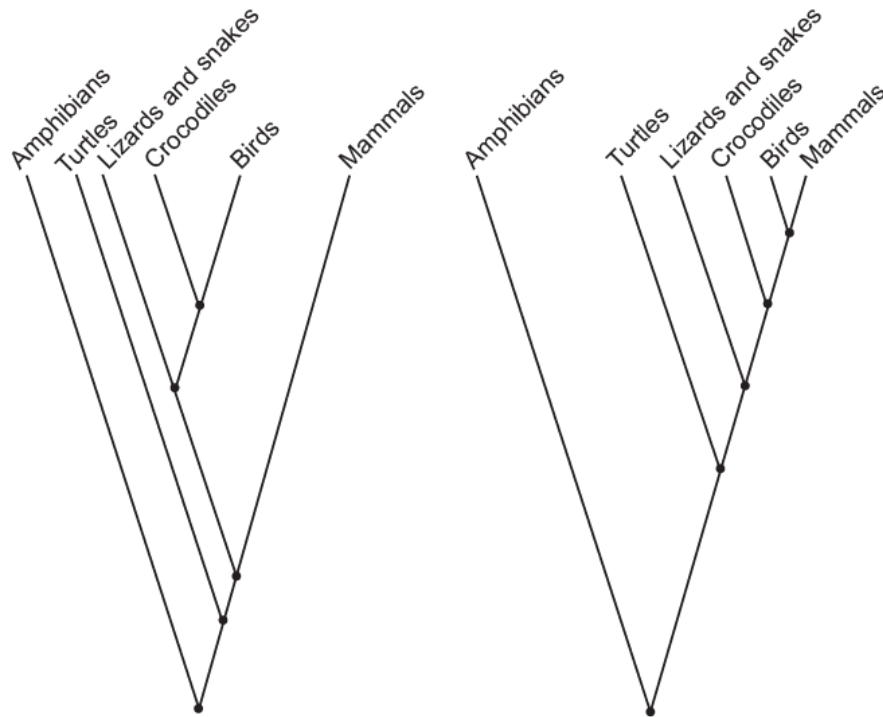


## Topic 5 practice Qs [22 marks]

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1. A bacterial population with no resistance to an antibiotic may develop into a bacterial population with some resistance to an antibiotic. Which event could lead to this? [1 mark]
- A. Antibiotic resistance was inherited from an ancestral population.
  - B. An antibiotic resistance plasmid is received from a bacterium in another population.
  - C. The enzyme needed for antibiotic resistance is received from a bacterium in another population.
  - D. The bacterial population mutated in response to antibiotics in the environment.
2. Cladograms can be created by comparing DNA or protein sequences. The cladogram on the left is based on DNA sequences and the cladogram on the right is based on comparing protein sequences. [1 mark]

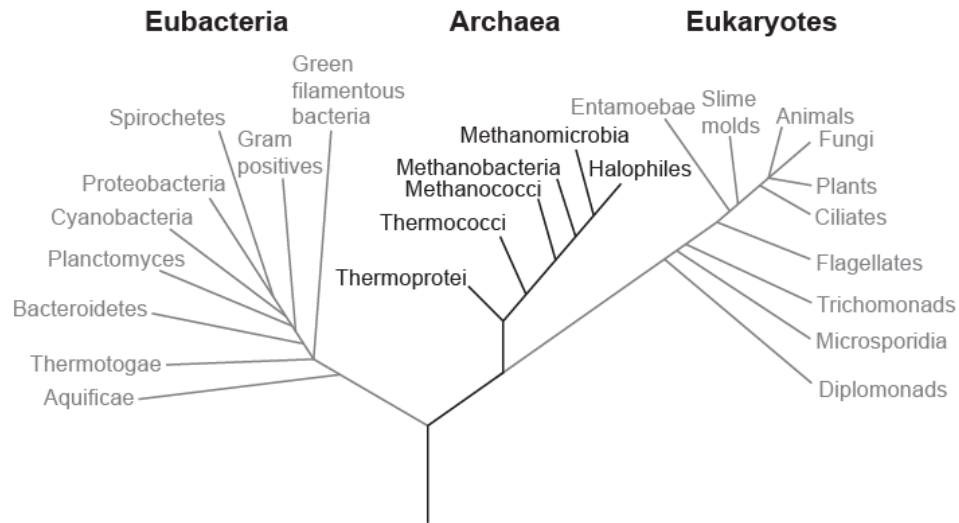


What is the reason that cladograms based on DNA sequences are more reliable predictors of the phylogenetic relationship of species than cladograms based on protein sequences?

- A. Amino acids are not as chemically stable as DNA nucleotides.
  - B. DNA mutates but amino acids do not.
  - C. Several different triplets of bases can code for the same amino acid.
  - D. There are 20 different amino acids but only 4 nucleotides.
-

3. Below is a phylogenetic tree of the three domains.

[1 mark]



There are important differences between the three domains. Which of these domains have organelles?

- A. Eubacteria and archaea
- B. Archaea only
- C. Eukaryotes and archaea
- D. Eukaryotes only

4. A plant has cambium in its vascular tissue and pollen is produced in male cones. The plant disperses seeds but does not produce fruit. In which phylum does this plant belong? [1 mark]

- A. Coniferophyta
- B. Angiospermophyta
- C. Filicinophyta
- D. Bryophyta

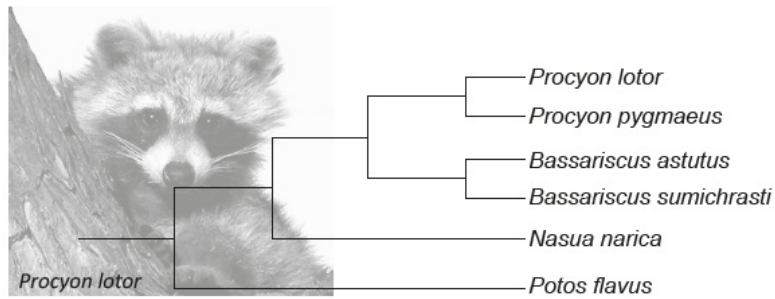
5. What is a direct consequence of the overproduction of offspring?

[1 mark]

- A. Individuals become more adapted to the environment.
- B. They will be subject to intraspecific competition.
- C. They will diverge to produce different species.
- D. They will suffer mutations.

6. The diagram represents a cladogram of the family Procyonidae.

[1 mark]



[Source: © International Baccalaureate Organization 2017]

What would justify classifying these organisms into four different genera?

- A. They live in different habitats.
- B. They do not share any common ancestors.
- C. There are enough differences between them.
- D. The number of times that the species have split.

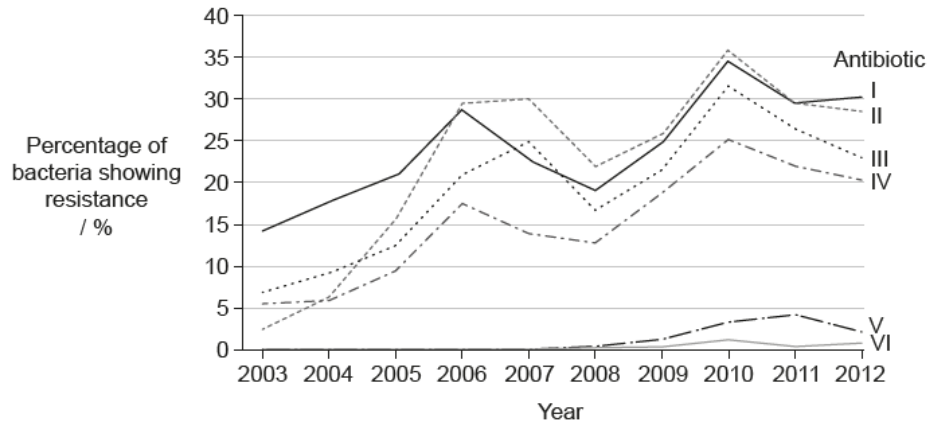
7. Which is a characteristic of both bryophyta and filicinophyta?

[1 mark]

- A. Vascular tissue
- B. Membranous leaves
- C. Release of spores
- D. Evergreen spines

8. The bacterium *Neisseria gonorrhoeae* causes infections related to the human reproductive system. The graph shows the percentage of samples in which this bacterium showed resistance to six antibiotics over a period of ten years.

[1 mark]



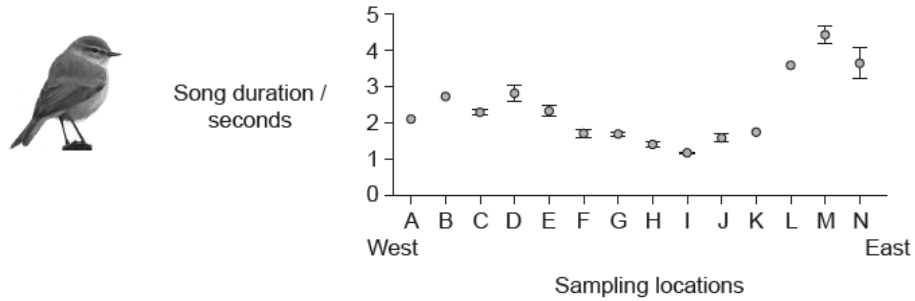
[Source: © All rights reserved. National Surveillance of Antimicrobial Susceptibilities of *Neisseria gonorrhoeae* Annual Summary 2012. Public Health Agency of Canada, 2012. Translated, adapted and reproduced with permission from the Minister of Health, 2017.]

What is a possible explanation for the total percentage resistance being larger than 100% in 2010?

- A. People do not take the antibiotics as prescribed.
- B. More people have been sampled in that year.
- C. There was an epidemic of *Neisseria gonorrhoeae* in that year.
- D. Some bacteria are resistant to more than one antibiotic.

9. An animal shows radial symmetry, has only one opening leading to a digestive cavity and is soft without a skeleton. To which phylum does this animal belong? [1 mark]
- A. Platyhelmintha
  - B. Annelida
  - C. Mollusca
  - D. Cnidaria

10. The graph shows the song duration of birds from the genus *Phylloscopus* sampled from west to east throughout Northern Europe and Northern Asia. [1 mark]



[Source: adapted from DE Irwin, (2000), *Evolution*, 54(3), Wiley, page 1006]

What concept do these data illustrate?

- A. Gradual divergence
  - B. Adaptive radiation
  - C. Interbreeding populations
  - D. Punctuated equilibrium
11. The photograph shows vegetation in a rocky area. [1 mark]



[Source: © International Baccalaureate Organization 2017]

Which characteristic of the plants indicates that the area in which they are growing is probably dry?

- A. Relatively small size
- B. Small flowers
- C. Narrow leaf surface
- D. Small root system

12. Lichens are returning to the forests of the industrial areas of the United Kingdom due to strict pollution control.

[1 mark]



[Source: adapted from [www.the-scientist.com](http://www.the-scientist.com)]

What is the expected outcome in the population of peppered moths (*Biston betularia*)?

- A. Increased numbers of light-coloured peppered moths
  - B. Increased industrial melanism in peppered moths
  - C. Increased predation of peppered moths
  - D. Increased speciation of peppered moths
13. Which evidence for evolution do the common features in the bone structure of vertebrate limbs provide?
- A. Adaptive radiation
  - B. Divergent radiation
  - C. Convergent evolution
  - D. Discontinuous variation

[1 mark]

14. In which domain are bryophyta found?

[1 mark]

- A. Plantae
- B. Archaea
- C. Eubacteria
- D. Eukaryote

15. The scientific name of the Wakatobi flowerpecker is *Dicaeum kuehni*.

[1 mark]



[Source: By Seán B. A. Kelly, David J. Kelly, Natalie Cooper, Andi Bahrun, Kangkuso Analuddin, Nicola M. Marples - Edit of File:Dicaeum\_celebicum\_compared\_to\_Dicaeum\_kuehni\_(realigned).jpg, CC BY 4.0, <https://commons.wikimedia.org/w/index.php?curid=33618785>]

Which species is most closely related?

- A. *Amerila kuehni*
- B. Wakatobi white-eye
- C. *Kuehneon duchyense*
- D. *Dicaeum celebicum*

16. The scientific name of the great egret has recently been changed from *Casmerodius albus* to *Ardea alba*.

[1 mark]



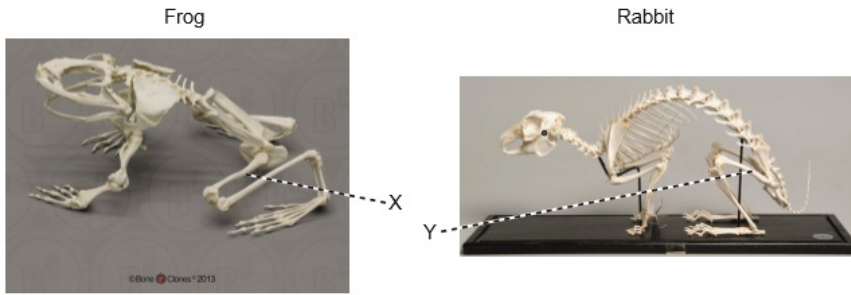
[Source: <http://images.freeimages.com/images/previews/218/ardea-alba-2-1250856.jpg>, by sxc]

What is a possible reason for the reclassification of egrets?

- A. Allopatric speciation
  - B. Discovery of different ancestry
  - C. A change in the mating behaviours
  - D. Change in habitat and geographic range
17. Which is a coniferophyte? [1 mark]
- A. *Adansonia digitata*, an African baobab tree with white flowers
  - B. *Cyathea australis*, an Australian tree fern producing spores
  - C. *Hypnum plumaeforme*, a green plant with no vascular tissue grown in Japanese gardens
  - D. *Pinus strobus*, a North American tree with ovules on scales not enclosed in an ovary
18. Which process promotes variation in a population? [1 mark]
- A. Mutation
  - B. Mitosis
  - C. Ageing in a population
  - D. Asexual reproduction
19. How can molluscs and platyhelminthes be distinguished? [1 mark]
- A. Molluscs are unsegmented but platyhelminthes are segmented.
  - B. Molluscs have a mouth and an anus but platyhelminthes do not.
  - C. Molluscs are smooth but platyhelminthes have bristles.
  - D. Molluscs remain attached to rock but platyhelminthes move around in water.
20. To which domain does *Carcharodon carcharias*, a shark, belong? [1 mark]
- A. Eukaryote
  - B. Consumer
  - C. Fish
  - D. Chordata

21. The pictures show skeletons of a frog (*Conraua goliath*) and of a domestic rabbit (*Oryctolagus cuniculus*).

[1 mark]



[Source: © Bone Clones, www.boneclones.com]

[Source: © CSG CIC Glasgow Museums and Libraries Collections]

What is the evolutionary relationship between X and Y?

- A. They are analogous.
  - B. X is analogous and Y is homologous.
  - C. They are homologous.
  - D. They are neither homologous nor analogous.
22. How can species of bacteria evolve to be resistant to antibiotics?
- I. A variation within one bacterium's genome confers resistance.
  - II. Antibiotics enable genes to become adapted through transcription and translation.
  - III. An incomplete dose of antibiotics allows bacteria with a high resistance to survive and reproduce.
- A. I only
  - B. I and II only
  - C. I and III only
  - D. III only

[1 mark]