G11 Biology: Class 9 Homework

1. Explain why a species is most likely to undergo adaptive radiation when there is little competition for resources. **[2 marks]**

2. Compare and contrast divergent and convergent evolution. Include examples to illustrate the similarities and differences. **[5 marks]**

3. Many species of fish and waterfowl are darker on their upper surface and lighter coloured below.

    a. What pattern of evolution is most likely at work? **[1 mark]**

    b. Suggest possible selective advantages for this coloration. **[2 marks]**

4. Snakes are not the only legless terrestrial vertebrates. Caecilians are a group of amphibians that also lack legs. Is this an example of convergent evolution or divergent evolution? Explain your reasoning. **[3 marks]**

5. Some scientists suggest that without the mass extinction of the dinosaurs, mammals would not have been able to undergo adaptive radiation. Use your understanding of competition for resources to support or refute this suggestion. **[3 marks]**

6. Birds are the only group of dinosaurs that survived the mass extinction of 65 million years ago. Speculate on how their ability to fly and endothermy (being warm-blooded) may have been keys to their survival. **[2 marks]**

7. Both salamanders and dogs have long tails, while bears do not. However, both bears and dogs have hair, while salamanders do not. Explain why having a long tail is not evidence that dogs are more closely related to salamanders than they are to bears. Explain why having hair is good evidence that dogs and bears are more closely related than dogs and salamanders. **[2 marks]**

8. What selective advantage does each of the following traits provide to humans?

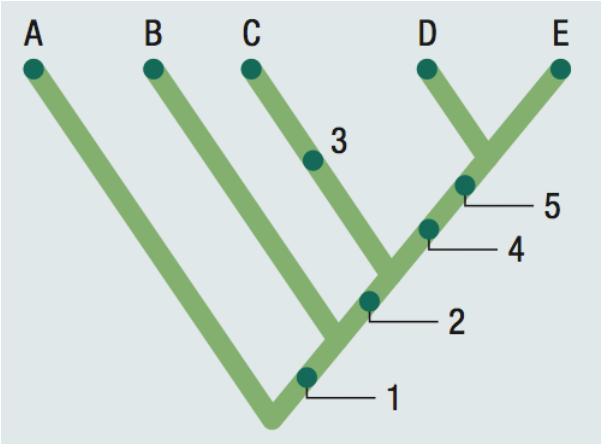
    a. A large brain **[1 mark]**

    b. Upright walking **[1 mark]**

    c. Complex finger movements **[1 mark]**

    d. Complex language **[1 mark]**

9. Use the cladogram to answer the following questions. Assume that each number represents the evolution of a new feature and that each letter represents a species alive today.



a) Which two species are most closely related? **[2 marks]**

b) List the synapomorphies shared by Species C and E. **[2 marks]**

c) To which species is Species C most closely related? **[2 marks]**

d) Is Species B more closely related to Species A or E? Explain your reasoning. **[2 marks]**

e) Which numbers represent new features that were not needed to draw this cladogram? **[2 marks]**

10. Most ground-dwelling mammals have eyes that look to the side, giving them a wide field of view to help them avoid predators. Many tree-dwelling mammals have eyes that are directed forward, giving them better 3D vision. Suggest an evolutionary explanation for why ground-dwelling humans have forward-directed eyes. **[2 marks]**