PRIFYSGOL ABERYSTWYTH UNIVERSITY

ENTRANCE EXAMINATION
JANUARY 2020

BIOLOGY 1: Molecules to Organs

Time Allowed – 1.5 hours

3 questions should be attempted

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1. Present the hypothesis, design and results of any real or imaginary scientific experiment in the format of a scientific report.

2. Discuss the following: "The genetic code is not a binary code as in computers, nor an eight-level code as in some telephone systems, but a quaternary code with four symbols. The machine code of the genes is uncannily computerlike." Richard Dawkins, *River Out of Eden* (1995).

3. Explain what happens during meiosis, and name some cells in which it occurs.

4. Describe the chemical structures of these polysaccharides, and where in nature they occur: glycogen, starch, cellulose and chitin.

5. Discuss the structures, functions and dietary health implications of lipids.

6. Illustrate, using graphs, how various factors affect the rates of enzyme reactions.

7. Outline all the processes in the incorporation of atmospheric CO_2 into the human body.

8. Describe the types of membranes found in cells, their structures and functions.

9. Compare adaptations for oxygen uptake in different organisms, such as earthworms, insects, fishes, frogs, birds and mammals.

10. Write an essay on (any aspect of) the human skeleton.

11. Explain what will happen to your next meal once it is inside your digestive system.

12. What are the biological events and purpose of a female's monthly 'period'?

13. Describe the structure and functioning of kidneys.

14. Britain's tallest broadleaf tree is a 49-metre London Plane at Bryanston School in Dorset. How does water from the roots reach the topmost leaves of such a tree?

15. Imagine you are in the 'fruit and vegetables' section of a supermarket. Pick out some of the items, and discuss their biological functions in the plant from which they came.

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16. What are ‘flowers’?

17. Discuss the biology of any medical illness with which you are familiar.

18. ‘Extra-solar’ planets are being found at an ever-increasing rate. Speculate on what forms life on other planets might take.