

UNIVERSITY OF BOLTON

SCHOOL OF SPORT AND BIOLOGICAL SCIENCES

**BSc (HONS) MEDICAL BIOLOGY WITH
FOUNDATION**

SEMESTER ONE EXAMINATION

2019/2020

**BIOLOGY FORM AND FUNCTION: LEVELS OF
ORGANISATION**

MODULE NO: BIO3027

Date: Wednesday 15th January 2020

Time: 10.00 am – 11.30 am

INSTRUCTIONS TO CANDIDATES:

Candidates are advised that the examiners attach importance to legibility of writing and clarity of expression.

YOU ARE STRONGLY ADVISED TO PLAN YOUR ANSWERS.

There are THREE sections and 21 questions on this paper.

Section A - 15 marks; Section B – 30 marks; Section C – 45 marks

Total – 90 marks

Answer ALL questions.

This exam is ONE AND A HALF HOURS

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SECTION A – Evolution and systematics. 15 marks.

Answer ALL questions in this section.

1. Briefly explain Darwin and Wallace's theory of evolution by natural selection. **3 marks**
2. State the breeding definition of species. **2 marks**
3. Define the term "sexual dimorphism" and provide a named example. **2 marks**
4. In the taxonomic hierarchy which level immediately follows Order? **2 marks**
5. Explain what biologists refer to as the BINOMIAL system of naming species, use named examples to illustrate your answer. **2 marks**
6. Using an example describe what population geneticists mean by a bottleneck. **2 marks**
7. In cladistics what does the term "derived character" mean? **2 marks**

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SECTION B – Cell Biology - 30 marks

Answer ALL questions in this section.

8. What is a chromosome? **2 marks**

9. With reference to stem cells, what does the term “potency” refer to? **5 marks**

10. The cytoskeleton is comprised of which three molecular structures? **3 marks**

11. In your answer booklet draw a large labelled diagram of an animal cell and label the following;

- a) Nucleolus
- b) Nucleus
- c) Ribosome
- d) Lysosome
- e) Rough Endoplasmic Reticulum
- f) Golgi Body
- g) Smooth Endoplasmic Reticulum
- h) Mitochondria
- i) Cytoplasm
- j) Centriole

(labels - 10 marks)
(drawing - 5 marks)

Total 15 marks

12. Give one function for each of the structures listed ‘a to e’ in question 11. above.

5 marks

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SECTION C – Physiology - 45 marks

Answer ALL questions in this section.

13. Draw a fully labelled diagram of the heart to show the following features: the atria, the ventricles, the semilunar valves, the bicuspid valve, the tricuspid valve, the chordae tendinae, the vena cava, the pulmonary artery and vein, and the aorta.

10 marks

14. A spirometer may be used to measure parameters and performance of the breathing system of a subject. Define the following parameters:

a) vital capacity

(2 marks)

b) FEV1

(2 marks)

Total 4 marks

15. Which of the parameters in question 14 will be lowered by a restrictive pulmonary disorder? Justify your answer.

1 mark

16. Describe THREE functions of the skeleton using named examples to illustrate your answer.

6 marks

17. Describe the molecular events which occur during muscle contraction.

6 marks

18. When an impulse is transmitted along a motor neuron all the muscle fibres within the motor unit will be activated. Name and explain this phenomenon.

3 marks

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19. In high intensity exercise such as that of a 20 metre sprint which energy system will be the primary system? Justify your answer.

3 marks

20. List digestive enzymes that the pancreas secretes and state their functions.

6 marks

21. Describe **EITHER** the male **OR** female reproductive system including reference to the structure and function.

6 marks

END OF QUESTIONS