UNIVERSITY OF GHANA

BSC. ENGINEERING

FIRST SEMESTER EXAMINATIONS: 2017/ 2018

DEPARTMENT OF BIOMEDICAL ENGINEERING

BMEN 201: GENERAL BIOLOGY (2 CREDITS)

INSTRUCTIONS:
ANSWER ALL QUESTIONS IN SECTION A AND ONE QUESTION IN SECTION B.
ANSWER A TOTAL OF FOUR (4) QUESTIONS.

TIME ALLOWED: TWO (2) HOURS

SECTION A
ATTEMPT ALL QUESTIONS IN THIS SECTION

1. a) Outline four (4) characteristics of animals and state how each of these characteristics distinguishes them from other organisms. [12 marks]
   b) Bryophytes are seen as a primitive group of plants compared to angiosperms. Explain three (3) features of bryophytes which can be described as limitations which angiosperms have been able to address or overcome. [12 marks]
   c) Describe the structure of a phospholipid and briefly explain how this structure influences the characteristic properties of the plasma membrane. [12 marks]

2. a) Archaea and bacteria are seen as such distinct groups of prokaryotes that each merited to be classified as a separate domain. Describe two (2) major differences between archaea and bacteria with regards to the structure of their cell walls and/or plasma membranes. [8 marks]
   b) Explain two major features/avenues of microorganisms which are exploited by antimicrobial agents to inhibit growth and/or cause cell death. [10 marks]

3. a) ***Briefly*** describe the four (4) levels of structural organisation of proteins.

[12 marks]

b) The type of linkages existing between the monomer units of a polysaccharide crucially influence its function to either serve a storage or structural role in living organisms. Explain. [8 marks]

c) Distinguish between the roles played by phosphodiester bonds and hydrogen bonds in the structure of a nucleic acid. [6 marks]

SECTION B
ATTEMPT ONLY ONE QUESTION FROM THIS SECTION

4. a) Why is it advantageous for organisms to maintain very small cell sizes?

[5 marks]

b) Briefly describe the structure of any one (1) typical organelle found in the cell. Outline the main functions the organelle plays in the cell and its ubiquity within different cell types and different organisms.

[15 marks]

5. a) What is an ecosystem? [2 marks]

b) Nature can be described as an inspiration for technology. **Discuss** three (3) engineering designs/products which have been clearly based on the structure, function and/ or behaviour of specific living organisms. [18 marks]