



**RAJARATA UNIVERSITY OF SRI LANKA  
FACULTY OF APPLIED SCIENCES**

**B.Sc. (General) Degree in Applied Sciences  
First Year – Semester I Examination – May/June 2016**

**FDN 1203 – GENERAL BIOLOGY FOR PHYSICAL SCIENCE STUDENTS**

**Time: Two (02) hours**

**PART A**

**Answer all questions. Underline the correct answer. (30 marks=1.5x20)**

1. When subunits called monomers are bonded together they form large molecules called polymers. Protein is a type of polymer. What's the monomer that makes up proteins?
  - (a) Amino acid
  - (b) Ion
  - (c) Monosaccharide
  - (d) Nucleotide
2. What term describes best the 'sugar' in a glass of lemonade?
  - (a) Solvent
  - (b) Solute
  - (c) Solution
  - (d) Ions
3. Underline the elements which make up a Carbohydrate.
  - (a) Carbon, Nitrogen and Hydrogen
  - (b) Carbon, Hydrogen and Oxygen
  - (c) Nitrogen, Hydrogen and Oxygen
  - (d) Starches and sugars
4. Which kind of a solution would cause the movement of water from the solution into the cell?
  - (a) Hypotonic
  - (b) Hypertonic
  - (c) Isotonic
  - (d) Hydrotonic

5. Living cells are continuously making a variety of proteins. On what organelle does this process occur?
- (a) Vacuole
  - (b) Ribosome
  - (c) Vesicle
  - (d) Rough ER

6. Assertion : A cell membrane shows fluid behaviour  
Reason : A membrane is mosaic or composite of diverse lipids and proteins.

Considering the above statements,

- (a) Assertion is true but the reason is false
  - (b) Both the assertion and the reason are false
  - (c) Both the assertion and the reason are true
  - (d) The reason is a true statement but it doesn't explain the assertion
7. What is the ability of organisms and cells to maintain a stable environment is called?
- (a) Protein synthesis
  - (b) Homeostasis
  - (c) Digestion
  - (d) Photosynthesis
8. Prokaryotes are classified as dwellers of two different domains. What are they?
- (a) Bacteria and Archaea
  - (b) Protista and Fungi
  - (c) Archea and Prostista
  - (d) Animalia and Plantae
9. The primary source of energy in any ecosystem on the earth would be,
- (a) proteins
  - (b) ATP
  - (c) sunlight
  - (d) carbohydrates
10. Glucose is a,
- (a) protein
  - (b) disaccharide
  - (c) monosaccharide
  - (d) starch
11. Which statement is **NOT TRUE** of the facilitated diffusion?
- (a) Specific channels help molecules to move through the cell membrane
  - (b) Aquaporins/chaperone molecules aid in the movement of molecules of interest
  - (c) Energy is used throughout the process
  - (d) In the process the channel proteins' structure may change to facilitate the movement of molecules

12. Joining of two monosaccharides takes place through;

- (a) condensation
- (b) a glycosidic bond
- (c) oxidation
- (d) a peptide bond

13. I. Vitamin A is soluble in oils and fats and its deficiency causes night blindness.

II. Vitamin B1 is soluble in water and its deficiency causes Beriberi.

III. Vitamin C is soluble in water and its deficiency causes dental caries.

From the above, the true statements are;

- (a) I and II only
- (b) I only
- (c) III only
- (d) All of the above

14. Which of the following is a characteristic of parasitism?

- (a) One organism kills and consumes another
- (b) Two organisms live together and neither is harmed
- (c) Two organisms nourish each other and both benefit
- (d) One organism lives in or on another and gains benefit

15. Which of the following nitrogen bases is found in DNA but not in RNA?

- (a) Cytosine
- (b) Adenine
- (c) Thymine
- (d) Uracil

16. Adjacent nucleotides in DNA and RNA are joined by,

- (a) covalent bond
- (b) phosphodiester bond
- (c) ionic bond
- (d) peptide bond

17. The single biggest factor contributing to the increment of human population for the last 200 years has been,

- (a) an increase in global birth rate
- (b) a decrease in global death rate
- (c) an increase in global death rate
- (d) a decrease in global birth rate

18. Which of the following statements accurately describes the relationship between photosynthesis and cellular respiration?
- (a) Photosynthesis occurs only in autotrophs; cellular respiration occurs only in heterotrophs
  - (b) Photosynthesis uses solar energy to convert inorganic compounds to energy rich organic compounds; respiration breaks down energy rich organic compounds to form ATP
  - (c) The primary function of photosynthesis is to use solar energy to form ATP; the primary function of respiration is to breakdown ATP and release energy
  - (d) Photosynthesis and respiration occur in separate, specialized organelles and the two processes cannot occur simultaneously
19. Continental drift is caused by,
- (a) the dispersal of seeds and spores from one continent to another
  - (b) the random loss of genes from populations isolated on a continent
  - (c) the upwelling and subsequent movement of marine sediments
  - (d) the movement of tectonic plates on earth's crust
20. The phenomenon in which high levels of carbon dioxide cause global warming is known as,
- (a) the Gaia hypothesis
  - (b) acid deposition
  - (c) the greenhouse effect
  - (d) global distillation

**PART B**

Answer all the questions. Write your answers in the spaces provided. (30 marks=15x2)

1. a) List **three (03)** major differences in mitotic and meiotic divisions. [03 marks]

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- b) State what are purines and pyrimidines with examples and a prime difference among them. [03 marks]

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- c) Define the following terms. [04 marks]

Mutation - .....

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Phenotype - .....

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Phosphodiester bond - .....

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Dominant character - .....

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- d) Find the possibility of an offspring to be with a blood type B, from a cross of two individuals with blood type AB (Hint: blood type O is recessive). [05 marks]

$I^A I^A$ / $I^A i$	- Type A
$I^B I^B$ / $I^B i$	- Type B
$I^A I^B$	- Type AB
$ii$	- Type O

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2. a) Define the terms 'Population' and 'Biosphere'. [02 marks]

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- b) Outline the major dissimilarities of autotrophs and heterotrophs and list the distinct types of heterotrophs. [04 marks]

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- c) What is denoted by the term 'Global Warming'? [03 marks]

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- d) Name **two (02)** gases/molecules which are responsible for 'Ozone Depletion', which is a thriving issue the earthlings are facing. [02 marks]

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- e) State **four (04)** steps you can implement to prevent/lessen the influence of humans towards the degradation of the prevailing ecosystem and the environment. [04 marks]

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### PART C

Answer all the questions. (40 marks=20x2)

3. a) Describe the 'Fluid Mosaic Model' of the plasma membrane.  
Discuss the role of membrane in the movement of materials through it by each of the following processes. (Use diagrams where appropriate)
- Passive transport
  - Active transport
- b) Explain the structural arrangement of the following membrane bound eukaryotic organelles, **relating to its function**.
- Endoplasmic reticulum
  - Golgi apparatus
  - Chloroplast
4. Write short notes on the following.
- a) Scientific method
  - b) Natural selection and evolution
  - c) Carbohydrates – structural and functional importance