

Mahindra University Hyderabad

École Centrale School of Engineering
Minor-I

Program: B. Tech.

Branch: CSE, CM, AI

Year: 2024

Semester: II

Subject: Introduction to Biology (BI1201)

Date: 28.02.2024

Start Time: 2:00 PM

Time Duration: 1:30 Hours

Max. Marks: 25

Instructions:

- 1) Answer all questions
- 2) Draw diagrams wherever necessary

Section-I. Choose the right option (8 x 1= 8 marks)

1. Chlamydomonas is a unicellular green alga. How does it differ from a photosynthetic bacterium?
 - a) Chlamydomonas is less complex than a prokaryotic bacterium
 - b) Chlamydomonas do not differ from photosynthetic bacterium
 - c) Chlamydomonas is a eukaryotic organism
 - d) Photosynthetic bacterium evolved from unicellular algae
2. Find the incorrect match
 - a) Chemical evolution – most widely accepted theory regarding origin of life
 - b) Biogenesis theory – Life originated spontaneously from non-living matter
 - c) Theory of Catastrophism – Universe has cyclic process of generation and destruction
 - d) Cosmozoic theory – life reached earth from outer space
3. Which of the following is true of amino acids, but not of carbohydrates?

a) The presence of nitrogen atoms	c) The presence of carbon atoms
b) The presence of hydrogen atoms	d) The presence of oxygen atoms

4. Identify the option, where all the columns are matched correctly:

1	Indirect evidence	Vestigial organ	Wings of bat
2	Direct evidence	Fossils	Appendix
3	Indirect evidence	Homologous organ	Wisdom teeth
4	Indirect evidence	Connecting link	Archaeopteryx

5. Which of the following are examples of in situ conservation?

- | | |
|-------------------|-----------------------|
| I. National parks | III. Sanctuary |
| II. Seed banks | IV. Botanical gardens |
-
- | | |
|--------------------|------------------|
| a) II and III only | c) I and IV only |
| b) I and III only | d) I only |

6. Glucose diffuses slowly through artificial phospholipid bilayers. The cells lining the small intestine, however, rapidly move large quantities of glucose from the glucose-rich food into their glucose-poor cytoplasm. Using this information, which transport mechanism is most probably functioning in the intestinal cells?
- a) Simple diffusion
 - b) Phagocytosis
 - c) Active transport pumps
 - d) Facilitated diffusion

7. A sequence of DNA contains 52000 base pairs. Analysis shows that 65% are A-T base pairs. How many nucleotides are guanine in the DNA sequence?
- a) 36400
 - b) 33800
 - c) 18200
 - d) 9100

8. Find the incorrect match
- a) Nucleolus- Synthesis of ribosome
 - b) Cytoplasm- Sites for metabolic processes
 - c) Nuclear pores- Import RNA into the nucleus
 - d) Ribosomes- Synthesis of protein

Section-II. State if the following statements are TRUE or FALSE. (8 x 1= 8 marks)

1. The endosymbiotic theory states that prokaryotes entered ancestral eukaryotes and lived symbiotically.
2. Darwin's theory of natural selection elucidates the survival of the fittest but not the arrival of the fittest.
3. DNA is composed of two strands of nucleotides coiled around each other. Each strand is composed of four complementary nucleotides – adenine (A), cytosine (C), guanine (G), and uracil (U).
4. Cells make thousands of different kinds of proteins in living systems out of only 20 amino acids.
5. The cytoskeleton protein "microfilaments" are responsible for chromosome movement and segregation during cell division.
6. Fats are hydrophobic in nature because the fatty acid tails of a fat molecule contain only nonpolar C-H bonds.
7. Lactose, a disaccharide sugar in milk is formed from glucose and galactose. The formula for both these monosaccharides is $C_6H_{12}O_6$, hence the formula of lactose is $C_{12}H_{24}O_{12}$.
8. Option value of biodiversity refers to the pleasure, excitement and visual peace we get from the beauty of our planet.

Section-III. Answer ALL of the following (9 marks)

- 1) Answer the following questions on biological significant properties of water.
 - a) Ice acts as a protective layer, allowing aquatic life to survive beneath frozen surfaces. What is the reason for this phenomenon? (1 Mark)
 - b) Water regulates body temperature and provides the necessary environment for biological processes to take place. What is the reason for this phenomenon? (1 Mark)

- 2) Describe the “Fluid Mosaic Model” of plasma membrane? (2 Mark)
- 3) Answer the following questions:
 - a) Invasion of alien species leads to extinction of native species. Justify this with one example (1Mark)
 - b) Habitat loss stands as the foremost threat driving species extinction. Justify this with one example (1Mark)
 - c) Polysaccharides are the main form of energy storage in plants. Justify this with one example. (1Mark)
- 4) Explain four key factors that lead to generation of variations according to “Neo-Darwinism” theory? (2 Mark)