



**Mahindra University Hyderabad**  
**École Centrale School of Engineering**  
**Minor-I**

Program: B. Tech. Branch: CSE, CM, AI, NT

Year: 2022 (CSE, CM, AI) and 2021 (NT)

Semester: II (CSE, CM, AI) and IV (NT)

Subject: Introduction to Biology (BI1201)

Date: 06.03.2023

Start Time: 2:00 PM

Time Duration: 1:30 Hours

Max. Marks: 25

**Instructions:**

- 1) Answer all objective questions
- 2) Answer only 5 short questions
- 3) Draw diagrams wherever necessary
- 4) Describe in detail when necessary

**Section-I. Match the following (10 x 0.5= 5 marks)**

1. ~~RNA~~
2. ~~Polysaccharide~~
3. ~~Lipid~~
4. Peroxisomes
5. ~~Protein~~
6. ~~Iron~~
7. Vacuoles
8. Flagella
9. ~~70s-Ribosomes~~
10. Lysosome

- A. Trace Element (6)
- B. Locomotion (8)
- C. Osmoregulation (7)
- D. Cellulose (2)
- E. Cholesterol (3)
- F. Cell Detoxification (4)
- G. Mitochondria (9)
- H. Digestive enzymes (10)
- I. Uracil (1)
- J. Amino Acids (5)

**Section-II. Choose the right option and justify your choice (10 x 1= 10 marks)**

1. Two DNA samples A and B have melting temperatures 80 and 60 degrees Celsius respectively. Identify the correct statement based on this information.

- a) B has more CG content than A
- b) A and B are complementary strands
- c) A has more CG content than B
- d) B has more hydrogen bonds than A

2. A horse ( $2n = 64$ ) and a donkey ( $2n = 62$ ) can mate and produce a mule. How many chromosomes would there be in a mule's body cells?

a) 31

b) 62

c) 63

d) 126



3. Find the incorrect match

- a) Chemical evolution – most widely accepted theory regarding origin of life
- b) Cosmozoic theory – life reached earth from outer space
- c) Biological evolution – first living organisms originated in water
- d) Biogenesis theory – Life originated from non-living substances

4. Hexose is a six-carbon monosaccharide which is found in many biologically important carbohydrates, including glucose. How many hydrogen atoms would you expect hexose to have if it has six carbon atoms, and six oxygen atoms?

- a) Six
- b) Twelve
- c) Ten
- d) Twenty-four

5. What will happen if Golgi apparatus is removed from cells?

- a) All sorts of protein synthesis will stop
- b) Majority of secretory vesicles formation will stop
- c) Energy production of the cell will stop
- d) Osmoregulation of cells will get disturbed

6. Which of these statements best describes what conservation biologists mean by the “the rapid loss of biodiversity”?

- a) Introducing species, have rapidly expanded their ranges.
- b) Harvests of marine fishes are declining.
- c) The current species extinction rate is as much as 100 times greater than at any time in the past 100,000 years.
- d) Many potential medicines are being lost as plant species become extinct.

7. The diploid chromosome number for the body cells of a mice is 24 ( $2n=24$ ). What would that number be after three generations if meiosis did not occur before gamete formation?

- a) 96
- b) 192
- c) 24
- d) 72

8. All of the following examples provide indirect evidence for evolution except

- a) Humans have a non-functional appendix
- b) Embryos of different vertebrates appear similar during initial stages of development
- c) Homologous organs
- d) Fossil record

9. A sequence of DNA contains 35000 base pairs. Analysis shows that 65% are A-T base pairs. How many nucleotides are cytosine?

- a) 12250
- b) 22750
- c) 6125
- d) 18375



19. Which cytoskeletal structure is linked with the movements of an immune cells like white blood cells (WBCs)?

- a) Microtubules
- b) Flagella
- c) Intermediate filaments
- d) Microfilament

**Section-III. Answer any 5 of the following (5 x 2= 10 marks)**

- 1) Water is crucial for life. Answer the following questions on biological significant properties of water.
  - a. Which property of water allows the water bugs to walk on water in a pond?
  - b. Why is the solid form of water less dense than the liquid form of water?
  - c. Which properties of water help plants to transport water from roots to leaves?
  - d. Large bodies of water, such as lakes and oceans, do not quickly fluctuate in temperature. What is the reason for this phenomenon?
- 2) A protein's functional shape results from four levels of structures. Explain these four levels of structures?
- 3) Explain the composition of the plasma membrane of eukaryotic cells and mention two functions of the plasma membrane?
- 4) Which cell organelles are involved in protein synthesis, folding, modification, and export from the cell? Explain the sequence of events that occurs from protein synthesis to its export from the cell.
- 5) How did the biological evolution of eukaryotes occur from prokaryotes?
- 6) Explain the key points of Darwinian Theory of Natural Selection?
- 7) List and describe four values of biodiversity.