

B.Sc. 6th Semester (Honours) Examination, 2023 (CBCS)

Subject : Physics

Course : DSE-3:(7) (OR)

(Biophysics)

Time: 3 hours

Full Marks: 60

The questions are equal value.

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as applicable.*

1. Answer *any ten* of the following questions:

2×10=20

- (a) Write any two functions of cell wall.
- (b) What are the differences between cell wall and cell membrane?
- (c) What is Allometric scaling law?
- (d) Define cellular reproduction.
- (e) What are the main types of cellular reproductions?
- (f) What are the approximate sizes of typical proteins found in human body?
- (g) What is the size of a nucleic acid?
- (h) What type of energy is required to form bacterial cells?
- (i) Define DNA replication process.
- (j) What are the steps of protein replication?
- (k) What do you mean by transcription of DNA?
- (l) How many genes are there in a typical human cell?

- (m) What is the number of genes present in an RBC cell?
- (n) What is self-sustaining ecosystem?
- (o) How many models of ecosystems are there? Name them.

2. Answer *any four* of the following questions:

5×4=20

- (a) How does the process of the exchange of energy with its environment occur in a living cell?
- (b) Draw a neat labelled diagram of any two very small genetic circuits.
- (c) What are the stages of RNA-Transcription process?
- (d) What is the structure and function of mitochondria in a living cell?
- (e) Discuss briefly about molecular evolution.
- (f) Discuss any one model of cellular dynamics.
- (g) What are the main functions of protein?
- (h) Write a short note on the transport process across a cell membrane.

3. Answer *any two* of the following questions:

10×2=20

- (a) Discuss about simple random walk.
 - (b) (i) Write a short note on Convergent Evolution.
(ii) Discuss briefly about Metabolic networks.
 - (c) (i) What is genotype-phenotype map? Write its two applications.
(ii) Draw the structure of a human brain indicating the main three parts.
 - (d) Draw the labelled diagram of a neuron.
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