C 22595 **(Pages : 2)** **Name.....**

Reg. No.....

FOURTH SEMESTER M.Sc. DEGREE [REGULAR/SUPPLEMENTARY] EXAMINATION, APRIL 2022

(CBCSS)

Physics

PHY 4E 24—BIO-PHYSICS

(2020 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend* **all** *questions in each section.*
2. *The minimum number of questions to be attended from the Section / Part shall remain the same.*
3. *The instruction if any, to attend a minimum number of questions from each sub section / sub part / sub division may be ignored.*
4. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

Section A

(8 Short questions, each answerable within 7.5 minutes)

Answer **all** *questions.*
Each question carries weightage 1.

1. Describe electron flow in photophosphorylation schematically.
2. Explain a coupled reaction.
3. What are semiconductor quantum dots ?
4. Write a note on optical biosensor ?
5. What are biosensors ? Give its classification based on transducing elements.
6. Define Wearable biosensor and explain its importance.
7. What is meant by hydrogels ? Give any two of its application.
8. Give the importance of natural biomaterials over other materials.

(8 × 1 = 8 weightage)

Turn over

Section B

(4 Essay questions, each answerable within 30 *minutes)*

Answer any **two** *questions.*
Each question carries weightage 5.

9. What are the reactions happening during photosynthesis ? Explain each reactions in details.
10. Illustrate bio-materials and its following types : (a) Metallic ; (b) Polymer ; (c) Ceramic ; and (d) Composites.
11. What are bio-materials ? Analyze its uses in cardiovascular applications.
12. Schematically explain : (a) Surface Plasmon Resonance (SPR)-based optical biosensors ; and (b) CNT-based electrochemical bio-sensors.

(2 × 5 = 10 weightage)

Section C

(7 Problem questions, each answerable within 15 minutes)

Answer any **four** *questions.*
Each question carries weightage 3.

13. Give an account on structure and functions of pyridine nucleotides.
14. Briefly explain the structure of virus.
15. Give the common characteristics and differences between adhesives and sealants.
16. Briefly explain bio-glasses and glass ceramics with its applications.
17. Briefly explain and sketch an electrochemical biosensor ?
18. Schematically explain evanescent wave fluorescence biosensors.
19. What are quantum dots and how do they work in the field of bio-imaging ?

(4 × 3 = 12 weightage)