M. Sc. Physics Examination, 2022

(2nd Year, 2nd Semester)

Biophysics

Paper – 401

Time : Two hours Full Marks : 40

Use separate answer script for each group.

Group – A

Answer ***any one*** question: 20

1. a) What do you mean by LCAO model? Write down the secular equations and secular determinant of an n-atomic molecule by LCAO theory. Hence calculate the energy and Eigen wave functions of a Hydrogen molecular ion. 1.5+1.5+7

   b) Explain the Effect of Radiation on Living Organisms. Describe the law of Bergonne and Tribondeau. 6+4

2. a) "Vitamin A is important for vision". As a student of physics background, how do you explain the above statement? 10

   b) Describe various Units of Radiation Exposure and Dose.

   A radiation worker received a gonadal dose of 25 mGy over a year. If 100% of this dose was from x-rays, what is the equivalent dose? 5+5

Group – B

Answer ***Four*** questions (any two from Q1 to Q4 and any two from Q5 to Q8): 4×5=20

1. Find out the molecular Eigen function for bonding and anti-bonding energies of ethylene molecule (C_2H_4).
2. Deduce the energy levels of a cyclic conjugated compound having total odd number of carbon atoms by using Huckel's theory.
3. How do you determine the entropy production inside a biological cell?
4. Discuss how the electromagnetic radiations interact with the living organism?
5. How blood glucose level changes after eating for i) Normal, ii) Pre Diabetic and iii) Diabetic person.
6. Explain the basic working principle of Stethoscope. How it changed with the invention of piezoelectric material?
7. Discuss the importance of Rectifier and amplifier circuit in RD instrument.
8. Explain the working principle of UV-Vis spectrometer.