Exam.Code:0039
Sub. Code: 0995

2022
B.Sc. (Hons.) Bio-Informatics
First Semester
BIN-1008: Physics

Time allowed: 3 Hours Max. Marks: 60

***NOTE**: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

*x-x-x*

1. Answer the following:
   a. What is diffraction of light?
   b. Calculate the path difference between two light sources if the phase difference is $2\pi/5$.
   c. What are the limitations of Coulomb's Law?
   d. Define Electric Flux.
   e. An electron and proton has same wavelength. Which of them has more energy.
   f. Show mathematically that the potential at a point on the equatorial line of an electric dipole is Zero?

(6x2)

## UNIT - I

2. a) Find the Electric field due to an electric dipole at a point on its equatorial line.
   b) Discuss in detail the role of physics in advancement of diagnostic techniques in life sciences. (6,6)

3. a) State Gauss's Theorem in electrostatics. Using this theorem, derive an expression for the field intensity due to an infinite plane sheet of charge.
   b). Derive an expression for energy stored in a capacitor. Two capacitors 2μF and 4μF are connected in parallel across a 300 Volt potential difference. Calculate the total energy stored in the system. (6,6)

4. a) What is electric current density? Write down the equation of continuity for steady current .

b) A charge +q is placed at the origin while a charge +4q is placed at a distance of 2m from the origin along the X-axis. Calculate the position of the point where the resultant electric field is zero. (6,6)

## UNIT - II

5. a) What are coherent sources? Write the various methods to obtain the coherent source experimentally. Write conditions for sustained interference.
   b) What is interference of light? Also calculate the intensity of maxima and minima in terms of path difference. (6,6)

6. a) Define Resolving power of a microscope. Show the image formation of a compound microscope by making a ray diagram and discuss its principle and working.
   b)Explain Heisenberg's uncertainity principle. How does it explain the non existence of electrons within the nuclei? (6,6)

7. a) Calculate the velocity and de-Broglie wavelength of a proton of energy $10^5$ electron volts.
   Given that - Mass of proton = $1.66 \times 10^{-27}$ kg; Planks Constant = $6.62 \times 10^{-34}$Js ; Charge on the electron = $1.6 \times 10^{-19}$C.
   b) What is Radioactivity? How does it vary with external parameters like temperature, pressure etc.? Enumerate the various laws of radioactive disintegration. (6,6)

x-x-x