Exam.Code:0033
Sub. Code: 0963

1128
B.Sc. (Hons.) Biotechnology
First Semester
BIOT-Sem-I-V-T: Physics

Time allowed: 3 Hours **Max. Marks: 67**

NOTE: *Attempt five questions in all, including Question No. IX (Unit-III) which is compulsory and selecting two questions each from Unit I -II.*

x-x-x

UNIT – I

I. a) State and explain Coulomb law. Two point charges one with charge q at (-d,0) and the second with charge -q at (d, 0) are placed. Find the electric field at point 'C' whose coordinates are (0, R). (X,Y) refer to coordinates. (2,6)

b) How technology helps us understand the functioning of biological systems. Explain with two examples. (5.4)

II. a) State and explain Gauss law. Find the electric field at any point outside a uniformly charged solid sphere of radius R and total charge q. (2,6)

b) Mycoplasma, smallest bacteria have a radius about 0.1 micrometer and the largest bacteria have a radius about 50 micrometers. What is the surface area -to-volume ratio for each of these? (5.4)

III. a) What is the total capacitance C if three capacitances C_1, C_2, C_3 are arranged (i) in parallel ii) in series (8)

b) Explain the equation of continuity. (5.4)

IV. a) An infinite plane carries a uniform surface charge σ. Find its electric field at any point perpendicular to the sheet. (8)

b) Obtain the expression for energy stored in a capacitor. (5.4)

P.T.O.

UNIT – II

V. a) Using Fresnel Biprism arrangement how can one determine the wavelength of monochromatic light. (8)

b) Many interferences leads to diffraction. Explain. (5.4)

VI. a) How does a telescope works? Obtain the expression for its resolving power.(8)

b) Distinguish Fraunhofer diffraction and Fresnel diffraction. (5.4)

VII. a) What is Compton effect? Obtain the expression $\Delta\lambda = \frac{h}{mc}(1-\cos\phi)$,where symbols have their usual moaning (8)

b) Explain the working of electron microscope. (5.4)

VIII. a) Explain the phenomena of radioactivity. What are the five kinds of radioactive de cays? Explain in detail. (8)

b) What is phase velocity? What is group velocity? When are they equal? (5.4)

UNIT – III

IX. Attempt the following:-

a) The distance between two cities is 1440 Km by road. How far is this in miles? (2)

b) Express Ohm's law in vector form. (2)

c) Explain the term polarization. (2)

d) What is i) half life ii) mean life of a radioactive substance. (2)

e) Explain concept of fluorescent microscope. (2)

f) State Uncertainty principle. (2)

g) The proton that is the nucleus of the hydrogen atom attracts the electron that orbits it. Relative to this force, does the electron attracts the proton with less force, with more force with the same amount of force? Explain. (1.4)

x-x-x