(i) Printed Pages: 3   Roll No. ....

(ii) Questions : 9   Sub. Code : | 0 | 9 | 6 | 2 |

Exam. Code : | 0 | 0 | 3 | 3 |

B.Sc. (Hons.) Biotechnology 1st Semester

(2122)

PHYSICS

Paper : BIOT-105T

Time Allowed : Three Hours]   [Maximum 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 and Unit II.

UNIT–I

I. (a) Explain with examples of how Physics, uncertainty principle and Bio-Physics are inter-related.   8

(b) A specific type of smallest bacteria have radius about 0.4 micrometer and the largest bacteria have radius about 50 micrometer. Estimate the surface area to volume ratio for each of these.   5.4

II. (a) Explain and differentiate between Electric field and Electric potential.   4

(b) Estimate roughly the following in mot suitable units/ range :

(i) Mass of a 15 cm scale

(ii) Diameter of pencil

(iii) Size of largest atom

(iv) Mass of a cell phone

(v) Time the light takes to travel 0.5 meter in free space.   4

(c) What is electric dipole ? Find electric field due to a dipole on a point along its axial line. 5.4

III. (a) What is equation of continuity ? Explain Ohm's law in vector form ? 5,3

(b) Derive Coulomb's law from Gauss's law. Find energy stored in a Capacitor. 5.4

IV. (a) Find the total capacitance if 3 capacitors with particular capacitance are connected in :

(i) Parallel

(ii) Series. 8

(b) If wavelength of light is 5500 Å, distance between two slits is 2 mm and distance between first order fringe and central fringe is 0.4 mm. Find the distance between slit and screen. Give conditions for two waves to be coherent. 5.4

UNIT–II

V. (a) Explain in detail the terms diffraction and interference.

8

(b) Explain Rayleigh criterion of resolution. 5.4

VI. (a) How Bragg's provides useful information regarding the internal structure of crystal ? 8

(b) What is Compton effect ? Find the change in wavelength of photon which strikes an electron with wavelength $(\lambda) = 0.06$ nm and moves aside with scattering angle of 30 degree. 5.4

VII. (a) What is radio-activity ? Give units of radioactivity. Explain half life period and disintegration constant.

2,1,5

(b) What is De-Broglie wavelength ? Find De-Broglie wavelength of electron. 5.4

VIII.(a) Explain Lloyd's Mirror and Fresnel Biprism. 8

(b) Explain particle in a box with respect to uncertainty principle. Can electron exist inside the nucleus or not ? Explain. 5.4

UNIT–III

IX. Attempt the following :

(a) What is current density ? 2

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

(c) What is ground velocity and phase velocity ? 2

(d) Give the relation between a meter and a foot. 2

(e) Why radioactivity follows exponential decay ? 2

(f) Explain the term polarization. 2

(g) What is resolving power ? 1.4