Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Only for Bio Tech) (2018 Batch) (Sem.–1)

INTRODUCTION TO PHYSICS : BIOTECHNOLOGY

Subject Code : BTPH-107-18

Paper ID : [75369]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

Q1 Answer briefly :

a) *"Population inversion is essential for Lasing action."* Comment.

b) What do you mean by 3-level laser?

c) What is the physical significance of Numerical aperture?

d) Give salient features of Type I superconductors.

e) Explain the concept of magnetic anisotropy.

f) Define Bragg's law.

g) *"Ultrasound waves can be harmful at times!"* Comment.

h) What do you understand by electron confinement?

i) Give working principle of electron microscope.

j) What do you understand by quantum dot?

SECTION-B

Q2 a) What is stimulated emission? How is it achieved to have lasing action? (4)

b) Find coherence length for sodium light having emission wavelengths 5890A° and 5896A°. (4)

Q3 a) Discuss the role of core and cladding in reference to step index fibre. (4)

b) Discuss important applications of fibre communication. (4)

Q4 a) Give qualitative description of BCS theory. (4)

b) Outline the properties of a superconducting state. (4)

Q5 a) What is the role of exchange energy in ferromagnetism? (4)

b) What do you understand by Ferrite materials? (4)

SECTION-C

Q6 a) What is the role of X-rays in the analysis of crystal structure? (4)

b) What do you understand by X-ray radiography? (4)

Q7 Demonstrate a method each for production and absorption of X-rays. (4)

Q8 a) Explain de-Broglie concept of matter wave. (4)

b) In an X-ray scattering experiment, the Compton shift was observed to be 0.026 A° for a scattering angle of 90°. Find the electron charge. (4)

Q9 a) Explain the cause of having modified properties at nanoscale. (4)

b) Discuss the synthesis procedure of a nanomaterial using bottom-up method. (4)