

B.Tech I Year I Semester (R15) Regular Examinations November/December 2018

BASIC PHYSICS

(Food Technology)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Define time period, phase, angular frequency and amplitude.
 - Explain the differences between interference and diffraction.
 - State and explain Coulomb's law of electrostatics.
 - Define magnetic permeability and magnetic susceptibility.
 - What is uncertainty principle? Discuss.
 - Explain the wave particle duality.
 - What are Bravais lattices? Explain.
 - Deduce the Bragg's law of X-ray diffraction in crystals.
 - What is binding energy? How it varies with atomic number Z.
 - What are the properties of nuclear forces?

PART – B
(Answer all five units, 5 X 10 = 50 Marks)**UNIT – I**

- 2 (a) Explain the physical significance of the gradient of a scalar field.
(b) Derive an expression for curl of a vector field. Show that $\text{curl } A = \nabla \times A$.

OR

- 3 (a) Write short note on line integral and surface integral.
(b) State and prove Stokes' theorem.

UNIT – II

- 4 (a) What is magnetic shell? Explain its significance.
(b) Write Maxwell's equation in differential and integral forms.

OR

- 5 (a) State the fundamental postulates of special theory of relativity.
(b) Derive Galilean transformation equations and prove that the laws of mechanics are identical in all inertial frames.

UNIT – III

- 6 (a) What do you understand by fine structure of spectral lines?
(b) Explain Hund's rules with examples.

OR

- 7 (a) Distinguish between spontaneous and stimulated emissions.
(b) What are the characteristics of lasers?
(c) State some important features of a hologram.

UNIT – IV

- 8 (a) What are Miller indices?
(b) Derive the expression for the interplanar spacing between two parallel planes with miller indices (hkl) in a cubic lattice with lattice parameter 'a'.

OR

- 9 (a) Discuss the formation of Brillouin zones for linear and two dimensional lattices.
(b) Explain the formation of energy bands in solids on the basis of band theory of solids.

UNIT – V

- 10 (a) What is radioactive decay? Describe three different types of radioactive decay and the laws?
(b) What is fusion? Explain.

OR

- 11 (a) Explain the function of control rods in a fission reactor.
(b) Explain the following: (i) Q value. (ii) Critical size. (iii) Nuclear cross section.