Time: 3 Hours

Max. Marks: 60

Instructions   1. It is compulsory to answer all the questions (2marks each) of Part -A in short.
2. Answer any four questions from Part -B in detail.
3. Different sub-parts of a question are to be attempted adjacent to each other.

PART -A

Q1 (a) What do mean by an inertial frame of reference?   (2)

(b) If a rod travels with a speed v=0.8c along its length, calculate the percentage of   (2)
contraction.

(c) What is the difference between an asteroid and a meteor?   (2)

(d) Explain Newton's First Law of motion with the help of an example.   (2)

(e) Write the Kepler Laws of Planetary motion.   (2)

(f) Explain the Zeroth Law of Thermodynamics.   (2)

(g) How is nuclear energy produced?   (2)

(h) Define galaxy and solar system.   (2)

(i) What are elementary particles? Give two examples.   (2)

(j) Why do elements form chemical bonds?   (2)

PART –B

Q2 (a) Derive the Lorentz Transformation equations for a particle moving with (5)
relativistic velocities.
(b) Is the universe expanding? Explain.   (5)

Q3 (a) Explain the different models for the structure of atom. Also explain their (5)
successes and limitations.
(b) Explain the Einstein's principle of mass energy equivalence.   (5)

Q4   Define Thermodynamics. Explain in detail the laws of Thermodynamics and (10)
their applications.

Q5 (a) Explain the importance of solar energy and wind energy in today's context.   (5)

(b) What are electromagnetic radiations? Explain the spectrum of electromagnetic (5)
radiation.

Q6 (a) What are harmonic and anharmonic oscillations? Give examples of each kind.   (5)
(b) Explain the structure of nucleus giving examples.   (5)

Q7   Write short notes on the following: (4x2.5)
      (a)Quantum world
      (b) Fission and Fusion
      (c) Space and time
      (d) Formation of seasons