CBCS-243

B. Sc. (Hon's) (Third Semester) Examination, Dec. 2023

(CBCS Course)

COMPUTER SCIENCE

Paper : 302

(Mechanics)

Time Allowed : Three hours

Maximum Marks : 60

Minimum Pass Marks : 21

Note : *Attempt the questions of **both** sections–'A' and 'B' as directed. Distribution of marks is given with sections.*

Section-'A'

(Short Answer Type Questions)   5×6=30

Note : *Attempt all **five** questions. **One** question from each unit is compulsory. Each question carries 6 marks.*

Unit-I

1. Discuss Galilean transformations.

Or

Prove that Newtonian fundamental equations are invariant under Galilean transformations.

Unit-II

2. Define conservative and non-conservative forces with examples. Find formula for work done by non-conservative forces.

Or

Explain stable, unstable and neutral equilibrium. Write the condition under which the system is stable or unstable.

Unit-III

3. State and prove theorem of parallel axes.

Or

Find the moment of inertia of a rod about an axis passing through centre of the rod and perpendicular to the rod.

Unit-IV

4. Define centres of oscillation and suspension show that the centre of oscillation and suspension are convertible.

Or

Differentiate between damped and forced oscillations.

Unit-V

5. State fundamental postulates of special theory of relativity and deduce the Lorentz transformation equations.

Or

Discuss time dilation.

Section-'B'

(Long Answer Type Questions)   3×10=30

Note : Attempt any **three** questions. Each question carries 10 marks.

6. State and prove principle of conservation of momentum.

7. State and prove law of conservation of energy.

8. Find moment of inertia of a solid sphere about one of its diameters.

9. State and explain Kepler's laws of planetary motion. Discuss motion of satellite in circular orbit.

10. Prove that :

$$E = mc^2$$