Roll No. | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 09

B.Sc. (Non Medical) (Sem.–1)

MECHANICS-I

Subject Code : BSNM-104-18

M.Code : 75745

Date of Examination : 19-01-23

Time : 3 Hrs. **Max. Marks : 50**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying ONE marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Write briefly :

a) Give one example each of inertial and non-inertial frames of reference.

b) What are the quantities which are invariant under Galilean transformations?

c) Define a rigid body.

d) Show that work done by a conservative force is zero.

e) What is impact parameter?

f) What is the physical significance of moment of inertia?

g) A wrench with a long arm is preferred for tightening a bolt. Why?

h) Define an elementary gyroscope.

i) Define '*Poisson's ratio*'.

j) What do you mean by elastic limit and breaking stress?

SECTION-B

2. Define a projectile and derive the equation of trajectory for a projectile fired at an angle with the horizontal.

3. Show that the total kinetic energy in the laboratory system is always greater than the total kinetic energy in the centre of mass system.

4. What is a collision? Explain briefly elastic and inelastic scattering. Discuss two types of inelastic scattering.

5. Define Kinetic Energy of rotation. Develop an expression between kinetic energy of rotation, moment of inertia and angular velocity.

6. Find the work done in stretching a wire.

SECTION-C

7. What is centre of mass? Find the total linear momentum of a system of particles about the centre of mass and show that it is zero.

8. Derive an expression for the moment of inertia of a solid cylinder about (a) its own axis of symmetry, (b) an axis passing through its centre and perpendicular to its axis of symmetry.

9. What is the difference between angle of twist and angle of shear? Deduce an expression for the couple required to twist a uniform solid cylinder by an angle.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.