

**Total No. of Pages : 02**

**B.Sc Non Medical (2018 & Onwards) (Sem.-1)**

**Subject Code : BSNM-104-18**

**Max. Marks : 50**

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.**

**1. Write briefly :**

- State Newton's laws of motion.
- State the principle of conservation of momentum.
- Differentiate between stable and unstable equilibrium.
- Show that work done by a conservative force is zero.
- How the momentum and energy conservation laws hold good in case of collision of particles which stick together.
- Derive the relationship between torque and angular momentum.
- Write the expression for angular momentum of a system of particles.
- Write the expressions for moment of inertia and radius of gyration for a system of particles.
- Define Hooke's law of elasticity and explain its validity.
- A load of 2kg produces an extension of 1mm in a wire of 3meters in length and 1mm in diameter. Calculate the Young's modulus of wire.

**SECTION-B**

2. Discuss rocket propulsion and derive the expression for velocity of rocket at any instant.
3. Define a projectile and derive the equation of trajectory for a projectile fired at an angle with the horizontal.
4. A body of mass 5kg initially at rest is subjected to a force of 20N. What is the kinetic energy acquired by the body at the end of 10s?
5. Prove the law of conservation of energy by using conversion of gravitational potential energy into kinetic energy for freely falling body.
6. Differentiate between elastic and inelastic scattering. Derive the expression for cross section of elastic scattering.

**SECTION-C**

7.
  - a) State and prove theorem of parallel axis of moment of inertia .
  - b) Derive the expression for moment of inertia of a rectangular bar about an axis passing through the midpoint of one side and perpendicular to its plane.
8.
  - a) Define Elasticity and discuss all moduli of elasticity.
  - b) Derive the expression for work done in stretching and twisting a wire.
9. Derive the expression for the determination of moment of inertia and torsional rigidity of an irregular body using Torsion pendulum.

**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.**