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

Total No. of Questions : 09

B.Sc (Non-Medical) (Sem.–6)

STATICS AND DYNAMICS

Subject Code : BSNM-606-18

M.Code : 79498

Date of Examination : 11-01-2023

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) State condition of equilibrium.

(b) Define coplanar forces.

(c) State λ-μ theorem.

(d) Forces 3Q, 5Q and 7Q are acting at a point are in equilibrium. Find the angle between the forces 3Q and 5Q.

(e) A force acting at a point can be resolved in how many components?

(f) A stone is thrown vertically and then it returns to the thrower. Is it a projectile? Explain.

(g) Vehicles stop on applying brakes. Does this phenomenon violate the principle of conservation of momentum?

(h) The amplitude of simple harmonic oscillator is doubled. How does this affect the total energy?

(i) Can an object be accelerated without speeding up or slowing down?

(j) The greatest height to which a man can throw a stone is ‘h’. What will be the greatest distance up to which he can throw the stone?

SECTION-B

2. State and prove parallelogram law of forces. Is it possible for a force to have a component larger in magnitude than the force itself?

3. What are the equilibrium conditions for coplanar concurrent forces?

4. Three forces 2P, 3P and 4P act along three sides of an equilateral tringle taken in order, find the magnitude and line of action of the resultant forces.

5. A bullet of mass 0.01 kg is fired horizontally onto a 4 kg wooden block at rest on a horizontal surface. The coefficient of kinetic friction between the block and the surface is 0.25. The bullet remains embedded in the block and the combination moves 20 m before coming to rest. With what speed did the bullet strike the block.

6. Derive an expression for gravitational potential energy of a body.

SECTION-C

7. State and Prove :

(a) Triangle law of forces

(b) Lami's theorem.

8. Find (a) the path of projectile (b) time of flight (c) horizontal range (d) maximum height, when projectile is projected with velocity V making an angle with the vertical direction.

9. Explain the relation in phase between displacement, velocity and acceleration in simple harmonic motion, graphically as well as theoretically.

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