B.Sc.DEGREE EXAMINATION,APRIL 2020
III Year V Semester
Dynamics

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Define rectilinear motion of a particle.
2. Define angular velocity of the particle about a fixed point.
3. Define simple harmonic motion of a particle.
4. Define vibration and amplitude with respect to simple harmonic motion of a particle.
5. Write down the expression for the range up on inclined plane, of a projectile.
6. Write down the expression for the maximum range down on inclined plane, of a projectile.
7. Define an impulsive force.
8. Define direct and oblique impacts of a smooth sphere on a plane.
9. Define moment of inertia of a particle.
10. Find the moment of inertia of a thin rod of length $2\mathbf{a}$ about a line through one end and perpendicular to the rod.
11. Write down the units of velocity in C.G.S, M.K.S and F.P.S systems.
12. State Newton's experimental law of impact.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. A particle has two velocities $\overline{v_1}$ and $\overline{v_2}$. Its resultant velocity is equal to $\overline{v_1}$ in magnitude. Show that when the velocity $\overline{v_1}$ is doubled, the new resultant is perpendicular to $\overline{v_2}$.
14. Show that in a simple harmonic motion, the sum of kinetic energy and potential energy is a constant.
15. Obtain the horizontal range of a projectile.
16. Show that when two spheres of equal masses collide directly, the velocities of the spheres are interchanged, if e=1.
17. Find the moment of inertia of a square about its diagonal of length l.

18. Find the magnitude and direction of the resultant of the velocities $\overline{v_1}$ and $\overline{v_2}$.
19. Find the velocities of two smooth spheres after a direct impact between them.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. A man seated in a train whose velocity is 80 k.m.p.h throws a ball horizontally and perpendicular to the train with the velocity of 60 k.m.p.h. Find the velocity of the ball immediately after the throw.
21. If initially the particle is projected from A with a velocity ϑ away from $O(OA{=}a)$, then find the simple harmonic motion.
22. Show that the path of a projectile is a parabola.
23. Find the impulse imparted to each sphere when two smooth spheres collide directly.
24. State and prove the perpendicular axis theorem.

B.Sc.DEGREE EXAMINATION,APRIL 2020
III Year V Semester
Dynamics

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Define rectilinear motion of a particle.
2. Define angular velocity of the particle about a fixed point.
3. Define simple harmonic motion of a particle.
4. Define vibration and amplitude with respect to simple harmonic motion of a particle.
5. Write down the expression for the range up on inclined plane, of a projectile.
6. Write down the expression for the maximum range down on inclined plane, of a projectile.
7. Define an impulsive force.
8. Define direct and oblique impacts of a smooth sphere on a plane.
9. Define moment of inertia of a particle.
10. Find the moment of inertia of a thin rod of length $2\mathbf{a}$ about a line through one end and perpendicular to the rod.
11. Write down the units of velocity in C.G.S, M.K.S and F.P.S systems.
12. State Newton's experimental law of impact.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. A particle has two velocities $\overline{v_1}$ and $\overline{v_2}$. Its resultant velocity is equal to $\overline{v_1}$ in magnitude. Show that when the velocity $\overline{v_1}$ is doubled, the new resultant is perpendicular to $\overline{v_2}$.
14. Show that in a simple harmonic motion, the sum of kinetic energy and potential energy is a constant.
15. Obtain the horizontal range of a projectile.
16. Show that when two spheres of equal masses collide directly, the velocities of the spheres are interchanged, if e=1.
17. Find the moment of inertia of a square about its diagonal of length l.

18. Find the magnitude and direction of the resultant of the velocities $\overline{v_1}$ and $\overline{v_2}$.
19. Find the velocities of two smooth spheres after a direct impact between them.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. A man seated in a train whose velocity is 80 k.m.p.h throws a ball horizontally and perpendicular to the train with the velocity of 60 k.m.p.h. Find the velocity of the ball immediately after the throw.
21. If initially the particle is projected from A with a velocity ϑ away from $O(OA{=}a)$, then find the simple harmonic motion.
22. Show that the path of a projectile is a parabola.
23. Find the impulse imparted to each sphere when two smooth spheres collide directly.
24. State and prove the perpendicular axis theorem.