MAY 2022 **U/ID 32511/UCM4B**

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer any TEN questions.

1. Define linear momentum.

2. State polygon law of forces.

3. Define moment of a couple.

4. What do you meant by center of gravity?

5. Define rectilinear motion.

6. Define kinetic energy.

7. Give an example for impulsive force.

8. Write any one laws of impact.

9. Define circular motion.

10. What do you mean by equiangular spiral?

11. Write down the moment of inertia of right circular hollow cylinder.

12. Define central orbit.

PART B — ($5 \times 5 = 25$ marks)

Answer any FIVE questions.

13. State Newton's laws of motion.

14. Find the magnitude and direction of the resultant of $\vec{F}_1$ and $\vec{F}_2$.

15. Three forces acting along the sides of a triangle in the same order are equivalent to a couple. Show they are proportional to the sides of the triangle.

16. Discuss composition of two SHM^s of same period.

17. Show that the parts of a projectile is a parabola.

18. Discuss the motion of a conical pendulum.

19. Show that a central orbit is a plane curve.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

20. State and prove Lami's theorem.

21. Discuss principle of virtual work.

22. Describe S.H.M. along a vertical line.

23. Find the velocities of two smooth spheres after a direct impact between them.

24. Derive the equation of a central orbit in polar coordinates.
