DECEMBER 2022 **U/ID 32511/UCM4B**

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 2 = 20$ marks)

Answer any TEN questions.

1. Define angle of friction.

2. What do you mean by effective forces?

3. Define couple.

4. Define centre of mass.

5. What do you meant by resultant velocity?

6. Define conservative field of force.

7. Write down the equation of power.

8. Define simple harmonic mean.

9. Define trajectory.

10. Define impulsive force.

11. State Newton's experimental law.

12. Define conical pendulum.

PART B — ($5 \times 5 = 25$ marks)

Answer any FIVE questions.

13. State and prove Lami's theorem.

14. Prove that a system of coplanar force reduce to either to a single force or to a couple.

15. If a point moves in a straight line with uniform acceleration and covers successive equal distances in times t_1, t_2, t_3 then show that $\frac{1}{t_1}-\frac{1}{t_2}+\frac{1}{t_3}=\frac{3}{t_1+t_2+t_3}$.

16. Show that the path of a project is a parabola.

17. Obtain the equation of a SHM.

18. Discuss the motion of a conical pendulum.

19. Derive differential equation of a central orbit.

PART C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

20. The magnitude of the resultant of two given forces P, Q is R. If Q is doubled, then R is doubled. If Q is reversed, then R is doubled. Show that $P : Q : R = \sqrt{2} : \sqrt{3} : \sqrt{2}$.

21. Find mass centre of three uniform rods forming a triangle.

22. Discuss SHM along a horizontal line.

23. Obtain the time of flight and range of a projective projected to travel above a line of greatest slope of an inclined plane.

24. State and prove perpendicular axis theorem.

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