SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
B.Sc.(Maths) END SEMESTER EXAMINATIONS APRIL-2023
SEMESTER - V
20UMACT5011 - Dynamics

Total Duration : 2 Hrs 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Find the magnitude and direction of the resultant of the velocities $\overline{v_1}$ and $\overline{v_2}$.
2. Show that, in a Simple harmonic motion, the sum of the Kinetic energy and Potential energy is a constant.
3. In a projectile, prove that g$T^{\,2} = 2Rtan\alpha$, with usual notations.
4. State Laws of Impact.
5. State and prove perpendicular axis theorem.
6. If a point moves in a straight line with uniform acceleration and covers successive distances in times t_1, t_2, t_3, then show that $\frac{1}{t_1} - \frac{1}{t_2} + \frac{1}{t_3} = \frac{3}{t_1 + t_2 + t_3}$
7. A particle is moving with simple harmonic motion and while moving from the mean position to one extreme position , its distances at three consecutive seconds are x_1, x_2, x_3. Show that its period is $\frac{2\pi}{\cos^{-1}((x_1 + x_3)/2x_2)}$.
8. Two equal balls of mass 'm' are in contact on a table.A third equal ball strikes both symmetrically and remains at rest after impact. Show that e $= \frac{2}{3}$.

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Find the components of velocity and acceleration in radial and transverse direction.
10. Prove that the composition of two simple harmonic motion of same period is also simple harmonic with the same period.
11. Prove that the path of a projectile is a parabola.
12. Find the velocities of two smooth spheres after a direct impact between them.
13. Find the Moment of Inertia of a solid sphere.

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