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. Physics - END SEMESTER EXAMINATIONS APRIL - 2024
SEMESTER - II
22UPHCT2004 - Mechanics

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

Section B

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

1. List the difference between the centre of mass and centre of gravity.

2. What do you mean by Constraints? Explain its types with an example.

3. Derive the Hamilton's equation of motion.

4. Explain the principle behind the working of compound pendulum and deduce an expression for the period of oscillation.

5. Define Centre of Pressure. Apply the concept of centre of pressure to a plane Surface S and derive an equation for it.

6. Derive the center of gravity of a solid hemisphere.

7. Explain the concept of Virtual work and derive D'Alembert's Principle.

8. A uniform rod of length 1.2m oscillates about an horizontal axis of rotation passing through one end. Find the period of oscillation. Find the positions of the other points about which the period is same. Also calculate the minimum period possible and position of the axis of rotation for obtaining the minimum period.

Section C

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

9. Define the centre of Gravity. Compute the centre of gravity for the following cases. (i) Right solid cone (ii) Hollow hemisphere.

10. Compute the position of the centre of pressure for a Triangular lamina immersed vertically in a liquid
(i) with vertex in the surface of liquid and base horizontal
(ii) with one side in the surface with no external pressure.

11. Derive Lagrange's equations from D'Alembert's Principle for a conservative System.

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12. Write the physical significance of Hamilton's equation of motion and derive an expression for the simple pendulum.

13. Determine the acceleration due to gravity using a Bifilar Pendulum – Parallel Threads.

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