| **Total Duration : 3 Hrs** | | **Total Marks : 75** | |
|---|---|---|---|
| MCQ | : 30 Mins | MCQ | : 15 |
| Descriptive | : 2 Hrs.30 Mins | Descriptive | : 60 |

## Section B

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

1. Explain the experimental verification of perpendicular axes theorem using Bifilar pendulum.

2. Distinguish between centre of gravity and centre of mass

3. State laws of floatation. Explain the stability of floating bodies.

4. Describe generalised co-ordinates and explain the transformation equations.

5. Explain the physical significance of Hamiltonian.

6. Write a note on phase-space.

7. Obtain an expression for principle of virtual work.

8. Find the centre of gravity of a right solid cone.

## Section C

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

9. Determine the value of 'g' at a place using compound pendulum and its theory.

10. Evaluate the center of gravity of
    (a) solid hemisphere and (b) a hollow hemisphere.

11. Deduce an expression for centre of pressure of a vertical triangular lamina immersed in a liquid

12. Deduce Lagrangian equation of motion from D' Alembert's principle.

13. Using Hamilton's equation of motion solve the problem of linear harmonic oscillator.