B.Sc. DEGREE EXAMINATION,APRIL 2019
I Year II Semester
Mechanics

Time : 3 Hours **Max.marks :60**

Section A $(10 \times 1 = 10)$ Marks

Answer any **TEN** questions

1. What is Compound pendulum?
2. Write the time period of oscillation of a Bifilar pendulum.
3. Define Centre of gravity.
4. Distinguish centre of gravity and centre of mass.
5. What is centre of pressure?
6. State the laws of floatation.
7. Define degrees of freedom.
8. What are constrains?
9. What is phase space?
10. Write Hamilton's equations.
11. What are Holonomic constrains?
12. What are transformation equations?

Section B $(5 \times 4 = 20)$ Marks

Answer any **FIVE** questions

13. Show that the centre of suspension and centre of oscillation of compound pendulum are interchangeable.
14. Find the centre of gravity of a solid cone.
15. With neat diagram explain the stability of floating bodies.
16. Explain D'Alembert's Principle.
17. Explain the physical significance of Hamiltonian (H).
18. Explain the concept of Principle of Virtual work.
19. Distinguish between scleronomic and rhenomic constraints.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Describe the theory of compound pendulum and explain the determination of 'g' using it.
21. Determine the centre of gravity of a solid and hollow hemisphere.
22. Calculate the centre of pressure of a triangular lamina immersed vertically in a liquid.
23. Derive Lagrange's equation from D'Alembert's principle.
24. Apply Hamilton equation of motion to linear harmonic oscillator to show that the motion is simple harmonic.

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