B.Sc.DEGREE EXAMINATION,APRIL 2020
I Year II Semester
Mechanics

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

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

Answer any **TEN** questions

1. Define radius of gyration.
2. What is an equipment simple pendulum?
3. Define - Unstable equilibrium.
4. Give the expression for the centre of gravity of a right solid cone.
5. Define the term "Centre of Buoyancy".
6. State the first law of floatation.
7. State the principle of virtual work.
8. Define cyclic co-ordinates.
9. What is meant by "Phase space"?
10. Give the equation showing Hamiltonian[H] is related to lagrangian [L].
11. What are holonomic constraints?
12. Define "Centre of mass"

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

Answer any **FIVE** questions

13. Show that the centre of suspension and centre of oscillation are interchangeable in a compound pendulum.
14. Deduce the centre of gravity of a solid hemisphere.
15. Describe the experimental determination for the meta centric height of a ship.
16. Explain the D 'Alembert's principle.
17. Derive Hamiltonian's equation of motion in case of a linear harmonic oscillator.
18. A Ship is of 20000 tons displacement. A load of 30 tons moved 50 metre across the deck make the ship tilt through $(3/4)^{\circ}$. Calculate the metracentric height.
19. Define centre of gravity. How centre of gravity differs from centre of mass?

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

Answer any **THREE** questions

20. Arrive at the value of 'g' using Bifilar pendulum.
21. Determine the centre of gravity for a hollow hemisphere.
22. Derive the equation for the centre of pressure of triangular lamina immersed in water with its vertex in the surface of the water and its base horizontal.
23. Deduce the Lagrange's equation of motion.
24. Discuss the Physical significance of H.

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