C. ABDUL HAKEEM COLLEGE (AUTONOMOUS),
MELVISHARAM - 632 509.
SEMESTER EXAMINATIONS, APRIL - 2018

B.Sc., PHYSICS **SEMESTER IV**

U15MPH401 / U14MPH401 - MECHANICS

Time: Three Hours Maximum: 75 Marks

SECTION - A (10 X 2 = 20 Marks)

Answer **ALL** Questions.

1. What is meant by a rigid body?
2. Define the radius of gyration.
3. Differentiate concurrent and parallel forces.
4. State laws of floatation.
5. Why is the gravitational constant called as universal constant?
6. Define escape velocity.
7. How do you define number of degrees of freedom?
8. Define virtual work.
9. What is Phase Space?
10. Give the physical significance of Hamiltonian function.

SECTION - B (5 X 5 = 25 Marks)

Answer **ALL** Questions.

11. a) Obtain an expression for the moment of inertia of a solid cylinder.

(Or)

b) Show that centre of oscillation and suspension of a compound pendulum is reversible.

12. a) Obtain an expression for centre of gravity of a solid tetrahedron.

(Or)

b) How will you determine the metacentric height of a ship? Explain.

13. a) State and explain Kepler's laws.

(Or)

b) Write a short note on the types of satellite orbits.

14. a) Write a note about the generalized co-ordinates and constaints.

(Or)

b) Obtain the equation of motion of a simple pendulum by using Lagrangian method.

15. a) Derive Hamilton's canonical equations of motion.

(Or)

b) What is the physical simplification of Hamiltonian? Explain.

SECTION - C (3 X 10 = 30 Marks)

Answer **ANY THREE** Questions.

16. Explain the method of determining 'g' using compound pendulum.
17. Obtain an expression for centre of pressure of a vertical rectangular lamina.
18. What is the principle of rocket motion? Deduce the equation of motion of a rocket.
19. Derive Lagrange's equation from the D'Alembert's principle.
20. Obtain the equation of motion of a simple pendulum by using Hamiltonian method.

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