PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2022
(Second Semester)

Branch – PHYSICS

__MECHANICS__

Time: Three Hours   Maximum: 50 Marks

__SECTION-A (5 Marks)__
Answer ALL questions
ALL questions carry EQUAL marks   (5 x 1 = 5)

1   Find Moment of inertia of a body is equal of__ the kinetic energy of rotation of a body forunit angular velocity
   (i)   Twice   (ii) Single
   (iii) Quarter   (iv) Thrice

2   Choose Hydrostatic pressure due to a liquid column of density ρ at a depth h from the surface is _____.
   (i) $h\rho m$ (ii) $h\rho g$
   (iii) htg (iv) ρmg

3   Identify the coefficient of viscosity is defined as the_per unit area required to maintain aunit velocity gradient
   (i)   Repulsive force   (ii) Tangential force
   (iii) Coersive force   (iv) Attractive force

4   _____is the velocity with which a body should be projected to enable it to escape from the gravitational pull of the earth.
   (i)   angular velocity   (ii) drift velocity
   (iii) present velocity   (iv) Escape velocity

5   Indicate the equation of D'Alembert's Principle is _____
   (i) $\sum_i (F_i - p_i).\delta r_i = 0$ (ii) $\sum_i F_i.\delta r_i = 0$

   (iii) $\sum_i \left(F_i - p_i\right) = 0$ (iv) $\sum_i \left(F_i - p_i\right)\delta r_i = 0$

__SECTION - B (15 Marks)__
Answer ALL Questions
ALL Questions Carry EQUAL Marks   (5 x 3 = 15)

6 a   Show that $J^2 = 2_E I$, where J,E and I are the angular momentum, kinetic energy of rotation and moment of inertia respectively.
                    OR
   b   The intermolecular distance between two atoms of hydrogen molecule is $0.77A^0$ and mass of the proton is 1.67×10^{-27}Kg. Calculate the moment of inertia of the molecule.

7 a   Analyze the centre of pressure.
                    OR
   b   Explain atmospheric pressure.

8 a   State Bernoulli's theorem.
                    OR
   b   Derive the equation of continuity for the steady flow of the fluid.

9 a   Bring out the jet propulsion.
                    OR
   b   Write short notes on artificial satellite.

10 a   State D'Alembert's principle.

OR

b   Produce the generalized coordinates.

SECTION -C (30 Marks)
Answer ALL questions
ALL questions carry EQUAL Marks   (5 x 6 = 30)

11 a   Analyze the theory of compound pendulum

OR

b   Examine the expressions for the acceleration due to gravity and radius of gyration using barpendulum.

12 a   Derive an expression change of pressure with altitude.

OR

b   Discuss the metacentric height of a ship determined.

13 a   Derive Euler's equation of flow of liquids.

OR

b   Enumerate the Torricelli's theorem.

14 a   Discuss the working principle of multistage rocket.

OR

b   Highlight the Satellites launched into orbit.

15 a   Derive Lagrange's equation of motion from D'Alembert's Principle.

OR

b   Summarize the constraints of motion and types.

Z-Z-Z   END