PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2025
(Second Semester)

Branch – **PHYSICS**

MECHANICS & FLUID DYNAMICS

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Workdone by a force on a particle is equal to the change in the ---------- a) Potential energy b) Linear momentum c) Angular momentum d) Kinetic energy	K1	CO1
	2	The rocket propulsion is based on the principle of conservation of ---------- a) Linear momentum b) Angular momentum c) Mass-energy d) parity	K2	CO2
2	3	The time period of a compound pendulum is the maximum when its length is ---- a) l=k b) l=0 c) l=k/2 d) l=1/k	K1	CO1
	4	The unit of radius of gyration is ---- a) kg b) m^{-2} c) m^2 d) m	K2	CO2
3	5	Choose the correct alternative from the following. Lami's theorem is a) applicable to only regular-shaped bodies in equilibrium. b) derived on the basis of the cosine rule of trigonometry. c) very helpful in determining the unknown forces acting at a point for an object in equilibrium. d) useful in determining the forces acting on a moving object	K1	CO1
	6	The centre of gravity of a solid cone (whose height is h) is along its axis at a distance of ----------from the vertex. a) h/2 b) h/4 c) 3h/4 d) h	K2	CO2
4	7	The hydrostatic pressure due to a liquid column of density ρ at a depth h from the surface is --- *a*) $h\rho g$ *b*) $h/\rho g$ *c*) ρ/hg *d*) $h\rho$	K1	CO1
	8	What happens when a fluid is at rest? a) There is no shear component b) Internal deformation is considerable c) Fluid element will not be subjected to normal & shear component d) Frictional force is present	K2	CO2
5	9	Water flowing with a velocity of 3 m/s in a 4 cm diameter pipe enters a narrow pipe having a diameter of 2 cm only. The velocity in the narrow pipe is ----- a) 12 m/s b) 1.5 m/s c) 3 m/s d) zero	K1	CO1
	10	A system consists of 3 particles free from constraints, it has ----- degrees of freedom a) 3 b) 9 c) 6 d) 1	K2	CO2

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SECTION - B (35 Marks)

Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Define (i) work, (ii) power and (iii) energy and give its unit	K3	CO1
		(OR)		
	11.b.	What is a rocket? Describe the theory and principle of a rocket.		
2	12.a.	Determine the value of 'g' by compound pendulum.	K3	CO1
		(OR)		
	12.b.	Give the theory of Kater's pendulum and find an expression for acceleration due to gravity.		
3	13.a.	State (i) parallelogram law of forces and (ii) triangular law of forces.	K4	CO2
		(OR)		
	13.b.	State and explain Lami's theorem.		
4	14.a.	Define Pressure and Thrust. Give its unit.	K4	CO3
		(OR)		
	14.b.	Determine the centre of pressure of rectangular lamina immersed vertically in a liquid with one edge in the surface of the liquid.		
5	15.a.	Apply lagrange's equation of motion and find quation for Atwood machine.	K5	CO3
		(OR)		
	15.b.	State and Prove Bernoulli's theorem.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions
ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Describe the motion of velocity of centre of mass.	K4	CO1
2	17	How moment of Inertia is experimentally determined using a thin circular ring.	K4	CO2
3	18	(i) Find the CG of a solid tetrahedron. (ii) Find the CG of a solid cone.	K5	CO2
4	19	Find the centre of pressure of a triangular lamina immersed vertically in a liquid with its vertex in the surface of the liquid and its base.	K5	CO2
5	20	Describe the working of (i) venturimeter and (i) pilot tube.	K4	CO1

Z-Z-Z END