PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2017
(First Semester)

Branch - **PHYSICS**

MECHANICS

Time : Three Hours Maximum : 75 Marks

SECTION-A (20 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 x 2 = 20)

1 State Archimedes Principle.
2 What is meta centre and metacentric height?
3 State perpendicular axes theorem of moment of inertia.
4 What is radius of gyration?
5 What is neutral filament?
6 What is bending couple?
7 Write about shape of the rocket.
8 Write any four uses of an artificial satellite.
9 . Define constraints.
10 Discuss about phase space.

SECTION - B (25 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks (5 x 5 = 25)

11 a Prove that "the hydrostatic pressure due to liquid column at depth h from the surface is p = hpg".

OR

b Determine the meta,centric height of a ship.

12 a State and explain parallel axes theorem of moment of inertia for a plane luminar body.

OR

b Write the comparision points between the translational and rotational motion.

13 a Derive the expression for bending moment.

OR

b Explain the simple laboratory method of determination of young's modulus for the material of a beam - method of bending.

14 a Explain about working of multi stage rocket.

OR

b , What is efficiency of a jet? Derive the expression for the efficiency of jet.

15 a Derive the mathematical statement of D'Alembert's principle.

OR

b Using lagrangian equation derive the expression for constant acceleration of an Atwood's machine.

SECTION - C (30 Marks)

Answer any **THREE** Questions

ALL Questions Carry **EQUAL** Marks (3 x 10 = 30)

16 Prove that "As the height or altitude increases in arithematical progression", the pressure decreases in geometrical progression".
17 Derive the expression for moment of inertia of solid sphere
(i) About its diameter (ii) About a tangent. (7 + 3)
18 What is canti lever? Obtain an expression for the depression at the free end of thin light beam clamped horizontally at one end and loaded at the other (weight of the cantilever ineffective).
19 Describe the process of launching of the satellite.
• 20 Derive the Hamiltonian equations of the motion and write the physical