18PHU05

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2019
(Second Semester)

Branch - PHYSICS

MECHANICS

Time: Three Hours Maximum: 75 Marks

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

1 Moment of inertia of a rectangular lamina about an axis passing through the center of lamina and parallel to one of its sides

(i) $\frac{Ml^2}{12}$ (ii) $\frac{M^2 1}{12}$

(iii) $\frac{Ml}{12}$ (iv) $\frac{M(l^2 + b^2)}{4}$

The compound pendulum has the angular frequency

(0 $\omega = \sqrt{Mgl/I}$ (ii) $\sqrt{\frac{Md}{-V\ i}}$

(iii) $\sqrt{\frac{Mgd}{I}}$ (iv) $\omega = \frac{M}{I}$

3 Indicate the correct answer the pressure that wea water exerts on a submerged submarine is called
(i) Underwater pressure (ii) Liquid pressure
(iii) Submerged pressure (iv) Hydrostatic pressure

4 Pascal's law is applicable to the liquid which is_____ .
(i) Compressible (ii) Incompressible
(iii) Solid in phase (iv) Super compressive

5 According to equation of continuity, when water falls its speed increases while its cross sectional area
(i) Increases (ii) Decreases
(iii) Remain same (iv) None of these

6 The motion of a liquid in a tube is described by
(i) Bemoulis theorem (ii) Poiseuille's equation
(iii) Stoke's law (iv) Archimede's principle

7 Jet engines works on_____ cycle.
(i) Brayton (ii) Dual
(iii) Carnot (iv) Otto

8 The materials which are used to make satellites are_____ .
(i) Aluminium alloy (ii) Copper alloy
(iii) Cromium alloy (iv) None of these

9 The principle of virtual work is valid for a
(i) Dynamic system of particles
(ii) System in that applied forces are present
(iii) Static system that has frictional forces
(iv) Static system that has no frictional forrpc

The Lagrange's equation for conservative system

(i) $\frac{d}{dt}\left(\frac{dL}{\dot{q}_j}\right) - \frac{dL}{q_j} = 0$ (ii) $\left(\frac{\partial L}{\partial \dot{q}_j}\right) = 0$

(iii) $\frac{d}{dt}\frac{dL}{a\dot{q}_j} = 0$ (tv) $\frac{\partial L}{\partial q_j} = 0$

SECTION - B (35 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks (5 x 7 = 35)

11 a Obtain the moment of inertia of circular lamina.

OR

b Enumerate the conical pendulum.

12 a Outline the hydrostatic pressure due to a liquid coloumn.

OR

b Explain the equilibrium of floating bodies.

13 a Differentiate streamline and turbulent flow.

OR

b Deduce the torricelli's theorem.

14 a Write a short note on
(i) Effect of smaller cross-section of the jet
(ii) Conditions of a satellite to be launched.

OR

b List out the applications of an artificial satellite.

15 a Discuss the conservation of energy.

OR

b Obtain the Lagrange's equation of Atwood machine.

SECTION - C (30 Marks)

Answer any **THREE** Questions

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

16 Explain the compound pendulum.

17 Write a short note on (i) Thrust on an immersed plane (ii) Meta-centric height

18 Deduce the Bernoulli's theorem.

19 Describe the followings (i) Shape of the rocket (ii) Weight and size of the rocket.

20 Obtain the Lagrangion equation of the motion.

Z-Z-Z END