V11P

Virudhunagar District

Common First Revision Test - January 2025

Standard 11

PHYSICS

Time Allowed: 3.00 Hours Maximum Marks: 70

PART-I

Answer all the questions. **15×1=15**

1) If the length and time period of an oscillating pendulum have errors of 1% and 3% respectively, then the error in measurement of acceleration due to gravity
   a) 4% b) 5% c) 6% d) 7%
2) Which of the following pairs of physical quantities have same dimensions?
   a) Pressure and stress
   b) Torque and energy
   c) Angular momentum and Planck's constant
   d) All the above
3) If an object is thrown vertically up with the initial speed "u" from the ground, then the time taken by the object to return back to ground is
   a) $\frac{u^2}{2g}$ b) $\frac{u^2}{g}$ c) $\frac{u}{2g}$ d) $\frac{2u}{g}$
4) The area under the velocity - time graph of a particle gives its
   a) acceleration b) velocity c) displacement d) force
5) The centrifugal force appears to exist
   a) only in inertial frames b) only in rotating frames
   c) in any accelerated frame
   d) both in inertial and non-inertial frames
6) An object of mass 10 kg moving with a speed of $15ms^{-1}$ hits the wall and comes to rest within 0.03 second. The impulse acting on the object is
   a) 100 Ns b) 125 Ns c) 130 Ns d) 150 Ns
7) What is the minimum velocity with which a body of mass "m" must enter a vertical loop of radius 'R' so that it can complete the loop?
   a) $\sqrt{2gR}$ b) $\sqrt{3gR}$ c) $\sqrt{5gR}$ d) $\sqrt{gR}$
8) The value of co-efficient of restitution(e) for a material during collision is usually
   a) $0 < e < 1$ b) $0 > e > 1$ c) $e = 1$ d) $e = 0$
9) If the linear momentum of the object is increased by 0.1%, then the kinetic energy is increased by
   a) 0.1% b) 0.2% c) 0.4% d) 0.01%
10) A couple produces
   a) pure rotation b) pure translation
   c) rotation and translation d) No motion
11) A rope is wound around a hallow cylinder of mass 3 kg and radius 40 cm. What is the angular acceleration of the cylinder of the rope is pulled with a force of 30N?
   a) 0.25 rad s^{-2} b) 25 rad s^{-2} c) 5 ms^{-2} d) 25 ms^{-2}
12) A ring, a disc, a hollow sphere and a solid sphere with same radius 'R' start to roll down an inclined plane at the same time. Which object will reach the bottom first?
   a) ring b) disc c) hollow sphere d) solid sphere
13) If the masses of the Earth and the Sun suddenly doubles, the gravitational force between them will
   a) remain the same b) increase 2 times
   c) increase 4 times d) decrease 2 times

14) The kinetic energy of the satellite orbiting around the Earth is
a) equal to magnitude of its potential energy
b) less than magnitude of its potential energy
c) greater than magnitude of its potential energy
d) zero

15) The work done by the sun's gravitational force on the Earth is
a) always zero b) always positive
c) can be positive (or) negative d) always –ve

PART-II

Note : Answer any six questions. Question No.24 is compulsory. 6×2=12

16) What are dimensionless quantities? Give examples.
17) Consider two masses of 10 g and 1 kg moving with the same speed 10 ms^{-1}. Calculate the magnitude of the momentum of the two masses.
18) Define : angular displacement and angular velocity.
19) State Lami's theorem.
20) What are inertial frames?
21) Define : Co-efficient of restitution.
22) A weight lofter lofts a mass of 250 kg with a force 5000 N to the height of 5m. What is the workdone by the weight lifter?
23) State Newton's Law of Gravitation.
24) Find the moment of inertia of a disc of mass 3 kg and radius 50 cm about an axis passing through the centre and perpendicular to the plane of the disc.

PART-III

Note : Answer any six questions. Q.No:33 is compulsory. 6×3=18

25) What are limitations of dimensional analysis?
26) Check the dimensional correctness of the equations
i) $v = u + at$ and ii) $\frac{1}{2}mv^2 = mgh$ where u,v - velocity ; g, a - acceleration ; t - time ; m - mass ; h = height.
27) Derive the expression for maximum height reached by the projectile thrown at an oblique angle 'θ' with the horizontal direction.
28) Show that in an inclined plane angle of friction is equal to angle of repose.
29) If two objects of masses 2.5 kg and 100 kg experience the same force 5N. What is the acceleration experienced by each of them?
30) Define the following
i) Power ii) Law of conservation of energy and iii) Conservative force
31) Obtain the relation between tarque and angular momentum.
32) State Kepler's laws of planetary motion.
33) A satellite is orbiting the earth in a circular orbit at a height 1600 km above the surface of the Earth. What is the acceleration experienced by the satellite due to Earth's gravitational force?
($g = 9.8\ ms^{-2}$; Radius of Earth = 6400×10^3 m)

PART-IV

Answer all the questions: 5×5=25

34) a) Explain in detail the various types of errors in measurement. **(OR)**
b) Derive to expression for escape speed.
35) a) Explain the variation of "g" with depth from the Earth's surface. **(OR)**
b) Discuss the properties of vector product of two vectors.
36) a) Derive kinematic equations of motion for constant acceleration. **(OR)**
b) State and Prove perpendicular axes theorem of moment of inertia.
37) a) Obtain the expression for velocities of the bodies after making one dimensional elastic collision. **(OR)**
b) Explain the motion of blocks connected by a string in vertical motion.
38) a) State and explain Work - Kinetic energy theorem. Mention any three examples for it. **(OR)**
b) Discuss rolling on inclined plane and arrive at the expression for the acceleration of the body.
