V11P

Virudhunagar District
Common Quarterly Examination - 2024

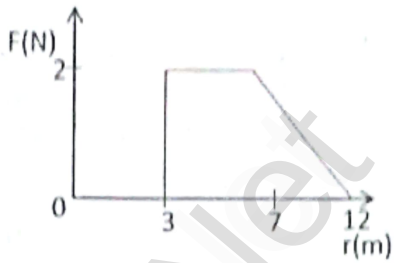
Standard 11
PHYSICS
PART - I

Time: 3.00 Hours Marks: 70

I. Choose the best answer: **15x1=15**

1) If the mass and radius of the Earth are both doubled, then the acceleration due to gravity g'
a) remains same b) $g/2$ c) 2g d) 4g

2) From the force - displacement graph, the work done by the force on the particle is



a) 11 J b) 12 J
c) 13 J d) 14 J

3) Which of the following pairs of physical quantities have same dimension?
a) force and power b) torque and energy
c) torque and power d) force and torque

4) Which of the following physical quantities cannot be represented by a scalar?
a) Mars b) length
c) momentum d) magnitude of acceleration

5) An object of mass 20 kg moving with a speed of $15 ms^{-1}$. The time taken by the object to come to rest when an opposing force of 50 N applied is
a) 8s b) 6s c) 9s d) 10s

6) The work done by the conservative force for a closed path is
a) always negative b) zero c) always positive d) not defined

7) The speed of a solid sphere after rolling down from rest without sliding on an inclined plane of vertical height h is
a) $\sqrt{\frac{4}{3}gh}$ b) $\sqrt{\frac{10}{7}gh}$ c) $\sqrt{2gh}$ d) $\sqrt{\frac{1}{2}gh}$

8) The gravitational potential energy of the Moon with respect to Earth is
a) always positive b) always negative
c) can be positive (or) negative d) always zero

9) If a particle has negative velocity and negative acceleration its speed
a) increases b) decreases c) remains same d) zero

10) Which of the following has maximum number of significance figure?
a) 2020 b) 0.02020 c) 20.2 d) 202

11) According to law of conservation of angular momentum
a) $\frac{dL}{dt} = 1$ b) $\frac{dL}{dt} = 0$ c) $\frac{dL}{dt}$ = infinity d) $\frac{dL}{dt} = -1$

12) When a car takes a sudden left turn in the curved road, passengers are pushed towards the right due to
a) inertia of direction b) inertia of motion
c) inertia of rest d) absence of inertia

13) A ball of mass 2kg and another ball of mass 1 kg are kept at the top of building 80m high. The ratio of their potential energies is
a) 2 : 1 b) 1 : 2 c) 1 : 1 d) 2 : 4

14) A rigid body rotates with an angular momentum L. If the kinetic energy is doubled, the angular momentum becomes
a) L b) $L/2$ c) $L\sqrt{2}$ d) $\frac{L}{\sqrt{2}}$

15) The gravitational force of attraction between two masses m and 2m separated by particular distance in air is F. If the masses are kept in water at the same distance, the gravitational force is
a) $F/2$ b) $F/4$ c) 2F d) F

PART - II

II. Answer any 6 of the following questions: Q.No. 24 is compulsory. 6x2=12

16) Define the two types of physical quantities
17) Define acceleration.
18) An electric fan of 75w is used 8 hours per day. Find the total electrical energy consumed in a month of 30 days.
19) Define torque. Write the unit
20) Define gravitational potential energy
21) State Newton's III law of motion. Give one example
22) Define coefficient of restitution.
23) An iron ball and a feather are dropped from a height of 10 m at the same time. At what time they reach the ground?
24) A mango of mass 400 gram is hanging from a tree. Find the tension acting on the mango.

PART - III

III. Answer any 6 of the following questions: Q.No. 33 is compulsory. 6x3=18

25) Write the limitations of dimensional analysis.
26) Discuss the properties of scalor product of two vectors.
27) Which is easier to move an object, push (on pull). Discuss with relevant diagram.
28) An object of mass 1 kg is falling from the height h=10m. What will be the speed of the object when it hits the ground? ($g=10ms^{-2}$)
29) Define angular momentum. Deduce the relation between angular momentum and angular velocity.
30) State the kepler's laws of planetary motion.
31) Mention the difference between conservative forces and non-conservative forces
32) A uniform disc of mass 100 g has diameter of 10 cm. Calculate the total energy of the disc when rolling on along a horizontal table with a velocity $20cms^{-1}$.
33) The ratio of the orbital distance of two planets are 1: 2, Find the ratio of gravitational field experienced by these two planets.

PART - IV

IV. Answer the following questions in detail **5x5=25**

34) a) Obtain an expression for the time period T of a simple pendulum. The time period T depends on (i) mass 'm' of the bob (ii) length 'l' of the pendulum (iii) acceleration due to gravity 'g' at the place where the pendulum is suspended (constant $k = 2\pi$)

(OR)

b) State and prove parallel axis theorem in moment of inertia.

35) a) Explain in detail the triangle law of vector addition.

(OR)

b) Arrive an expression for velocities of two bodies in one dimension elastic collision

36) a) Explain the motion of blocks connected by a string in vertical direction.

(OR)

b) Derive an expression for escape velocity

37) a) Derive an expression for centripetal acceleration

(OR)

b) Explain the motion of a body on an inclined plane. Obtain an expression for velocity of a body when reaches the ground.

38) a) State and prove Work = Energy theorem

(OR)

b) Derive an expression for mement of inertia of a rod about its centre and perpendicular to the rod.