V11P

Virudhunagar District

Common Second Revision Test - 2025

Standard 11

PHYSICS

Time: 3.00 Hrs. Marks: 70

Part - I

Choose the correct answer: 15×1=15

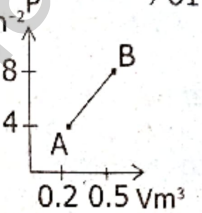
1) The ratio of the acceleration for a solid sphere (mass m and radius r) rolling down an inclined plane of angle 'θ' without slipping and slipping down the inclined plane without rolling is
a) 5:7 b) 2:3 c) 2:5 d) 7:5

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

3) If the temperature of the wire is increased the Young's modulus will
a) remain the same b) decreases
c) increases rapidly d) increases by a very small amount

4) Earth's acceleration due to gravity is 'g_1'. A planet whose mass and diameter are 3 times that of earth has acceleration due to gravity 'g_2'. Then g_2/g_1 is
a) $\frac{1}{9}$ b) $\frac{1}{3}$ c) $\frac{1}{27}$ d) $\frac{1}{81}$

5) In the P.V diagram work done by the gas is



a) 1.8×10^5 J b) 0.9×10^5 J c) 0.6×10^5 J d) 1.2×10^5 J

6) When a cycle tyre suddenly bursts, the air inside the tyre expands. This process is
a) isothermal b) adiabatic c) isobaric d) isochoric

7) Which of the following gases will have least rms speed at a given temperature?
a) Hydrogen b) Nitrogen c) Oxygen d) Carbon dioxide

8) In SHM, the acceleration of the bob of simple pendulum is 16 ms^{-2} at a distance of 4m from the mean position, then the time period is
a) 2πs b) πs c) 4πs d) 2s

9) An air column in a pipe which is closed at one end, will be in resonance with the vibrating body of frequency 83 Hz. Then the length of the air column is
a) 0.5m b) 1.5m c) 2.0m d) 1.0m

10) 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

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

12) The ratio of distances travelled by a free falling body during successive interval of time is
a) 1:3:5:7 b) 2:4:6:8 c) 1:4:7:10 d) 1:2:3:4

13) 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

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

15) A particle moves along the circular path of radius 30 cm with a velocity 6 ms^{-1}, its acceleration is
a) zero b) 120 ms^{-2} c) 36 ms^{-2} d) 1.2 ms^{-2}

Part - II

Answer any six of the following questions: **6×2=12**
Answer the Question No. 24 is compulsory.

16) Write the limitations of dimensional analysis.
17) Define a vector. Give examples.
18) A car travel with a velocity 50 m/s along the curved road of radius of curvature 10m. Calculate the centrifugal force exerting on a person of mass 60 kg sitting inside the car.
19) Define coefficient of restitution.
20) State Newton's universal law of gravitation.
21) A rod of length 10m and cross sectional area $1.25\times10^{-4}\ m^2$ is subjected to a load of 5 kg. If the young's modulus of material of rod is $4\times10^{10}\ Nm^{-2}$, calculate the change in length ($g = 10\ ms^{-2}$).
22) State Stefan - Boltzman's law.
23) Define Degrees of freedom.
24) Two springs with spring constant $1\ Nm^{-1}$ and $2\ Nm^{-1}$ are connected in series together. Calculate the resultant spring constant.

Part - III

Answer any six of the following questions: **6×3=18**
Answer the Question No. 33 is compulsory.

25) Write the properties of scalar product of two vectors.
26) Show that impulse is the change of momentum.
27) An object of mass 1 kg is falling from the height h = 10m. Calculate the potential energy and kinetic energy of the object at h = 4m.
28) State Kepler's laws of planetary motion.
29) Write the applications of viscosity.
30) Consider two sound waves with wavelengths 5m and 6m. If these two waves propagate in a gas with velocity $330\ ms^{-1}$. Calculate the number of beats per second.
31) Explain what do you mean by Root mean square speed of a gas molecule?
32) Explain any two types of oscillations.
33) A carnot engine whose efficiency is 45% takes seat from a source at a temperature 327°C. To have an engine of efficiency 60%. What must be the intake temperature for the same sink temperature?

Part - IV

Answer the following questions in detail: **5×5=25**

34) a) Explain the triangle law in vector addition.

(OR)

b) What are Geo stationary satellites? Obtain an expression for total energy of satellite revolving around the earth.

35) a) Describe the motion of a vechile on a banked road. Obtain expression for speed along the curved path.

(OR)

b) State and prove Bernoulli's theorem for a flow of incompressible, non-viscous and stream - lined flow of fluid.

36) a) State and explain work - energy principle. Mention any three examples for it.

(OR)

b) Explain in detail Newton's law of cooling.

37) a) Derive the expression for moment of inertia of a rod about its centre and perpendicular to the rod.

(OR)

b) Show that the oscillations of simple pendulum are simple harmonic and derive an expression for time period of oscillation.

38) a) What is mean free path? Obtain an expression for mean free path of a gas molecule.

(OR)

b) Derive Newton's formula for velocity of soundwaves in air and also discuss the Laplace's correction.
