



PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SAMPLE PAPER 13 (UNSOLVED)

Part I

1. If the error in the measurement of radius is 2%, then the error in the determination of

volume of the psphere will be

A. 0.08

B. 0.02

C. 0.04

D. 0.06

Answer: D



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2. If the force is proportional to square of velocity, the the dimensional of proportionality constant is

A. $[MLT^0]$

B. $[MLT^{-1}]$

C. $[ML^{-2}T]$

D. $[ML^{-1}T^0]$

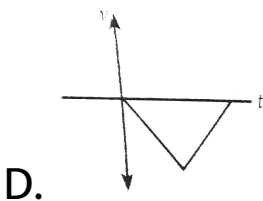
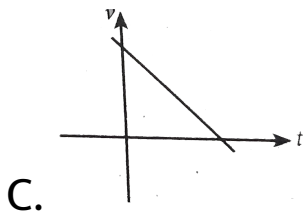
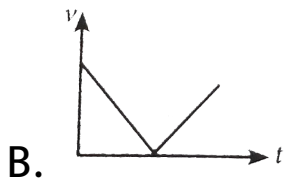
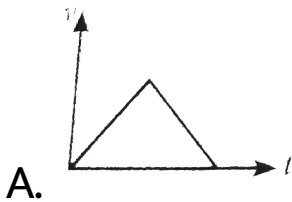
Answer: D



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3. A ball is projected vertically upwards with a velocity v . It comes back to ground in time t .

which v - t graph shows the motion correctly ?



Answer: C



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4. A block of mass m slides down the plane inclined at an angle 60° with an acceleration $g/2$. Find the co-efficient of kinetic friction.

A. 0.01

B. 0.05

C. 0.03

D. 0.06

Answer: B



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5. If a wire is stretched to double of its original length, then the strain in the wire is

A. 1

B. 2

C. 3

D. 4

Answer: A



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6. The displacement y of a wave travelling in the x direction is given by $y = (2 \times 10^{-3}) \sin\left(300t - 2x + \frac{\pi}{4}\right)$, where x and y are measured in metres and t in second. The speed of the wave is

A. 150m s^{-1}

B. 300m s^{-1}

C. $450ms^{-1}$

D. $600ms^{-1}$

Answer: A



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7. Two identical particles move towards each other with velocity $2v$ and v respectively. The velocity of centre of mass is

A. v

B. $\frac{v}{3}$

C. $\frac{v}{2}$

D. zero

Answer: C



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8. If the mass and radius of the Earth are both doubled, then the acceleration due to gravity g

A. remains same

B. $\frac{g}{2}$

C. $2g$

D. $4g$

Answer: C



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9. A closed tube partly filled with water lies in a horizontal plane. If the tube is rotated about a perpendicular bisector, the moment of inertia of the system.

A. increases

B. decreases

C. remain constant

D. depends on sense of rotation

Answer: A



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10. Hot water in a thermos flask is an example of ___ system

A. Temperature of the system increases

B. Temperature of system decreases

C. Temperature of the system remains
constant

D. Work is done by the system

Answer: C



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11. The angle between the normal force and the resultant force of normal force and maximum frictional force is

- A. angle of friction
- B. angle of repose
- C. angle of inclination
- D. none of the above

Answer: A



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12. The wettability of a surface by a liquid depends primarily on

A. viscosity

B. surface tension

C. density

D. angle of contact between the surface and the liquid.

Answer: D



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13. Which of the following represent simple harmonic motion?

(i) $x = A \sin \omega t + B \cos \omega t$ (ii)

$x = A \sin \omega t + B \cos 2\omega t$ (iii) $x = Ae^{i\omega t}$ (iv)

$x = A \ln \omega t$

A. (i) alone

B. (i) and (ii)

C. (ii) and (iv)

D. all

Answer: B



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14. Moment of inertia depends upon.....
and it does not depend upon.....

- A. axis of rotation
- B. torque applied
- C. angular speed
- D. angular momentum

Answer: A



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15. The number of degrees of freedom for a diatomic gas molecule is

A. 2

B. 3

C. 5

D. 6

Answer: C



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Part II

1. What is significant figures?



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2. Write down the Kinematic equations for Angular motion.



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3. Define Lami's theorem.



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4. For elastic collision, coefficient of restitution is



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5. State Newtons Universal law of gravitaion.



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6. If the Earth's pull on the Moon suddenly disappears, what will happen to the Moon?



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7. Distinguish between cohesive and adhesive forces.



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8. Jogging every day is good for health. Assume that when you jog a work of 500 kJ is done and 230 kJ of heat is given off. What is the change in internal energy of your body?



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9. What is meant by Doppler effect?



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Part iii

1. Check the correctness of the equation $\frac{1}{2}mv^2 = mgh$ using dimensional analysis method.



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2. State the laws of simple pendulum.



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3. What is the smallest radius of a circle at which a cyclist can travel if its speed is 70 km/hr, given that he bends by angle 60° while turning.



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4. How will you measure the work done ?

When

the force acts along the direction of motion of the body



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5. State conservation of angular momentum.



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6. State and prove perpendicular axis theorem.



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7. Define (i) specific heat capacity (ii) Heat capacity (iii) Molar specific heat capacity at constant pressure



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8. Can the given heat energy be completely converted to work in a cyclic process? If not , when can the heat can completely converted to work ?



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9. What are longitudinal and transverse waves ?



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1. (i) Explain the use of screw gauge and vernier caliper in measuring smaller distances.
(ii) Write a note on triangulation method and radar method to measure larger distances.



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2. Derive equations of uniformly acceleration motion by calculus method.



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3. Explain the motion of blocks connected by a string in (i) vertical motion (ii) horizontal motion .



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4. A bullet of mass 20 g strikes a pendulum of mass 5kg. The centre of mass of pendulum rises a vertical distance of 10 cm. If the bullet

gets embedded into the pendulum, calculate its initial speed.



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



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6. Describe Newton's formula for velocity of sound waves in air.



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7. The reading of pressure meter attached with a closed pipe is $5 \times 10^5 \text{ Nm}^{-2}$. On opening the valve of the pipe, the reading of the pressure meter is $4.5 \times 10^5 \text{ Nm}^{-2}$. Calculate the speed of the water flowing in the pipe.



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8. If 10^{20} oxygen molecules per second strike 4cm^2 of wall at an angle of 30° with the normal when moving at a speed of $2 \times 10^3\text{ms}^{-1}$, find the pressure exerted on the wall. (mass of 1O_2 atom = $2.67 \times 10^{-26}\text{kg}$)



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9. How will you determine the velocity of sound using resonance air column apparatus ?



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10. Explain in detail the Maxwell Boltzmann distribution function.



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