PHYSICS

BOOKS - FULL MARKS PHYSICS (TAMIL ENGLISH)

SAMPLE PAPER -1

Part I

1. A dimesnsionless quantity

A. never has a unit

B. always has a unit

C. may have or have not a unit

D. none of the above

Answer: C

▶ **Watch Video Solution**

2. The magnitude of average velocity is equal to average speed when the particle moving with ....

A. variable speed

B. constant velocity

C. variable velocity

D. constant acceleration

Answer: B

3. Two blocks of masses m and 2m are placed on a smooth horizontal surface as shown in the first case only a force F_1 is applied from the left later only a force F_2 is applied from the right if the force acting at the interface of the two blocks in the two case is same then $F_1 : F_2$ is

   A. $1 : 1$

   B. $1 : 2$

C. $2:1$

D. $1:3$

Answer: C

4. The instantaneous angular position of a point on a rotating wheel is given by the equation $\theta(t) = 2t^3 - 6t^2$. The torque on the wheel becomes zero at : ....

A. $t = 1s$

B. $t = 0.5s$

C. $t = 0.25s$

D. $t = 2s$

Answer: A

▶ **Watch Video Solution**

5. The work done by the conservative force for a closed

path is

A. always negative

B. zero

C. always positive

D. not defined

Answer: B

6. The rain drops are spherical in shape due to ....

A. gravity

B. due to contraction

C. surface tension

D. viscosity

Answer: C

7. Which of the following diagrams does not represent a streamline flow?

A.

B.

C.

D.

Answer: D

 Watch Video Solution

8. When a spiral spring is stretched by a force, the resultant strain is ....

    A. volume

    B. shear

    C. tensile

    D. all these

Answer: B

▶ **Watch Video Solution**

9. In a simple harmonic oscillation, the acceleration against displacement for one complete oscillation will be.

A. an ellipse

B. a circle

C. a parabola

D. a straight line

Answer: D

▶ **Watch Video Solution**

10. Beats are produced by two progressive waves. Maximum loudness at the waxing is x times the loudness of each wave. The value of x is ....

A. 1

B. $\sqrt{2}$

C. 2

D. 4

Answer: D

11. Explain the role of lakes in an ecosystem.

A. ice is a good conductor of heat

B. ice reflects heat and light

C. of anomalous expansion of water between $4°C$

to $0°C$

D. nothing can be said

Answer: C

 Watch Video Solution

12. According to kinetic theory of gases, the rms velocity of the gas molecules is directly proportional to ....

A. T^2

B. T^3

C. T^4

D. T^8

Answer: C

▶ **Watch Video Solution**

13. Two springs of spring constant $1500 Nm^{-1}$ and `3000 Nm-1 respectively are stretched with the same force. They will have potential energy in the ratio .....

    A. $1 : 2$

    B. $2 : 1$

    C. $1 : 4$

    D. $4 : 1$

Answer: B

▶ **Watch Video Solution**

14. When the axis of rotation passes through its centre of gravity, then the moment of inertia of a rigid body is ....

    A. reduced, to its minimum value

    B. zero

    C. ncreased to its maximum value

    D. infinity

Answer: A

15. Power is given by ....

A. $P = \dfrac{\overrightarrow{F}}{\overrightarrow{V}}$

B. $\dfrac{\overrightarrow{F}^2}{\overrightarrow{V}}$

C. $\dfrac{\overrightarrow{F}}{\overrightarrow{V}^2}$

D. $\overrightarrow{F} \cdot \overrightarrow{V}$

Answer: D

▶ **Watch Video Solution**

16. Two protons are travelling along the same straight path but in opposite directions. The relative velocity

between the two is

A. c

B. $\dfrac{c}{2}$

C. $2c$

D. 0

Answer: A

 Watch Video Solution

17. If the Earth stops rotating about its own axis, g remains unchanged at

A. equator

B. poles

C. latitude of $45°$

D. no where

Answer: B

▶ **Watch Video Solution**

18. When train stops, the passenger move forward, It is due to ....

A. inertia of passenger

B. Inertia of train

C. gravitational pull by Earth

D. none of the above

19. A particle of mass m moves in the xy plane with a velocity v along the straight line AB. If the angular momentum of the particle with respect to origin O is L_A when it is at A and L_B when it is at B, then

A. $L_A = L_B$

B. $L_A < L_B$

C. $L_A > L_B$

D. the relationship between L_A and L_B depends

   upon the slope of the line AB

Answer: A

▶ **View Text Solution**

20. A couple produces ....

A. pure rotation

B. pure translation

C. rotation and translation

D. no motion

Answer: A

21. A body starting from rest has an acceleration of $20ms^{-2}$ the distance travelled by it in the sixth second is ...

    A. 110 m

    B. 130 m

    C. 90 m

    D. 50 m

Answer: A

22. A lift of mass 1000 kg which is moving with an acceleration of $1 ms^{-2}$ in upward direction , then the tension developed in string which is connected to lift is _____

A. 9800 N

B. 10800 N

C. 11000 N

D. 10000 N

Answer: C

23. The relation between acceleration and displacement of four particles are given below

A. $a_x = 2x$

B. $a_x = +2x^2$

C. $a_x = -2x^2$

D. $a_x = -2x$

Answer: D

24. A sonometer wire is vibrating in the second overtone. In the wire there are ....

A. two nodes and two antinodes

B. one node and two antinodes

C. four nodes and three antinodes

D. three nodes and three antinodes

Answer: D

> ▶ **Watch Video Solution**

25. Which of the following is the best reflector of light?

A.

B.

C.

D.

Answer: C

▶ **Watch Video Solution**

---

26. According to kinetic theory of gases, the rms velocity of the gas molecules is directly proportional to ....

A. $\sqrt{T}$

B. T^3

C. T

D. T^4

Answer: A

▶ **Watch Video Solution**

27. A body of mass m moving with velocity v collides head on with another body of mass 2m which is initially at rest. The ratio of K.E of colliding body before and after collision will be

A. $1:1$

B. $2:1$

C. $4:1$

D. $9:1$

Answer: D

Watch Video Solution

28. Four particles have velocity 1,0, 2 and $3ms^{-1}$ The root mean square velocity of the particles is ......

A. $3.5ms^{-1}$

B. $\sqrt{3.5}ms^{-1}$

C. $1.5ms^{-1}$

D. 0

Answer: B

29. Two vibrating tuning forks produce progressive waves given be $y_1 = 4\sin 500\pi t$ and $y_2 = 2\sin 506\pi t$ where t is in seconds number of beats produced per minute is ....

A. 360

B. 180

C. 3

D. 60

Answer: B

> ▶ **Watch Video Solution**

---

30. Workdone by a simple pendulum in one complete oscillation is ....

A. 0

B. $\sqrt{mg}$

C. $mg\cos\theta$

D. $mg\sin\theta$

Answer: A

Part Ii

1. What are longitudinal and transverse waves ?

2. Is it possible that the brakes of a car are so parfect that car stops instantaneously . If not give reason.

3. Why does rubber ball bounce greater heights on hills than

▶ **Watch Video Solution**

4. State conservation of angular momentum.

▶ **Watch Video Solution**

5. Mountain roads rarely go striaght up the slop, but wind up gradually. Why ?

▶ **Watch Video Solution**

6. State Newton's second law .

> ▶ **Watch Video Solution**

7. Explain why the specific heat capacity at constant pressure is greater than the specific heat capacity at constant volume.

> ▶ **Watch Video Solution**

8. Define angle of contact.

> ▶ **Watch Video Solution**

9. Define forced oscillation . Give an example.

10. A girl is swinging on a swing in the sitting position. How will the period of swing be affected if she stands up?

11. A car starts to move from rest with uniform acceleration $10ms^{-2}$ then after 5 sec, what is its velocity?

12. Define Lami's theorem.

13. A constant torque is acting on a wheel. If starting from rest, the wheel makes n rotations in t seconds, Show that the angular acceleration is given by $\alpha = \dfrac{4\pi n}{t^2}$ rad s^{-2}.

14. Why a given sound is louder in a hall than in the open?

> ▶ **Watch Video Solution**

15. What are the differences between connection and conduction?

> ▶ **Watch Video Solution**

16. Why two holes are made to empty an oil tin ?

> ▶ **Watch Video Solution**

17. If the length of the simple pendulum is increased by 44% from its original length, calculate the percentage increase in time period of the pendulum.

> ▶ **Watch Video Solution**

18. When do the real gases obey more correctly the gas equation : PV=nRT?

> ▶ **Watch Video Solution**

Part Iii

1.

$$G = 6.67 \times 10^{-11} Nm^2(kg)^{-2} = \ldots\ldots\ldots (cm)^3 s^{-2} g^{-1}$$

.

2. An object is thrown with initial speed $5ms^{-1}$ with an angle of projection $30°$. What is the maximum height and range reached by the particle?

3. Three mass points $m_1 m_2$ amd m_3 are located at the vertices of an equilateral triangle of length a. What is the moment of inertia of the system about an axis along the altitude of the triangle passing through m_1?

4. A box is pulled with a force of 25 N to produce a displacement of 15 m. If the angle between the force and displacement is $30°$. Find the work done by the force ?

5. The time period of a mass suspended by a spring (force constant K) is T. If the spring is cut into three equal pieces, what will be the force constant of each part? If the same mass be suspended from one piece what will be the periodic time?

6. Give various applications of viscosity

7. Write a note on quasi-static process.

8. A body cools from $60°$ C to $50°$ C in 10 min of room If the room temperature is $25°$ C and assuming Newton's cooling law holds good, the temperature of the body after 10 more minute.

▶ **Watch Video Solution**

9. Consider two springs with force constants $1 Nm^{-1}$ and $2 Nm^{-1}$ connected in parallel. Calculate the effective spring constant (k_p) and comment on k_p.

▶ **Watch Video Solution**

10. A stone is thrown upwards with a speed y from the top of a tower. It reaches the ground with a velocity 3v. What is the height of the tower?

11. An object at an angle such that the horizontal range is 4 time of the maximum height. What is the angle of projection of the object?

12. A room contains oxygen and hydrogen molecule in the ratio 3:1 . The temperature of the room is $27°C$ .The molar mass of O_2 is 32 g mol^{-1} and for H_2 3 g mol^{-1} . The value of gas constant R is 8.32 J $mol^{-1}K^{-1}$

calculate:

(a) rms speed of oxygen and hydrogen molecule.

(b) Average kinetic energy per oxygen molecule and per hydrogen molecule.

(c) Ratio of average kinetic energy of oxygen molecules and hydrogen molecules.

13. Define angle of friction

14. How does resolve a vector into its component? Explain.

15. Derive an expression for energy of satellite.

16. Explain in detail newton's law of cooling .

> ▶ **Watch Video Solution**

17. Explain Laplace's correction.

> ▶ **Watch Video Solution**

18. Explain the types of equilibrium with suitable examples

> ▶ **Watch Video Solution**

1. Describe the construction and working of venturimeter and obtain an equation for the volume of liquid flowing per second though a wider entry of the tube

▶ **Watch Video Solution**

2. Derive the time period of satellite orbiting the Earth.

▶ **Watch Video Solution**

3. State and explain work energy principle. Mention any three examples for it.

4. Derive an expression for potential energy near the surface of the earth

5. Derive the expression for Carnot engine efficiency.

6. Derive the expresssion for moment of inertia of a rod about its centre and perpendicular to the rod.

▶ **Watch Video Solution**

7. Prove that gravitational field intensity at any point in equal to acceleration experienced at that point.

▶ **Watch Video Solution**

8. Define an adiabatic process.

▶ **Watch Video Solution**

9. Describe the construction and working of venturimeter and obtain an equation for the volume of liquid flowing per second through a wider entry of the tube.

10. Define gravitational potential energy.

11. What are the applications of dimensional analysis? Verify $s = ut + \dfrac{1}{2}at^2$ by dimensional analysis

12. Explain the types of equilibrium with suitable examples

▶ **Watch Video Solution**

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

▶ **Watch Video Solution**

14. Derive the kinematic equations of motion for constant acceleration.

15. State and prove perpendicular axis theorem.

16. Explain in detail the triangle law of addition.

17. Explain in detail the various types of errors.

18. To move an object, which one is easier, push or pull?

Explain

19. Describe the method of measuring angle of repose

20. 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.

21. (i) Explain the use of screw gauge and vernier caliper in measuring smaller distances.

(ii) Write a note on triangultion method and radar method to measure larger distances.

▶ **Watch Video Solution**

22. Jupiter is at a distance of 824.7 million km from the Earth. Its angular diameter is measured to be 35.72". Calculate the diameter of Jupiter.

▶ **Watch Video Solution**