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PHYSICS

BOOKS - S CHAND PHYSICS (ENGLISH)

SAMPLE QUESTION PAPER-2

Section A

1. Which of the following is unitless quantity?

A. pressure gradient

B. force gradient

C. force gradient

D. velocity gradient

Answer:

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2. In 0.02800 number of significant figures will be:

A. 2

B. 3

C. 4

D. 5

Answer:

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3. The angle between $\overrightarrow{A} = \hat{i} + \hat{j}$ and $\overrightarrow{B} = \hat{i} - \hat{j}$ is

A. 5°

B. 90°

C. -45°

D. 180°

Answer:

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4. When mass and speed of a body is doubled the kinetic energy increases

A. 2 times

B. 4 times

C. 8 times

D. 16 times

Answer:

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5. The unit of moduluts of elasticity is :

A. kg/(meter^2-second)

B. kg/(meter-second^2)

C. kg/$\left(\text{meter}^2 - \text{second}^2\right)$

D. kg/meter^3-second

Answer:

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6. Answer the question briefly and to the point:

What will happen to the potential energy of the atoms of a solid when compressed? On stretching a wire ?

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7. "Water can be boiled in a paper cup". Explain how?

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8. Answer the question briefly and to the point:

Write down the relation between phase

difference and path difference of a particle executing SHM.

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9. The earth is acted upon by gravitation of the sun, even thought it does not fall into the sun. Why ?

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10. Answer the question briefly and to the point:

Write two examples of centripetal force.

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11. Answer the question briefly and to the point:

Can a scalar quantity be added to a vector quantity? Is their product possible ?

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12. Answer the question briefly and to the point:

)Express 0,000003 kg in power of 10.

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Section B

1. Which law of motion does give the measure of force ?

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2. The wings of an aeroplane are rounded at the front and flattened at the back. Why ?

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3. A force of 98 N is just able to move a block of mass 20 kg on a rough horizontal surface. Calculate the coefficient of friction and the angle of friction $\left(g = 9.8ms^{-2}\right)$.

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4. A man weighing 70 kg carries a 30 kg box to the top of a building 20 m high. Calculate the work done by the man (take $g = 9.8ms^{-2}$).

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5. A body of mass 5 kg initially at rest is subjected to a force of 20 N. What is the kinetic energy acquired by the body at the end of 10 s?

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6. Show that the area of the triangle contained between the vectors $\vec{A}$ and $\vec{B}$ is one-half the magnitude of $\vec{A} \times \vec{B}$.

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7. If a hollow pipe passes across the centre of gravity of the Earth, then what changes would take place in the velocity and acceleration of a ball dropped in the pipe ?

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8. Distinguish between streamline flow and turbulent flow.

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9. Calculate the energy radiated per minute by a black body of surface area $200cm^2$, maintained at 127° C.

$\sigma = 5.7 \times 10^{-8} Wm^{-2} K^{-4}$

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10. At temperature $27^{\circ}C$, black body is emitting at heat at a rate of 3.0×10^5 Joule/second-metre^2 At what temperature will it emit heat at rate of243×10^5 Joule/second-metre)?

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11. The frequency of oscillation of a mass m suspended by a spring is n_1 . If the length of

the spring is cut to one-half, the same mass oscillates with frequency n_2. Determine the value of n_2 / n_1.

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12. If we put a glass on our car, humming sound is heard, why?

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13. State the necessary conditions for the interference of two sound waves.

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Section C

1. The length of a pipe open at both ends is 48 cm and its fundamental frequency is 320 Hz. If the speed of sound be $320ms^{-1}$ then determine the diameter of the pipe. If one end

of the pipe be closed, then what will be the fundamental frequency?

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2. Obtain the formulae for displacement, velocity, acceleration and time period of a particle executing simple harmonic motion. When is the velocity of particle maximum and when zero ? Acceleration ?

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3. What are fundamental and derived units ? Give three examples of derived units.

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4. The celing of a long hall is 25 m high, What is the maximum horizontal distance that a ball thrown with a speed of $40ms^{-1}$ can go without hitting the ceiling of the hall?

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5. To maintain a rotor at uniform angular speed of $200\mathrm{rad}/s$ an engine needs to transmit a torque of 180 Nm. What is the power of the engine required ?

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6. The radius of the earth is approximately 6000 km. What will be your weight at 6000 km above the surface of the earth ? At 12000 km above? At 18000 km above ?

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7. State Newton.s law of gravitation. Distinguish between g and G.

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8. Deduce expressions for the excess pressure inside a :

(i) liquid drop, (ii) soap bubble.

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9. Two stars X and Y emit maximum radiations at 4800Å and 6000Å respectively. If the temperature of the star Y is 5800 K, then what is the temperature of the star X?

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Section D

1. Three vessels of equal capacity have gases at same temperature and pressure. The first vessel contains neon (monoatomic). The

second contains chlorine (diatomic) and the third contains uranium hexafluoric (polyatomic). Do the vessels contain equal number of respective molecules ? Is the root-mean-square speed of molecules the same in the three cases? If not, in which case is Ums the largest ?

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2. At what temperature is the root-mean-square speed of an atom in an argon gas

cylinder equal to the rms speed of a helium gas atom at $-20^{\circ}C$? The atomic masses of argon and helium are 39.9 a.m.u. and 4.0 a.m.u, respectively.

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3. Define gravity and explain its variation, above and below the surface of earth.

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4. If the radius of the earth be $6.38x10^4m$ and the acceleration due to gravity at earth be $9.8ms \wedge (2)$ then calculate the escape velocity of a body from the earth.s surface.

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5. What do you understand by projectile ? Show that the path of a projectile is parabolic.

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6. A bomb is fired from a cannon with a velocity of $1000ms^{-1}$ making an angle of 30° with the horizontal $\left(g = 9.8m/s^2\right)$.

What is the time taken by the bomb to reach the highest point ?

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7. A bomb is fired from a cannon with a velocity of $1000ms^{-1}$ making an angle of 30° with the horizontal $\left(g = 9.8m/s^2\right)$.

What is the total time of its motion ?

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8. A bomb is fired from a cannon with a velocity of $1000ms^{-1}$ making an angle of 30° with the horizontal $\left(g = 9.8m/s^{2}\right)$.

With what speed the bomb will hit the ground and what will be it direction of motion while hitting?

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9. A bomb is fired from a cannon with a velocity of $1000ms^{-1}$ making an angle of 30° with the horizontal $\left(g = 9.8m/s^2\right)$.

What is the maximum height attained by the bomb?

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10. A bomb is fired from a cannon with a velocity of $1000ms^{-1}$ making an angle of 30° with the horizontal $\left(g = 9.8m/s^2\right)$.

At what distance from the cannon the bomb will hit the ground?

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