



PHYSICS

BOOKS - HT Olympiad Previous Year Paper

NSO QUESTION PAPER 2016 SET A

Science

1. A body covers 26, 28, 30, 32 meters in 10^{th} , 11^{th} , 12^{th} and 13^{th} seconds respectively. The

body starts

A. From rest and moves with uniform velocity.

B. From rest and moves with uniform acceleration.

C. With an initial velocity and moves with uniform acceleration.

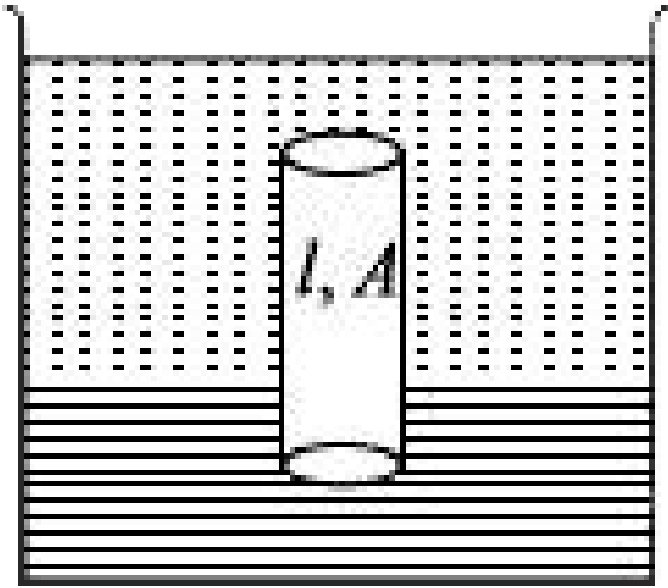
D. With an initial velocity and moves with non-uniform acceleration.

Answer: C



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2. A solid cylinder of length l , cross sectional area A and density $\frac{5}{4} \times 10^3 \text{ kg m}^{-3}$ is immersed such that it floats with its axis vertical at the liquid-liquid interface with length $l/4$ in the denser liquid as shown in the figure.



The lesser dense liquid is open to atmospheric pressure P_0 . If the density of lesser dense liquid is $1.0 \times 10^3 \text{ kg m}^{-3}$ then the density of denser liquid will be

A. $1.5 \times 10^3 \text{ kg m}^{-3}$

B. $2.0 \times 10^3 \text{ kg m}^{-3}$

C. $2.5 \times 10^3 \text{ kg m}^{-3}$

D. $3.0 \times 10^3 \text{ kg m}^{-3}$

Answer: B



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3. Statement 1: The force of action and reaction always appear due to actual physical contact of two bodies.

Statement 2: A particle can move only under the action of a force.

A. Both statements 1 and 2 are true and statement 2 is the correct explanation of statement 1.

B. Both statements 1 and 2 are true but statement 2 is not the correct explanation of statement 1.

C. Statement 1 is true but statement 2 is false.

D. Both statements 1 and 2 are false.

Answer: D



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4. A stone is dropped from the top of tower. When it has fallen by $5m$ from the top, another stone is dropped from a point $25m$ below the top. If both stones reach the ground at the moment, then height of the tower from grounds is : (take $g = 10m / s^2$)

A. 45 m

B. 50 m

C. 60 m

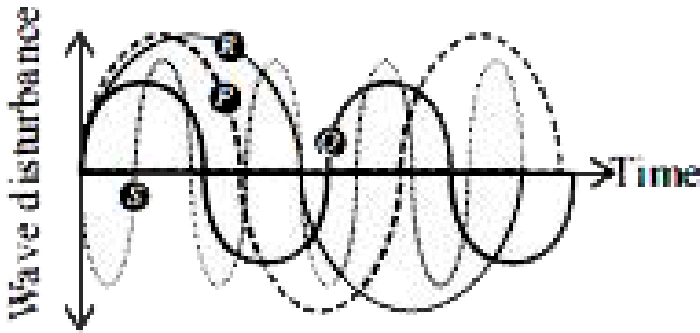
D. 65 m

Answer: A



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5. Refer to the graph given here:



Which of the following sound waves is high-pitched but soft?

A. P

B. Q

C. R

D. S

Answer: D



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6. The frequency of a source is 20 kHz. The frequencies of sound wave produced by it in water and air will be

A. Be the same as that of the source

B. Depend upon the velocity of the waves
in these media

C. Depend upon the wavelength of the waves in these media

D. Depend upon the density of the media.

Answer: A



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7. A body of mass m is moving in a circle of radius r with a constant speed v , the work done by the centripetal force in moving the

body over half the circumference of the circle
is

A. Zero

B. $F \times 2\pi r$

C. $F \times \pi r$

D. $F \times 2r$

Answer: A



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8. Two satellites of masses of m_1 and m_2 ($m_1 > m_2$) are revolving round the earth in circular orbits of radius r_1 and r_2 ($r_1 > r_2$) respectively. Which of the following statements is true regarding their speeds v_1 and v_2 ?

A. $v_1 = v_2$

B. $v_1 > v_2$

C. $v_1 < v_2$

D. Cannot be predicted

Answer: C



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9. Which of the following statements is/are incorrect?

(i) Work and energy have different units.

(ii) Two bodies of unequal masses have equal acceleration at any instant of time when they are dropped from a cliff.

(iii) When an aeroplane takes off, the work done by its weight is positive.

(iv) When the speed of a particle is doubled, the ratio of its momentum and kinetic energy gets halved.

A. (ii) only

B. (i) and (iii) only

C. (i), (ii) and (iv) only

D. (i), (ii), (iii) and (iv)

Answer: B



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10. A bicycle moves on a horizontal road with some acceleration. The forces of friction between the road and the front and rear wheels are F_1 and F_2 respectively.

A. Both F_1 and F_2 act in the forward direction.

B. Both F_1 and F_2 act in the backward direction.

C. F_1 acts in the forward direction, F_2 acts in the backward direction.

D. F_1 acts in the backward direction, F_2 acts in the forward direction.

Answer: D



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11. A girl whose eyes are 150 cm above the ground looks at her reflection in a vertical mirror 250 cm away. The top and bottom of the mirror are 200 cm and 120 cm above the

ground respectively. What length below her eyes can she see, of herself in the mirror?

- A. 60 cm
- B. 75 cm
- C. 100 cm
- D. 120 cm

Answer: A



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12. In an experiment, 1.50 g of pure copper(II) oxide was reduced to pure metal by heating with pure carbon. In another experiment, 1.15 g of pure copper was treated with nitric acid and the product formed was heated strongly till no further change was observed. The mass of copper(II) oxide so formed was found to be 1.40 g. The mass of pure metal formed in the first experiment and the law followed are respectively

A. 1.15 g and law of conservation of mass

B. 1.50 g and law of constant proportions

C. 1.23 g and law of constant proportions

D. 2.47 g and law of multiple proportions.

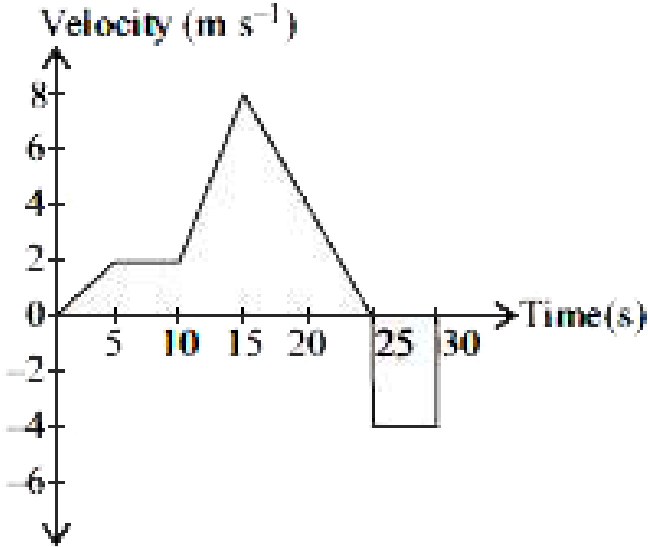
Answer: C



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Achievers Section

1. Refer to the given graph and fill in the blanks by choosing an appropriate option.



The displacement of the particle from its initial position at the end of 15 s and 30s is (i) and (ii) respectively. The average velocity of the particle between 15 s and 25 s and 0 s to 30s is (iii) and (iv) respectively.



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2. A particle falls from rest under gravity. Its potential energy with respect to the ground (PE) and its kinetic energy (KE) are plotted against time (t). Choose the correct graph.



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