PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 84

Physics

1. At the time of total solar eclipse, the spectrum of solar radiation would be

A. A large number of dark Fraunhofer lines

B. A smaller number of dark Fraunhofer lines

C. No lines at all

D. All Fraunhofer lines changed into bright coloured lines

Answer: D

2. Two balls are thrown simultaneously in air. The acceleration of the centre of mass of the two balls while in air

    A. is equal to g (acceleration due to gravity)

    B. depends in the speeds of the two balls

    C. depends in the masses of the two balls

    D. depends on the direction of motion of the two balls.

Answer: A

3. A particle of mass 10 g moves along a circle of radius 64 cm with a constant tangential acceleration. What is the magnitude of this acceleration if the kinetic energy of the particle becomes equal to $8 \times 10^{-4} J$ by the end of the second revolution after the beginning of the motion ?

A. $0.18ms^{-2}$

B. $0.2ms^{-2}$

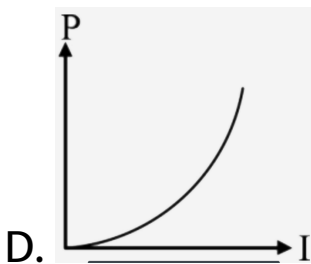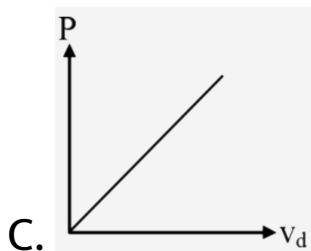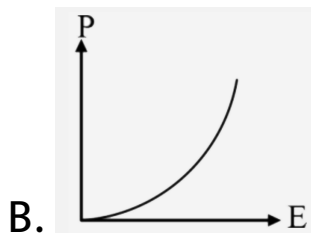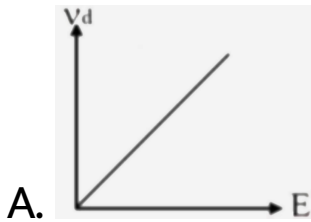C. $0.1ms^{-2}$

D. $0.15ms^{-2}$

Answer: C

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4. E denotes electric field in a uniform conductor, I corresponding current through it, v_d velocity of electrons and P denotes

thermal power produced in the conductor, then which of the following graph is correct?

A.

B.

C.

D.

Answer: C

5. The reading of the ammeter and voltmeter are (Both the instruments are ac meters and measures rms value) -

A. 2A , 110 V

B. 2 A, 0 V

C. 2V , 55 V

D. 1 A, 0 V

Answer: B

6. Three point charges of $+2q, +2q$ and $-4q$ are placed at the corners A, B and C of an equilateral triangle ABC of side x. The magnitude of the electric dipole moment of this system is

A. $2qx$

B. $3\sqrt{2}qx$

C. $3qx$

D. $2\sqrt{3}qx$

Answer: D

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7. The main scale of a vernier callipers reads $10mm$ in 10 divisions. Ten divisions of vernier scale coincide with nine divisions of the main scale. When the two jaws of the callipers touch each other, the fifth division of the vernier

coincides with 9 main scale divisions and zero of the vernier is to the right of zero of main scale, when a cylinder is tighty placed between the two jaws, the zero of the vernier scale lies slighty to the left of 3.2cm and the fourth vernier division coincides with a main scale division. Find diameter of the cylinder.

A. 3.19 cm

B. 3.14 cm

C. 3.04 cm

D. none the these

Answer: A

8. The effect of rotation of the eath on the value of acceleration deu to gravity g is

    A. Maximum at both poles

    B. Minimum at both poles

    C. Maximum at equator and minimum at the poles

D. Minimum at the equator and maximum at the poles

Answer: C

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9. A body takes 5 minutes for cooling from $50°C$ to $40°C$ Its temperature comes down to $33.33°C$ in next 5 minutes. Temperature of surroundings is

A. $15°C$

B. $20°C$

C. $25°C$

D. $10°C$

Answer: B

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10. A certain ideal gas undergoes a polytropic

process PV^n = constant such that the molar

specific heat during the process is negative. If

the ratio of the specific heats of the gas be γ, then the range of values of n will be

A. $0 < n < \gamma$

B. $1 < n < \gamma$

C. $n = \gamma$

D. $n > \gamma$

Answer: B

11. H^+, He^+ and O^{++} all having the same kinetic energy pass through a region in which there is a uniform magnetic field perpendicular to their velocity . The masses of H^+, He^+ and O^{2+} are $1a\mu$, $4a\mu$ and $16a\mu$ respectively . Then

A. H^+ will be least deflected

B. He^+ and O^+ will be deflected equally.

C. O^+ will be deflected most
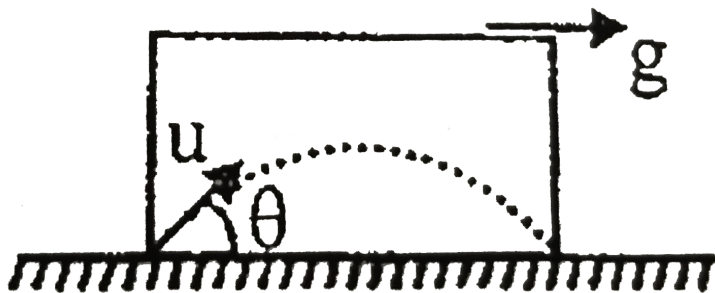
D. All will be deflected equally.

Answer: B

12. A large box is moving on a horizontal floor with constant acceleration a=g. A particle is projected inside box with velocity u and angle θ with horizontal from box frame. For the given u, the value of θ for which horizontal

range inside he box will be maximum is

A. $\dfrac{\pi}{4}$

B. $\dfrac{\pi}{8}$
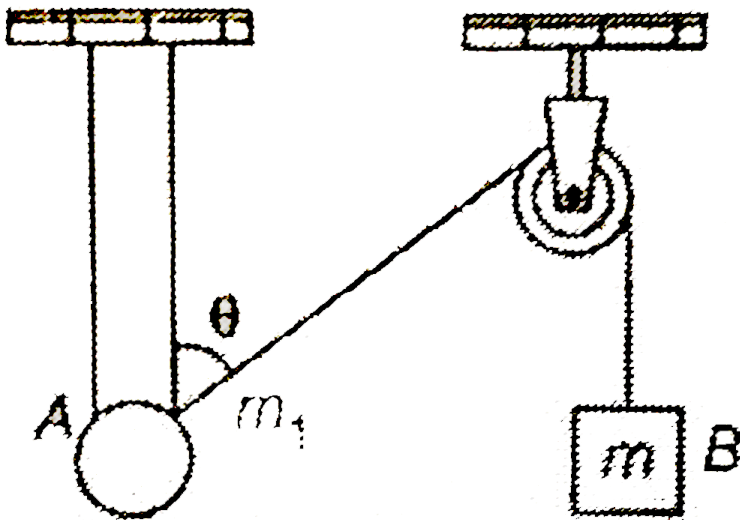
C. $\dfrac{3\pi}{8}$

D. $\dfrac{\pi}{3}$

Answer: B

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13. A ring of mass 5 kg sliding on a frictionless

vertical rod connected by a clock B of mass 10

kg by the help of a massless string.

Then, at the equilibrium of the system, the

value of θ is

A. 30°

B. 60°

C. 90°

D. 0°

Answer: B

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14. The volume occupied by an atom is greater than the volume of the nucleus by factor of about

A. $10^5 : 1$

B. $10^{20} : 1$

C. $10^{15} : 1$

D. $1 : 10^{15}$

Answer: C

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15. A massless spring of length l and spring constant k is placed vertically on a table. A ball

of mass m is just kept on top of the spring.

The maximum velocity of the ball is

A. $g\sqrt{\dfrac{m}{k}}$

B. $g\sqrt{\dfrac{2m}{k}}$

C. $\dfrac{g}{2}\sqrt{\dfrac{m}{k}}$

D. $g\sqrt{\dfrac{m}{2k}}$

Answer: A

16. A light whose frequency is equal to $6 \times 10^{14} Hz$ is incident on a metal whose work function is $2eV$ $(h = 6.63 \times 10^{-34} Js, 1eV = 1.6 \times 10^{-19} J)$. The maximum energy of electrons emitted will be:

    A. 2.49 eV

    B. 4.49 eV

    C. 0.49 eV

    D. 5.49 eV

Answer: C

17. A tank is filled with water of density $1 gcm^{-3}$ and oil of density $0.9 gcm^{-3}$. The height of the water layer is 100 cm and of the oil layer is 400 cm. If g = 980 cms^{-2}, then the velocity of efflux from an opening in the bottom of the tank is

A. $\sqrt{920 \times 980}$ cm s^{-1}

B. $\sqrt{900 \times 980}$ $\mathrm{cm\ s}^{-1}$

C. $\sqrt{1000 \times 980}$ $\mathrm{cm\ s}^{-1}$

D. $\sqrt{92 \times 980}$ $\mathrm{cm\ s}^{-1}$

Answer: A

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18. A ray of light is incident normally on one face of a right-angled isosceles prism and then it grazes the hypotenuse. The refractive index of the material of the prism is

A. 1.33

B. 1.414

C. 1.5

D. 1.732

Answer: B

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19. An ice skater spins at 3π rad s^{-1} with hers arms extended. If her moment of inertia with arms folded is 75% of that with arms

extended, her angular velocity when she fold her arms is

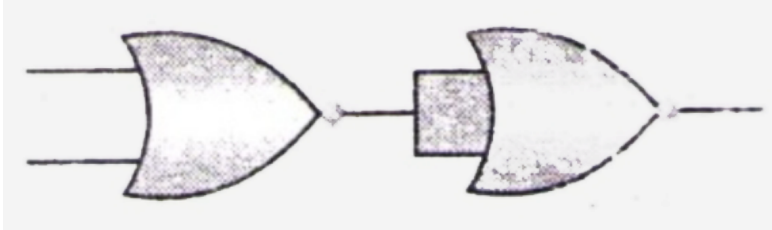A. $\pi rads^{-1}$

B. $2\pi rads^{-1}$

C. $3\pi rads^{-1}$

D. $4\pi rads^{-1}$

Answer: D

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20. Identify the logic operation performed by the circuit given here.

A. OR

B. NOR

C. NOT

D. NAND

Answer: A

21. What is the molar specific heat capacity of a gas undergoing an adiabatic process ?

A. Zero

B. 1

C. ∞

D. None the these

Answer: A

22. Solar constant is defined as energy received by Earth per cm^2 per minute. Find the dimensions of solar constant.

A. $[ML^2T^{-3}]$

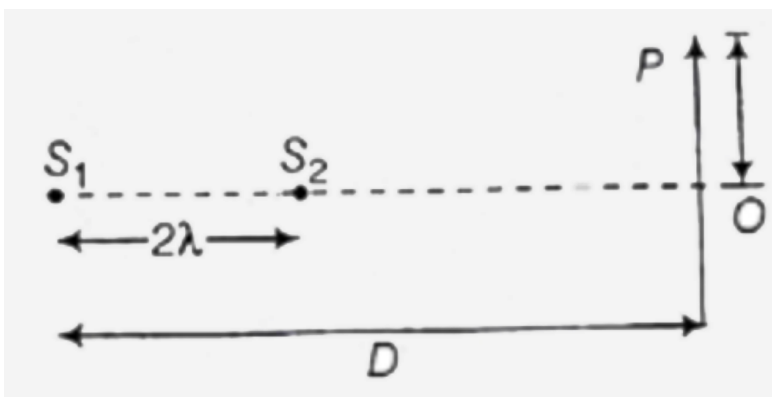B. $[M^2L^0T^{-1}]$

C. $[ML^0T^{-3}]$

D. $[MLT^{-2}]$

Answer: C

23. Two coherent point sources S_1 and S_2 vibrating in phase emit light of wavelength λ. The separation between them is 2λ. The light is collected on a screen placed at a distance $D > > \lambda$ from the slit S_1 as shown. The minimum distance, so that intensity at P is equal to the intensity at O

A. $\sqrt{2}D$

B. $\sqrt{3}D$
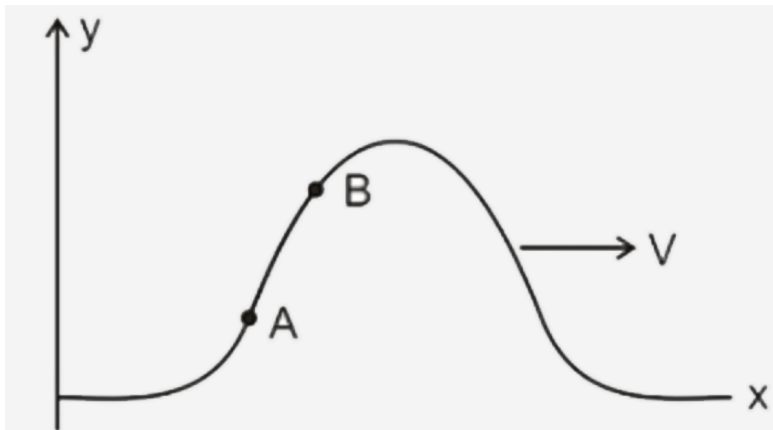
C. $\sqrt{8}D$

D. $\sqrt{5}D$

Answer: B

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24. A wave pulse is generated in a string that lies along x- axis. At the points A and B, as shown in the figure, if R_A and R_B are the

ratio of wave speed to the particle speed

respectively then:

A. $R_A > R_B$

B. $R_B > R_A$

C. $R_A = R_B$

D. Information is not sufficient to decide.

Answer: B

25. A force F acting on a body depends on its displacement S as $F \propto S^{-1/3}$. The power delivered by F will depend on displacement as

A. $s^{2/3}$

B. $s^{-5/3}$

C. $s^{1/2}$

D. s^0

Answer: D

26. An electric dipole is placed at the origin O and is directed along the x-axis. At a point P, far away from the dipole, the electric field is parallel to y-axis. OP makes an angle θ with the x-axis then

A. $\tan \theta = \sqrt{3}$

B. $\tan \theta = \sqrt{2}$

C. $\theta = 45°$

D. None the these

Answer: B

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27. The electric potential between a proton and an electron is given by $V = V_0 \ln\left(\dfrac{r}{r_0}\right)$, where r_0 is a constant. Assuming Bhor model to be applicable, write variation of r_n with n, being the principal quantum number. (a) $r_n \propto n$ (b) $r_n \propto \dfrac{1}{n}$ (c) $r_n \propto n^2$ (d)$r_n \propto \dfrac{1}{n^2}$

A. $r_n \propto n$

B. $r_n \propto \dfrac{1}{n}$

C. $r_n \propto n^2$

D. $r_n \propto \dfrac{1}{n^2}$

Answer: A

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28. A satelite is revolving in a circular orbit at a height h above the surface of the earth of radius R. The speed of the satellite in its orbit

is one-fourth the escape velocity from the surface of the earth. The relation between h and R is

A. $h = 2R$

B. $h = 3R$

C. $h = 5R$

D. $h = 7R$

Answer: D

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29. A particle moves in the X-Y plane under the influence of a force such that its linear momentum is

$$\overrightarrow{p}(t) = A\left[\hat{i}\cos(kt) - \hat{j}\sin(kt)\right], \quad \text{where} \quad A$$

and k are constants. The angle between the force and the momentum is

A. $0°$

B. $30°$

C. $45°$

D. $90°$

Answer: D

30. when an ideal gas with pressure p and volume V is compressed Isothermally to one - fourth of its volume, is pressure is P_1 when the same gas is compressed polytropically according to the equation $PV^{1.5}$ contents to one - fourth of its initial volume, the pressure is P_2 the ratio $\dfrac{P_1}{P_2}$ is

A. $\dfrac{1}{2}$

B. $\dfrac{1}{2^{1.5}}$

C. 2

D. $2^{1.5}$

Answer: A

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31. A horizontal overhead powerline is at height of $4m$ from the ground and carries a current of $100A$ from east to west. The

magnetic field directly below it on the ground is

$$\left(\nu_0 = 4\pi \times 10^{-7} TmA^{-1}\right)$$

A. $2.5 \times 10^{-7}T$ northwards

B. $2.5 \times 10^{-7}T$ southwards

C. $5 \times 10^{-6}T$ northwards

D. 5×10^{-6} T southwards

Answer: D

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32. A body is thrown with the velocity $20ms^{-1}$ at an angle of $60°$ with the horizontal. Find the time gap between the two positions of the body where the velocity of the body makes an angle of $30°$ with horizontal.
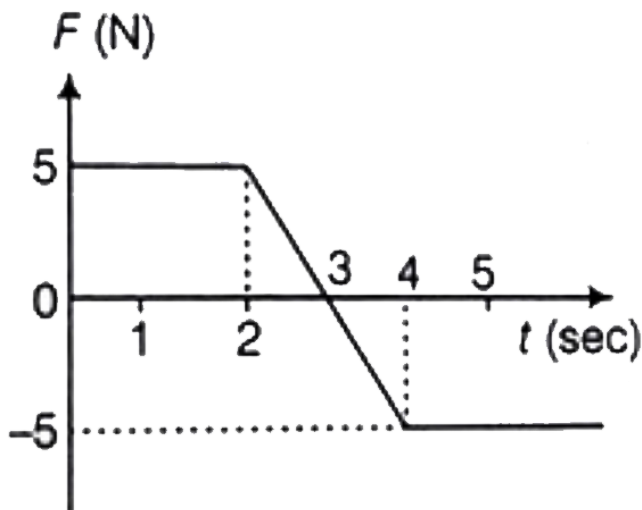
A. 1.15 s

B. 0.95 s

C. 1 s

D. 1.5 s

Answer: A

33. A block of the mass of 1 kg is moving on the x -axis. A force F acting on the block is shown. The veloity of the block at time t = 2 s is $-3ms^{-1}$. What is the speed of the block at time t = 4 s?

F (N)

A. $8ms^{-1}$

B. $2ms^{-1}$

C. $3ms^{-1}$

D. $5ms^{-1}$

Answer: C

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34. The half-life of a radioactive nucleus is 50 days. The time interval $(t_2 - t_1)$ between the

time t_2 when $\dfrac{2}{3}$ of it has decayed and the time t_1 when $\dfrac{1}{3}$ of it had decayed is
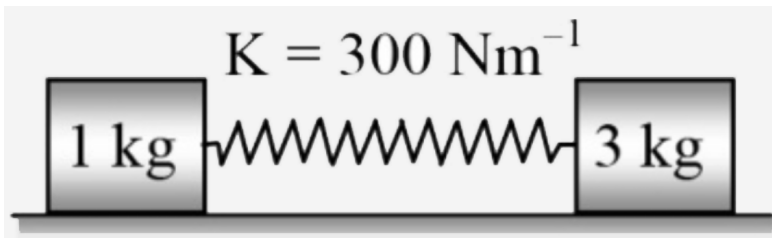
A. 30 days

B. 50 days

C. 60 days

D. 15 days

Answer: B

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35. Two point masses of 3.0 kg and 1.0 kg are attached to opposite ends of a horizontal spring whose spring constant is $300 Nm^{-1}$ as shown in the figure. The natural vibration frequency of the system is of the order of :

$$K = 300 \text{ Nm}^{-1}$$

1 kg —WWWWWWW— 3 kg

A. 4 Hz

B. 3 Hz

C. 2 Hz

D. 1 Hz

Answer: B

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36. The wavelength of de - Broglie wave is $2\mu m$

, then its momentum is

$\left(h = 6.63 \times 10^{-34} J - s \right)$

A. $3.315 \times 10^{-28} kgms^{-1}$

B. $1.66 \times 10^{-28} kgms^{-1}$

C. $4.97 \times 10^{-28} kgms^{-1}$

D. $9.9 \times 10^{-28} kgms^{-1}$

Answer: A

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37. Two wires A and B are of same material. Their lengths are in the ratio 1:2 and diameters are in the ratio 2:1 when stretched by force F_A and F_B respectively they get

equal increase in their lengths. Then the ratio $\dfrac{F_A}{F_B}$ should be

A. $1:2$

B. $1:1$

C. $2:1$

D. $8:1$

Answer: D

38. A person's near point is $50cm$ and his far point $3m$. Power of the lenses he requires for

(i) reading and

(ii) for seeing distant stars are

    A. $-2D$ and $+3D$
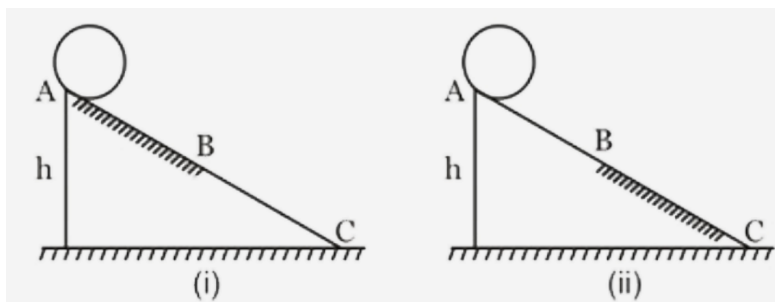
    B. $+2D$ and $-3D$

    C. $+2D$ and $-0.33D$

    D. $-2D$ and $+0.33D$

Answer: C

39. In both the figure all other factors are same, except that in figure (i) AB is rough and BC is smooth while in figure (ii) AB is smooth and BC is rough. The kinetic energy of the ball on reaching the bottom

A. Is same in both the cases

B. Is greater in case (i)

C. Is greater in case (ii)

D. Information insufficient

Answer: B

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40. A transistor oscillator is

(i) An amplifier with positive feedback

(ii) An amplifier with reduced gain

(iii) The one in which DC supply energy is

converted into AC output energy. Then

A. All (i) , (ii) and (iii) are correct

B. (i) and (ii) are correct

C. (i) and (iii) are correct

D. (ii) and (iii) are correct

Answer: C

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41. Two vessel separately contains two ideal gases A and B at the same temperature, the pressure of A being twice that of B. under such

conditions, the density of A is found to be 1.5 times the density of B. the ratio of molecular weight of A and B is

A. $\dfrac{3}{4}$

B. 2

C. $\dfrac{1}{2}$

D. $\dfrac{2}{3}$

Answer: A

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42. The length of a given cylindrical wire is increased by 100%. Due to the consequent decrease in diameter the change in the resistance of the wire will be

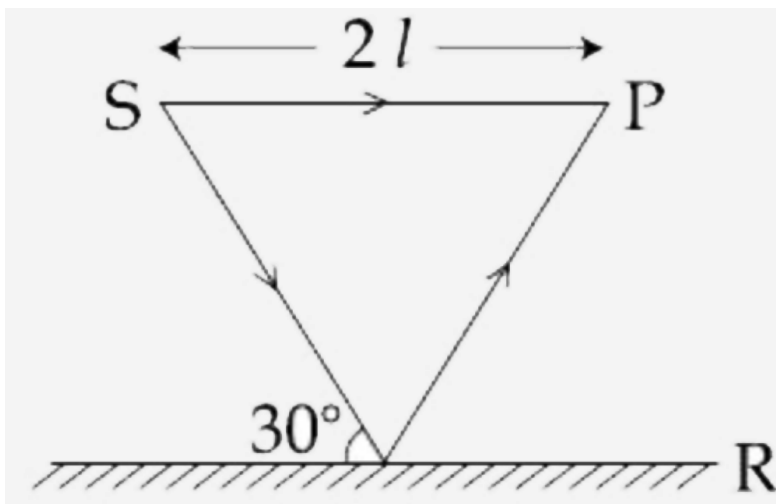   A. 200%

    B. 100%

    C. 50%

    D. 300%

Answer: D

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43. The interference pattern is observed at P due to the superposition of two rays coming out from a source S as shown in the diagram. The value of l for which maxima is obtained at P is, (Given that R is a perfect reflecting surface)

A. $l = \dfrac{2n\lambda}{\sqrt{3} - 1}$

B. $l = \dfrac{(2n - 1)\lambda\sqrt{3}}{4\left(2 - \sqrt{3}\right)}$

C. $l = \dfrac{(2n - 1)\lambda}{\sqrt{3} - 1}$

D. $l = \dfrac{(2n - 1)\lambda}{2\left(\sqrt{3} - 1\right)}$

Answer: B

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44. A tuning fork of known frequency $256Hz$ makes 5 beats per second with the vibrating

string of a piano. The beat frequency decreases to 2 beats per second when the tension in the piano string is slightly increased. The frequency of the piano string before increasing the tension was

A. 258 Hz

B. 254 Hz

C. 251 Hz

D. 261 Hz

Answer: C

45. A body of mass 1 kg is moving in a vertical circular path of radius 1 m. The difference between the kinetic energies at its highest and lowest positions is [take g=10m/s^2]

A. $4\sqrt{5}$

B. 20 J

C. 10 J

D. 30 J

Answer: B

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