# PHYSICS

# BOOKS - NTA MOCK TESTS

# NTA NEET SET 95

Physics

**1.** The largest wavelength in the ultraviolet region of the hydrogen spectrum is 122 nm. The smallest wavelength in the infrared region

of the hydrogen spectrum (to the nearest integer) is

A. 802 nm

B. 823 nm

C. 1882 nm

D. 1648 nm

**Answer: B**

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**2.** If the electron in the hydrogen atom jumps from third orbit to second orbit the wavelength of the emitted radiation in term of Rydberg constant is

A. $\frac{6}{5R}$

B. $\frac{36}{5R}$

C. $\frac{64}{7R}$

D. $\frac{36}{7R}$

**Answer: B**

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**3.** If a force is applicable to an elastic wire of the material of Poisson's ratio 0.2 there is a decrease of the cross-sectional area by 1 % . The percentage increase in its length is :

A. $1\%$

B. $5\%$

C. $2.5\%$

D. $1.5\%$

**Answer: C**

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**4.** An object of mass 3m splits into three equal fragments. Two fragments have velocities $v\hat{j}$ and $v\hat{i}$. The velocity of the third fragment is

A. $\frac{v}{\sqrt{2}}$

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

C. v

D. $v\sqrt{2}$

**Answer: D**

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**5.** An object of mass 10kg is attached to roof by string whirled round a horizontal circle of radius 4 and and and $30^\circ$ to the vertical. The tension in the string (approximately) is

A. 720 N

B. 960 N

C. 114 N

D. 125 N

**Answer: C**

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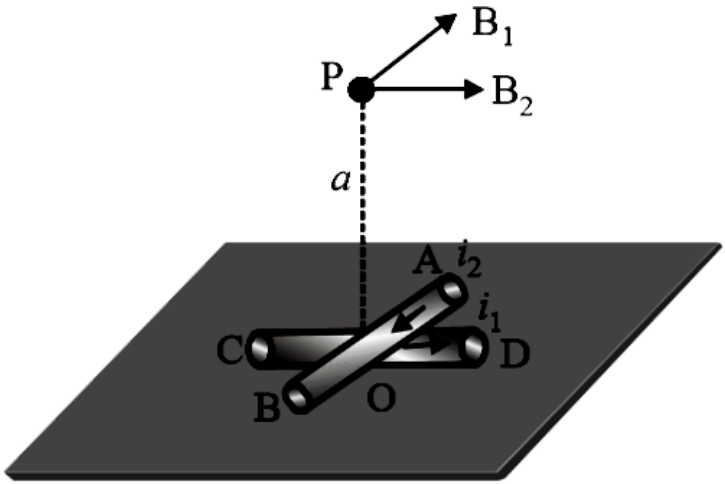
**6.** The straight long conductors AOB and COD are perpendicular to each other and carry current $i_1$ and $i_2$. The magnitude of the magnetic induction at point P at a distance a from the point O in a direction perpendicular

to the plane ACBD is




A. $\frac{\mu_0}{2\pi a}(i_1 + i_2)$

B. $\frac{\mu_0}{2\pi a}(i_1 - i_2)$

C. $\frac{\mu_0}{2\pi a}\sqrt{(i_1^2 + i_2^2)}$

D. $\frac{\mu_0}{2\pi a}\frac{i_1 i_2}{(i_1 + i_2)}$

**Answer: C**

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**7.** 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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**8.** A millivoltmeter of 25 m V range is to be converted into an ammeter of 25 A range . The value (in ohm ) of necessary shunt will be

A. 0.001

B. 0.01

C. 1

D. 0.05

**Answer: A**

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**9.** Two identical charge of value Q each are placed at (-a,0) and (a , 0) . The end coordinates of the point where the net electric field is zero and maximum are respectively-

A. (0,0), (0,0)

B. $\left(0, \frac{a}{\sqrt{2}}\right), (0, 0)$

C. $(0, 0), \left(0, \frac{a}{\sqrt{2}}\right)$

D. $\left(\frac{a}{\sqrt{2}}, 0\right), \left(0, \frac{a}{\sqrt{2}}\right)$

**Answer: C**

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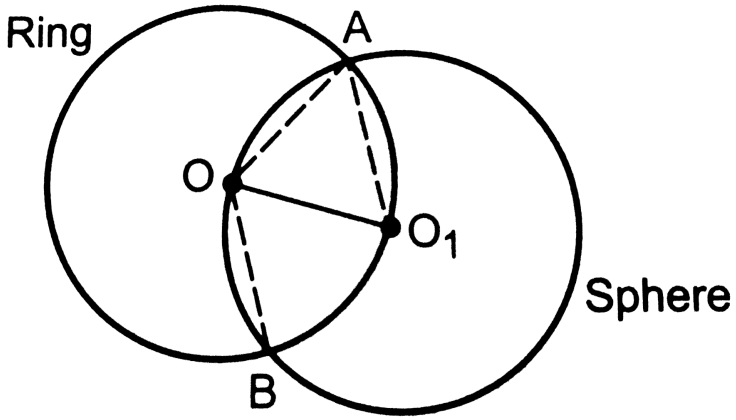
**10.** A Charge Q is distributed uniformly on a ring of radius r. A sphere of equal r is

constructed with its centre at the periphery of the ring (figure 30.12) Find the flux of the electric field through the surface of the sphere.




A. $\frac{q}{\varepsilon_0}$

B. $\frac{2q}{\varepsilon_0}$

C. $\frac{q}{2\varepsilon_0}$

D. $\frac{q}{3\varepsilon_0}$

**Answer: D**

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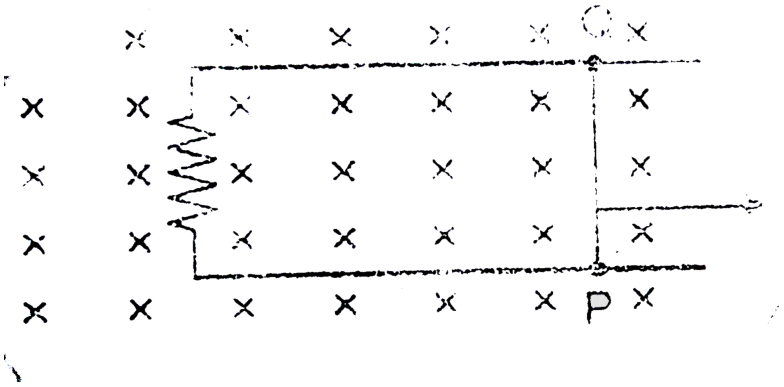
**11.** A $0.5m$ long metal rod $PQ$ completes the circuit as shown in the figure. The area of the circuit is perpendicular to the magnetic field of flux density $0.15T$. If the resistance of the total circuit is $3\Omega$ calculate the force needed to move the rod in the direction as indicated

with a constant speed of $2ms^{-1}$




A. 5.78 mN

B. 3.75 mN

C. 4.95 mN

D. 11.23 mN

**Answer: B**

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**12.** In a series LCR circuit the rms voltage across the inductance , capacitance and resistance are respectively 4 V, 8 V and 5 V . The RMS voltage of the AC source in the circuit is

A. 17 V

B. 13 V

C. 5 V

D. 6.4 V

**Answer: D**

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**13.** A particle is projected vertically with speed V from the surface of the earth . Maximum height attained by the particle , in term of the radius of earth R,V and g is ( V $<$ escape velocity , g is the acceleration due to gravity on the surface of the earth )

A. $\frac{3RV^2}{2gR - 2V^2}$

B. $\frac{2RV^2}{3gR - V^2}$

C. $\frac{RV^2}{2gR - V^2}$

D. $\frac{RV^2}{gR - 2V^2}$

**Answer: C**

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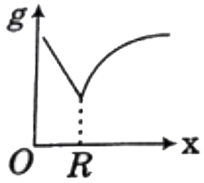
**14.** Which graph correctley presents the variation of acceleration due to gravity with the distance form the centre of the earth?

A.

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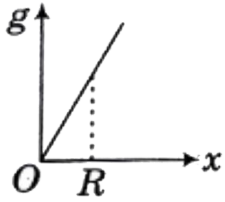


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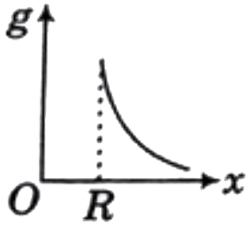
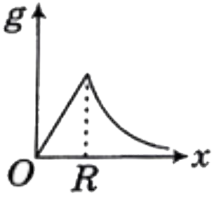



D.




**Answer: D**

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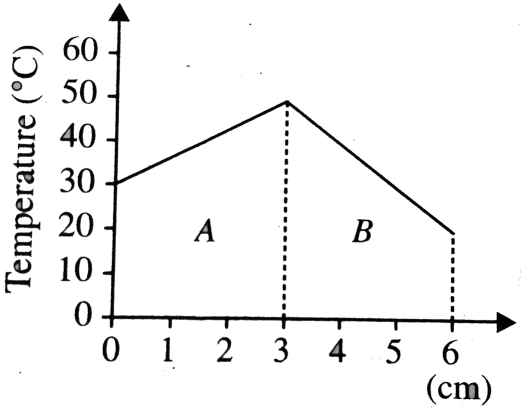


**15.**

The temperature across two different slabs A and B are shown I the steady state (as shown Fig) The ratio of thermal conductivities of A and B is

A. $2:3$

B. $3:2$

C. $1:1$

D. $5:3$

**Answer: B**

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**16.** An ideal gas is expanding such that $PT^2 =$ constant. The coefficient of volume expansion of lthe gas is:

A. $\frac{1}{T}$

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

C. $\frac{3}{T}$

D. $\frac{4}{T}$

**Answer: C**

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**17.** The relation between internal energy $U$, pressure $P$ and volume $V$ of a gas in an adiabatic process is

$U = a + bPV$ where a and b are constant .

What is the effective value of adiabatic constant Y.

A. $\frac{a}{b}$

B. $\frac{b+1}{b}$

C. $\frac{a+1}{a}$

D. $\frac{b}{a}$

**Answer: B**

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**18.** A proton, a deuteron and an $\alpha$-particle with the same KE enter a region of uniform magnetic field, moving at right angles to B. What is the ratio of the radii of their circular paths ?

A. $1:\sqrt{2}:1$

B. $1:\sqrt{2}:\sqrt{2}$

C. $\sqrt{2}:\sqrt{2}:1$

D. $\sqrt{2}:1:1$

**Answer: A**

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**19.** Electric charge $q$ is uniformly distributed over a rod of length . The rod is placed parallel to a long wire carrying a current 'I' The separation between the rod and the wire is 'a'. find the force needed to move the rod along its length with a uniform velocity 'v'

A. $\frac{\mu_0 iqv}{2\pi a}$

B. $\frac{\mu_0 qv}{3\pi a^2}$

C. $\frac{\mu_0 q^2 v}{2\pi a^2}$

D. $\frac{\mu_0 ivq}{3\pi a}$

**Answer: A**

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**20.** An object , moving with a speed of $6.25m/s$, is decelerated at a rate given by : $\frac{dv}{dt} = -2.5\sqrt{v}$ where $v$ is the instantaneous speed . The time taken by the object , to come to rest , would be :

A. 2 s

B. 4 s

C. 8 s

D. 1 s

**Answer: A**

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**21.** A body is thrown up with a speed $u$, at an angle of projection $\theta$ If the speed of the projectile becomes $\frac{u}{\sqrt{2}}$ on reaching the

maximum height , then the maximum vertical height attained by the projectile is

A. $\frac{u^2}{4g}$

B. $\frac{u^2}{3g}$

C. $\frac{u^2}{2g}$

D. $\frac{u^2}{g}$

**Answer: A**

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**22.** A block of mass m is placed on a smooth wedge of inclination $\theta$. The whole system is accelerated horizontally, so that the block does not slip on the wedge. The force exerted by the wedge on the block (g is acceleration due to gravity) will be

A. $\frac{mg}{\cos\theta}$

B. $mg\cos\theta$

C. $mg\sin\theta$

D. $\frac{mg}{\sin\theta}$

**Answer: A**

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**23.** A pendulum bob of mass 50 gm is suspended from the ceiling of an elevator. The tension in the string if the elevator goes up with uniform velocity is approximately

A. 0.30 N

B. 0.40 N

C. 0.42 N

D. 0.50 N

**Answer: D**

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**24.** When $_{}(3)Li^7$ nuclei are bombarded by protons , and the resultant nuclei are $_{}(4)Be^8$ , the emitted particle will be

A. alpha particles

B. beta particles

C. gamma photons

D. neutrons

**Answer: C**

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**25.** In a photoelectric experiment, if both the intensity and frequency of the incident light are doubled, then the saturation photoelectric current

A. Remains constant

B. Is halved

C. Is doubled

D. Becomes four times

**Answer: C**

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**26.** The function $\sin^2(\omega t)$ represents:

A. A simple harmonic motion with a period $2\pi / \omega$

B. A simple harmonic motion with a period $\pi / \omega$

C. A periodic , but not simple harmonic motion with a period $2\pi / \omega$

D. A periodic , but not simple harmonic motion with a period $\pi / \omega$

**Answer: D**

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**27.** A particle executing a simple harmonic motion has a period of 6 s. The time taken by the particle to move from the mean position to half the amplitude, starting from the mean position is

A. $\frac{1}{4}s$

B. $\frac{3}{4}s$

C. $\frac{1}{2}s$

D. $\frac{3}{2}s$

**Answer: C**

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**28.** A metal surface of work function $1.07eV$ is irradiated with light of wavelength $332nm$. The retarding potential required to stop the escape of photo - electrons is

A. 1.07 eV

B. 2.66 eV

C. 3.7 eV

D. 4.81 eV

**Answer: B**

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**29.** When radiation is incident on a photoelectron emitter , the stopping potential is found to be $9vo < s$ . If $e/m$ for the electrons is $1.8 \times 10^{11} Ckg^{-1}$ the maximum velocity of the ejected electrons is

A. $6 \times 10^{5} ms^{-1}$

B. $8 \times 10^5 ms^{-1}$

C. $10^6 ms^{-1}$

D. $1.8 \times 10^6 ms^{-1}$

**Answer: D**

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**30.** The length of a rubber cord is $l_1$ m when the tension is 4 N and $l_2$ m when the tension is 6 N.The length when the tension is 9 N, is

A. $5l_1 - 4l_2$

B. $5l_2 - 4l_1$

C. $9l_1 - 8l_2$

D. $9l_2 - 8l_1$

**Answer: B**

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**31.** A typical riverborne silt particle has a radius of $20(\mu)m$ and a density of $2 \times 10^3 kg/m^3$. The viscosity of water is

$1.0mPI$. Find the terminal speed with which such a particle will settle to the bottom of a motionless volume of water.

A. 0.67

B. 0.77

C. 0.87

D. 0.97

**Answer: C**

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**32.** A point source of light is kept at a distance of $15cm$ from a converging lens,on its optical axis.The focal length of the lens is $10cm$ and its diameter is $3cm$ ,A screen is placed on the other side of the lens ,perpendicular to the axis of lens,at a distance $20cm$ from it.Then find the area of the illuminated part of the screen?

A. $\frac{\pi}{4}cm^2$

B. $\frac{\pi}{6}cm^2$

C. $\frac{\pi}{2}cm^2$

D. $\frac{\pi}{3}cm^2$

**Answer: A**

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**33.** The refracting angle of a prism is A and refractive index of the material of prism is $\cot(A/2)$ . The angle of minimum deviation will be

A. $90^\circ - A$

B. $2A$

C. $180^\circ - A$

D. $180^\circ - 2A$

**Answer: D**

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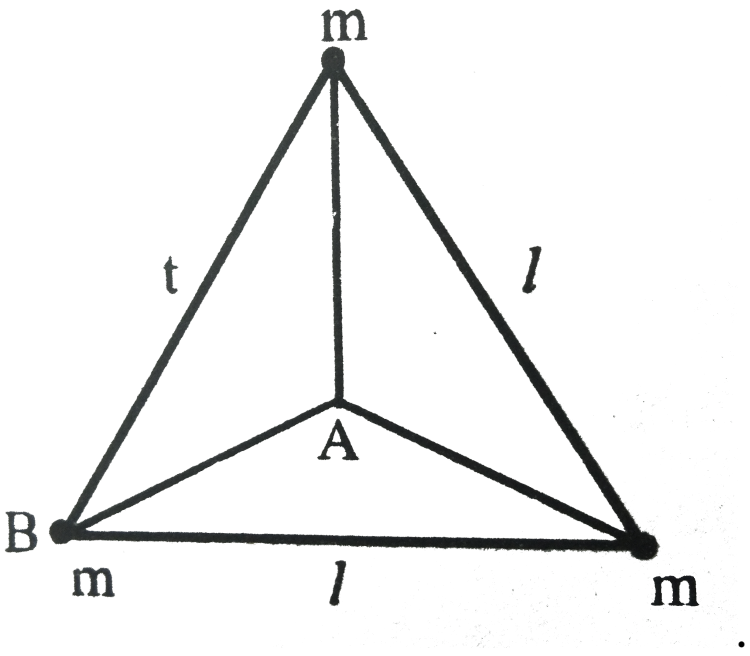
**34.** Three equal masses $m$ are rigidly connected to each other by massless rods of length $l$ forming and equilateral triangle, as shown above. The assembly is to be given an

angular velocity $\omega$ about an axis perpendicular to the triangle. For fixed $\omega$, what is the ratio of the kinetic energy of the assembly for an axis through $Bt$ compared with that for an axis through $A$.




A. $1:2$

B. $2:1$

C. $3:2$

D. $1:3$

**Answer: B**

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**35.** A solid cylinder of mass $20kg$ rotates about its axis with angular velocity of $100$ radian $s^{-1}$. The radius of the cylinder is $0.25m$. The

magnitude of the angular momentum of the cylinder about its axis of rotation is

A. 62.5 Js

B. 70.4 Js

C. 79.6 Js

D. 60.5 Js

**Answer: A**

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**36.** The input resistance of a common emitter amplifier is $330\Omega$ and the load resistance is $5k\Omega$ A change of base current is $15\mu A$ results in the change of collector current I mA. The voltage gain of the amplifier is

A. 1000

B. 10001

C. 1010

D. 1100

**Answer: C**

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**37.** When the forwward bias voltage of a diode is changed from $0.6$ V to $0.7$ V the current changes from 5 mA to 15 mA. Then its forward bias resistance is

A. $0.01\Omega$

B. $0.1\Omega$

C. $10\Omega$

D. $100\Omega$

**Answer: C**

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**38.** The coefficient of apparent expansion of mercury in a glass vessel is $153 \times 10^{-6} / ^{\circ} C$ and in a steel vessel is $114 \times 10^{-6} / ^{\circ} C$. If $\alpha$ for steel is $12 \times 10^{-6} / ^{\circ} C$, then that of glass is

A. $9 \times 10^{-6} .^{\circ} C^{-1}$

B. $6 \times 10^{-6} .^{\circ} C^{-1}$

C. $36 \times 10^{-6}.^{\circ} C^{-1}$

D. $27 \times 10^{-6}.^{\circ} C^{-1}$

**Answer: A**

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**39.** In a particular system the units of length, mass and time are chosen to be $10cm, 10g$ and $0.1s$ respectively. The unit of force in this system will be equal to

A. $\frac{1}{10}N$

B. 1 N

C. 10 N

D. 100 N

**Answer: A**

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**40.** Two light waves having the same wavelength $\lambda$ in vacuum are in phase initially. Then the first ray travels a path of length $L_1$

through a medium of refractive index $\mu_1$. Then second ray travels a path of length $L_2$ throug a medium of refractive index $\mu_2$. The two waves are then combined to observed interference effects. The phase difference between the two, when they interfere, is

A. $\frac{2\pi}{\lambda}\left(\frac{L_1}{\mu_1}-\frac{L_2}{\mu_2}\right)$

B. $\frac{2\pi}{\lambda}(L_2-L_1)$

C. $\frac{2\pi}{\lambda}(\mu_2 L_1-\mu_1 L_2)$

D. $\frac{2\pi}{\lambda}(\mu_1 L_1-\mu_2 L_2)$

**Answer: D**

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**41.** In young's double slit experiment the slits are illumated by light of wavelength $5890^{\circ}$ A and the distance between the fringes obtained on the screen is $0.2^{\circ}$. If the whole apparatus is immersed in water then the angular fringe width will be, if the refractive index of water is $4/3$

A. $0.30^{\circ}$

B. $0.15^{\circ}$

C. $15^\circ$

D. $30^\circ$

**Answer: B**

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**42.** The equation of a simple harmonic wave is given by $y = 6\sin 2\pi(2t - 0.1x)$ ,where x and y are in mm and t is in second. The phase difference between two particles 2 mm apart at any instant is

A. $18^\circ$

B. $36^\circ$

C. $54^\circ$

D. $72^\circ$

**Answer: D**

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**43.** It takes 2.0 seconds for a sound wave to travel between two fixed points when the day temperature is $10^\circ C$. If the temperature rise

to $30^{\circ}C$ the sound wave travels between the same fixed parts in

A. 1.9 s

B. 2.0 s

C. 2.1 s

D. 2.2 s

**Answer: A**

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**44.** Two bodies of mass $m_1$ and $m_2$ are initially at rest placed infinite distance apart. They are then allowed to move towards each other under mutual gravitational attaction. Show that their relative velocity of approach at separation r betweeen them is

$$v = \frac{\sqrt{2G(m_1 + m_2)}}{r}$$

A. $\left[2G\frac{(m_1 + m_2)}{r}\right]^{\frac{1}{2}}$

B. $\left[\frac{2G}{r}m_1 + m_2\right]^{\frac{1}{2}}$

C. $\left[\left(2G\frac{(m_1 - m_2)}{r}\right]^{\frac{1}{2}}\right.$

D. $\left[\frac{r}{2G(m_1m_2)}\right]^{\frac{1}{2}}$

**Answer: A**

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**45.** A ball is released from the top of a tower. The ratio of work done by force of gravity in 1st second, 2nd second and 3rd second of the motion of ball is

A. $1:2:3$

B. $1:4:16$

C. $1:3:5$

D. $1:9:25$

**Answer: C**

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