PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET TEST 85

Physics

1. Starting with a sample of pure $.^{66}Cu, 7/8$ of it decays into Zn in 15 minute. The corresponding half-life is:

A. $7\frac{1}{2}$ minutes

B. 10 minutes

C. 14 minutes

D. 5 minutes

Answer: D

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2. A stationary hydrogen atom emits photon corresponding to the first line of Lyman series. If R is the Rydberg constant and M is the mass

of the atom, then the velocity acquired by the atom is

A. $\left[\sqrt{\frac{3E}{2m}+C^2}\right]-c$

B. $\left[\sqrt{\frac{3E}{4m}+C^2}\right]-c$

C. $\frac{3E}{4mc}$

D. $\frac{E}{mc}$

Answer: A

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3. A bullet of mass 0.02 kg travelling horizontally with velocity 250 ms^{-1}strikes a block of wood of mass 0.23 kg which rests on a rough horizontal surface. After the impact, the block and bullet move together and come to rest after travelling a distance of 40 m. The coefficient of sliding friction of the rough surface is $\left(g = 9.8ms^{2}\right)$

A. 0.75

B. 0.61

C. 0.51

D. 0.30

Answer: C

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4. Comprehension # 2

When two bodies collide normally they exert equal and opposite impulses on each other. Impulse $=$ change in linear momentum. Coefficient of restitution between two bodies is given by :-

$$e = \frac{|\text{Relative velocity of separation}|}{|\text{Relative velocity of approach}|} = 1,$$

for elastic collision

Two bodies collide as shown in figure. During collision they exert impulse of magnitude J on each other.

For what value of J (in Ns) the $2kg$ block will change its direction of velocity?

A. $J < 12$

B. $J > 12$

C. $J < 10$

D. $J > 10$

Answer: B

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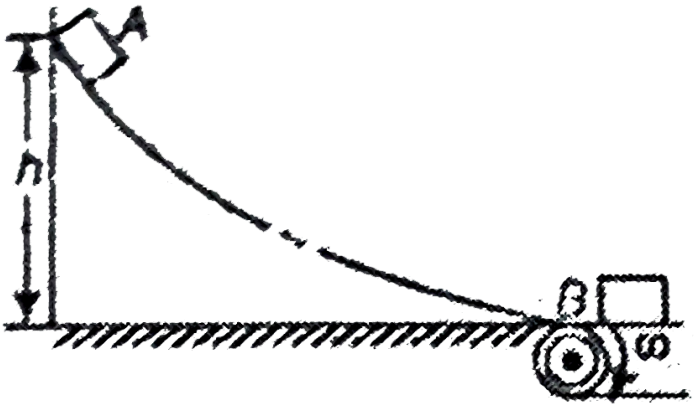
5. Particles are released from rest A and slide down the smooth surface of hight h to a conveyor B. The correct angular veleocity ω of the coneyor pulley of radius r to prevent any sliding on the belt as the particles transfer to

the conveyor is



A. $\sqrt{\frac{gh}{r}}$

B. $\sqrt{\frac{2gh}{3r}}$

C. $\sqrt{\frac{2gh}{r}}$

D. $\sqrt{\frac{gh}{2r}}$

Answer: C

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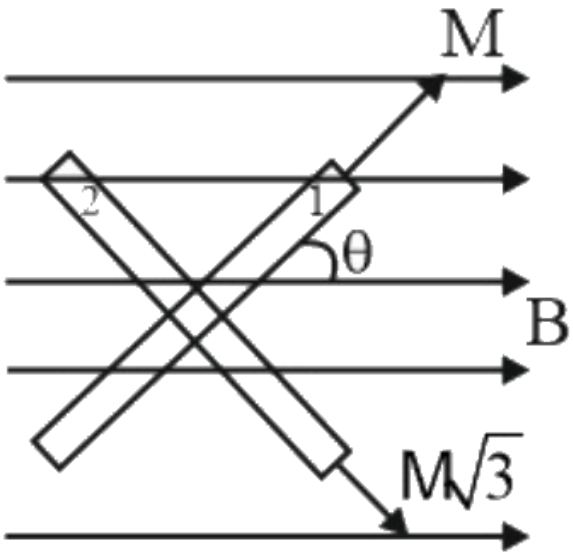
6. Two short bar magnets of dipole moments M and $M\sqrt{3}$ are joined at right angles to form a cross as depicted in the figure . The value of θ for which the system remains in equilibrium

in a uniform external magnetic field B, is



A. $\theta = 30^\circ$

B. $\theta = 45^\circ$

C. $\theta = 60^\circ$

D. $\theta = 15^\circ$

Answer: C

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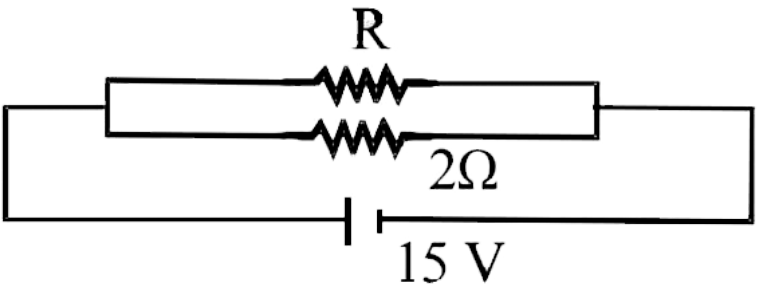
7. If in the circuit, power dissipation is 150W, the R is



A. 2Ω

B. 6Ω

C. 5Ω

D. 4Ω

Answer: B

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8. Two coil are placed close to each other. The mutual inductance of the pair of coils depends upon.

A. Relative position and orientation of the two coils

B. The materials of the wires of the coils

C. The currents in the two coils

D. The rates at which currents are changing in the two coils

Answer: A

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9. Three capacitors each of capacity $4\mu F$ are to be connected in such a way that the effective capacitance is $6\mu F$. This can be done by

A. Connecting two in parallel and one in series

B. Connecting all of them in series

C. Connecting them in parallel

D. Connecting two in series and one in parallel

Answer: D

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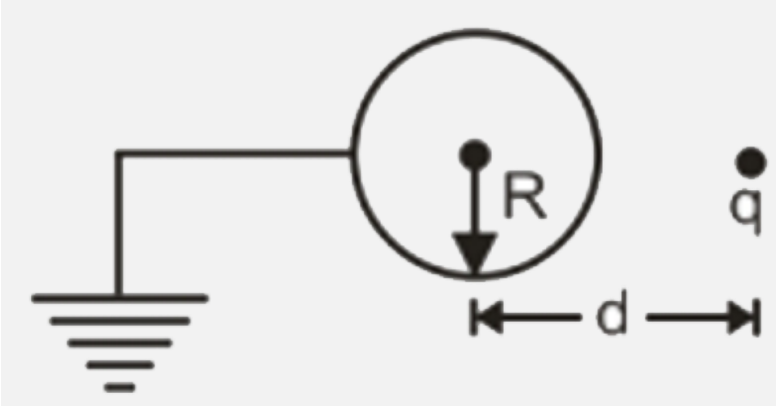
10. In the shown figure, the charge appearing on the conducting shell (grounded) of Radius R, when a point charge q is kept at a distance of d from the centre of the sphere is:



A. q

B. $\frac{qd}{r}$

C. $-\frac{qr}{d}$

D. 0

Answer: C

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11. In a series resonant LCR circuit the voltage across R is 100 volts and R = $1k(\Omega) with C = 2(\mu)F.$ The resonant

frequency (ω) is $200 rad/s$. At resonance the voltage across L is

A. $4 \times 10^{-3} V$

B. $2.5 \times 10^{-2} V$

C. 40 V

D. 250 V

Answer: D

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12. The transformation ratio in the step -up transformer is

A. 1

B. Greater than one

C. Less than one

D. The ratio greater or less than one depends on the other factors

Answer: B

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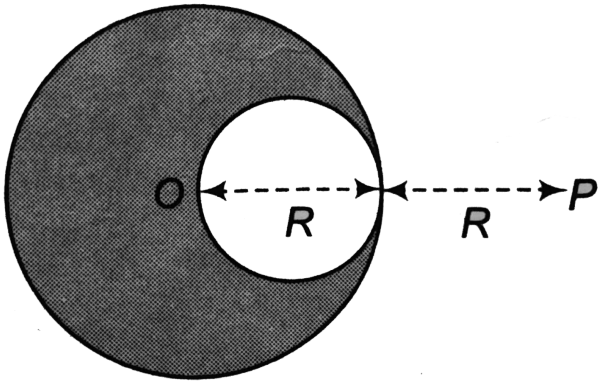
13. A solid sphere of uniform density and radius R applies a gravitational force of attraction equal to F_1 on a particle placed at P, distance $2R$ from the centre O of the sphere. A spherical cavity of radius $R/2$ is now made in the sphere as shown in figure. The particle with cavity now applies a gravitational force F_2 on same particle placed at P. The

radio F_2 / F_1 will be



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

B. $\frac{7}{9}$

C. 3

D. 7

Answer: B

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14. A cavity of radius $R/2$ is made inside a solid sphere of radius R. The centre of the cavity is located at a distance $R/2$ from the centre of the sphere. The gravitational force on a particle of a mass $'m'$ at a distance $R/2$ from the centre of the sphere on the line joining both the centres of sphere and cavity is (opposite to the centre of cavity). [Here $g = GM/R^2$, where M is the mass of the solide sphere]

A. $\frac{mg}{2}$

B. $\frac{3mg}{8}$

C. $\frac{mg}{16}$

D. None of these

Answer: B

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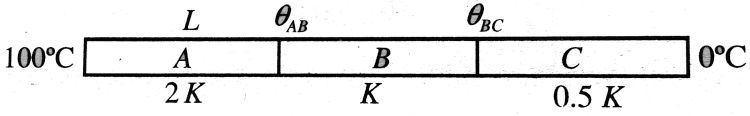

15.

Three cylindrical rods A, B and C of equal lengths and equal diameters are joined in series as shown if Fig. Their thermal conductivities are 2K, K and 0.5K, respectively. In steady state, if the free ends of rods A and C are at $100^\circ C$ and $0^\circ C$, respectively, calculate the temperature at the two junction points. Assume negligible loss by radiaiotn through

the curved surface. What will be the equivalent thermal conductivity?

A. $K_{eq} = \left(\frac{6}{7}\right)K$

B. $K_{eq} = \left(\frac{4}{5}\right)K$

C. $K_{eq} = \left(\frac{8}{7}\right)K$

D. $K_{eq} = \left(\frac{7}{6}\right)K$

Answer: A

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16. One mole of an ideal gas at an initial temperature true of TK does $6R$ joule of work adiabatically. If the ratio of specific heats of this gas at constant pressure and at constant volume is $5/3$, the final temperature of the gas will be

A. $(T + 2.4)K$

B. $(T - 2.4)K$

C. $(T + 4)K$

D. $(T - 4)K$

Answer: D

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17. The ratio of velocity of sound in hydrogen and oxygen at STP is

A. $16:1$

B. $8:1$

C. $4:1$

D. $2:1$

Answer: C

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18. A particle of mass $2 \times 10^{-5} kg$ moves horizontally between two horizontal plates of a charged parallel plate capacitor between which there is an electric field of $200 NC^{-1}$ acting upward. A magnetic induction of 2.0 T is applied at right angles to the electric field in a direction normal to both $\vec{B}$ and $\vec{v}$. If g is $9.8 ms^{-2}$ and the charge on the particle is

$10^{-6}C$, then find the velocity of charge particle so that it continues to move horizontally

A. $2ms^{-1}$

B. $20ms^{-1}$

C. $0.2ms^{-1}$

D. $100ms^{-1}$

Answer: A

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19. With a standard rectangular bar magnet the time period of a vibration magnetometer is 4 s. The bar magnet is cut parallel to its length into four equal pieces. The time period of vibration magnetometer when one piece is used (in second) (bar magnet breadth is small) is

A. 16

B. 8

C. 4

D. 2

Answer: C

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20. Two stations A and. B are 110 km apart on a straight line. One train starts from A at 7 a.m. and travels towards B at 20 kmph. Another train starts from B at 8 a.m. and travels towards A at a speed of 25 kmph. At what time will they meet? $9\ a\dot{m}\cdot$ b. $10\ a\dot{m}\cdot$ c. $10.\ 30\ a\dot{m}\cdot$ d. $11\ a\dot{m}\cdot$

A. 9 a. m.

B. 10 a. m.

C. 10.30 a.m.

D. 11 a.m.

Answer: B

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21. It was calculated that a shell when fired from a gun with a certain velocity and at an angle of elevation $5\pi/36$ radius should strike

a given target. In actual practice it was found that a hill just intervened in the trajectory. At what angle of elevation should the gun be fired to hit the target ?

A. $\frac{5\pi}{36} rad$

B. $\frac{11\pi}{36} rad$

C. $\frac{7\pi}{36} rad$

D. $\frac{13\pi}{36} rad$

Answer: D

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22. A piece of wire is bent in the shape of a parabola $y = kx^2$ (y-axis vertical) with a bead of mass m on it. The bead can slide on the wire without friction. It stays at the lowest point of the parabola when the wire is at rest. The wire is now accelerated parallel to the x-axis with a constant acceleration a. The distance of the new equilibrium position of the bead, where the bead can stay at rest with respect to the wire, from the y-axis is:

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

B. $\frac{a}{2gk}$

C. $\frac{2a}{gk}$

D. $\frac{a}{4gk}$

Answer: B

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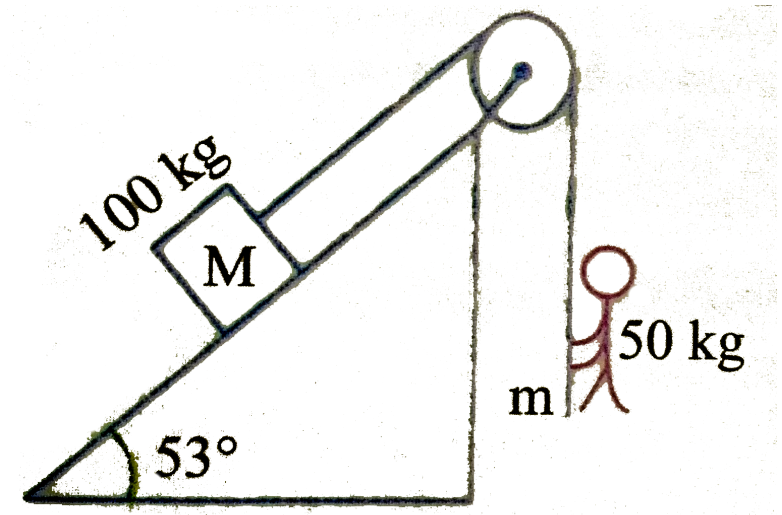
23. By what acceleration the boy must go up so that $100kg$ block remains stationary on the wedge. The wedge is fixed and is smooth

$(g = 10m/s^2)$



A. $2ms^{-2}$

B. $4ms^{-2}$

C. $8ms^{-2}$

D. $6ms^{-2}$

Answer: D

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24. The binding energy per nucleon of O^{16} is $7.97MeV$ and that of O^{17} is $7.75MeV$. The energy (in MeV) required to remove a neutron from O^{17} is.

A. 3.52

B. 3.64

C. 4.23

D. 7.86

Answer: C

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25. Half-life of radioactive sample, when activity of material initially was 8 counts and after 3 hours it becomes 1 count is

A. 2 h

B. 1 h

C. 3 h

D. 4 h

Answer: B

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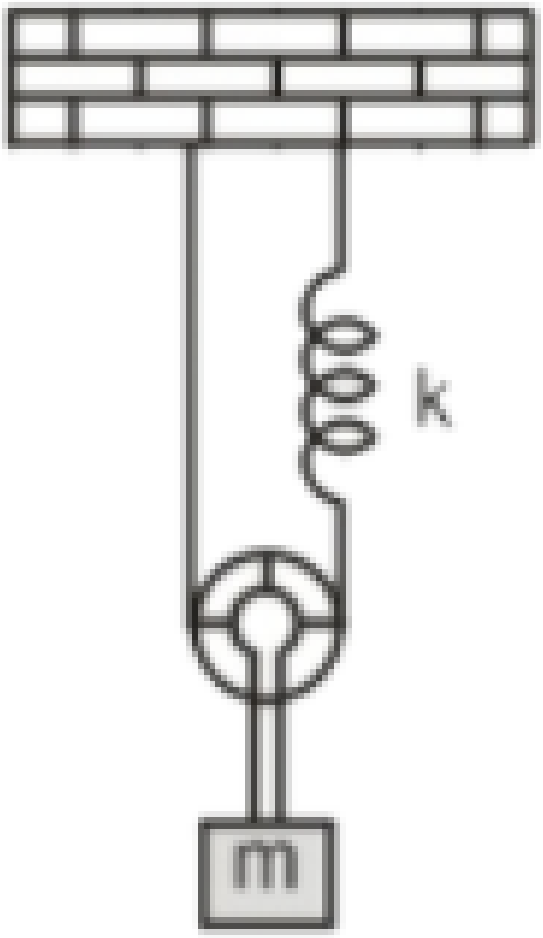
26. A system shown in the figure consists of a massless pulley, a spring of force constant k displaced vertically downwards from its equilibrium position and released, then the

Period of vertical oscillations is



A. $T = \pi\sqrt{\left(\frac{m}{4k}\right)}$

B. $T = 2\pi\sqrt{\left(\frac{m}{4k}\right)}$

C. $T = 2\pi\sqrt{\left(\frac{m}{2k}\right)}$

D. $T = 2\pi\sqrt{\left(\frac{m}{3k}\right)}$

Answer: B

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27. If a simple harmonic motion is represented by $\frac{d^2x}{dt^2} + \alpha x = 0$, its time period is :

A. $2\pi\alpha$

B. $2\pi\sqrt{\alpha}$

C. $2\pi / \alpha$

D. $2\pi / \sqrt{\alpha}$

Answer: D

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28. The energy that should be added to an electron to reduce its de-Broglie wavelength from 1 nm to 0.5 nm is

A. four times the initial energy

B. equal to the initial energy

C. twice the initial energy

D. thrice the initial energy

Answer: D

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29. Light of wavelength 5000Å falls on a sensitive plate with photoelectric work

function of $1.9eV$. The kinetic energy of the photoelectron emitted will be

A. $1.16eV$

B. $2.38eV$

C. $0.58eV$

D. $2.98eV$

Answer: C

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30. If air of weight w is filled in a empty ballon which weights w_1 the weight of ballon will become w_2 Suppose the density of air inside and out side the vallon is same, then,

A. $w_2 = w_1 + w$

B. $w_2 = \sqrt{w_1 w}$

C. $w_2 = w_1$

D. $w_2 = w_1 - w$

Answer: C

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31. A horizontal pipeline carries water in a streamline flow. At a point along the pipe, where the cross- sectional area is $10cm^2$, the water velocity is $1ms^{-1}$ and the pressure is 2000 Pa. The pressure of water at another point where the cross-sectional area is $5cm^2$, is.....Pa. (Density of water $= 10^3 kg.\, m^{-3}$)

A. 500

B. 400

C. 300

D. 600

Answer: A

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32. A convex, rearview mirror of focal length 20cm, is fitted in a car. A second car 2 m broad and 1.6m high is 6m away from the first car and overtakes the first car at a relative speed of $15ms^{-1}$, then the speed of the first car is

A. $0.016ms^{-1}$

B. $0.257ms^{-1}$

C. $0.162ms^{-1}$

D. $0.0073ms^{-1}$

Answer: A

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33. A plano convex lens of refractive index 1.5 and radius of curvature 30cm. Is silvered at the curved surface. Now this lens has been used to

form the image of an object. At what distance from this lens an object be placed in order to have a real image of size of the object.

A. 20 cm

B. 30 cm

C. 60 cm

D. 80 cm

Answer: A

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34. Two rings of same radius and mass are placed such that their centres are at a common point and their planes are perpendicular to each other. The moment of inertia of the system about an axis passing through the centre and perpendicular to the plane of one of the rings is (mass the ring $= m$, radius $= r$)

A. $\frac{1}{2}mr^2$

B. mr^2

C. $\frac{3}{2}mr^2$

D. $2mr^2$

Answer: C

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35. Two rings of radius R and nR made of same material have the ratio of moment of inertia about an axis passing through center is $1:8$. The value of n is

A. 2

B. $2\sqrt{2}$

C. 4

D. $\frac{1}{2}$

Answer: A

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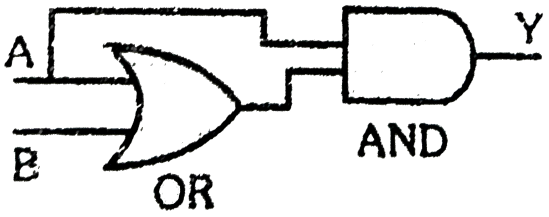
36. The output Y of the combination of gates shown in equal to :-



A. A

B. $\overline{A}$

C. $A + B$

D. AB

Answer: A

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37. When $p-n$ junction diode is forward biased then

A. the depletion region in reduced and barrier height is increased

B. the depletion region is widened and barrier height is reduced

C. both the depletion region and barrier height are reduced

D. both the depletion region and barrier height are increased

Answer: C

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38. A pendulum clock is 5 sec. Slow at a temperature $30^\circ C$ and 10 sec. fast at a temperature of $15^\circ C$, At what temperature does it give the correct time-

A. $18^\circ C$

B. $22^\circ C$

C. $20^\circ C$

D. $25^\circ C$

Answer: C

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39. The dimensional formula for entropy is

A. $[MLT^{-2}K^{-1}]$

B. $[ML^2T^{-2}]$

C. $[ML^2T^{-2}K^{-1}]$

D. $[ML^{-2}T^{-2}K^{-1}]$

Answer: C

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40. Yong's double-slit experiment is carried out by using green, red and blue light, one color at a time. The fringe widths recorded are β_G, β_R and β_B, respectively. Then

A. $\beta_G > \beta_B > \beta_R$

B. $\beta_B > \beta_G > \beta_R$

C. $\beta_R > \beta_B > \beta_G$

D. $\beta_R > \beta_G > \beta_B$

Answer: D

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41. A Young's double slit experiment uses a monochromatic source. The shape of the interference fringes formed on a screen is

A. Straight line

B. Parabola

C. Hyperbola

D. Circle

Answer: A

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42. If a sound wave of frequency 500 Hz and velocity 350 m/s. Then the distance between the two particles of a phase difference of 60° will be nearly

A. 70 cm

B. 0.7 cm

C. 12.0 cm

D. 120.0 cm

Answer: C

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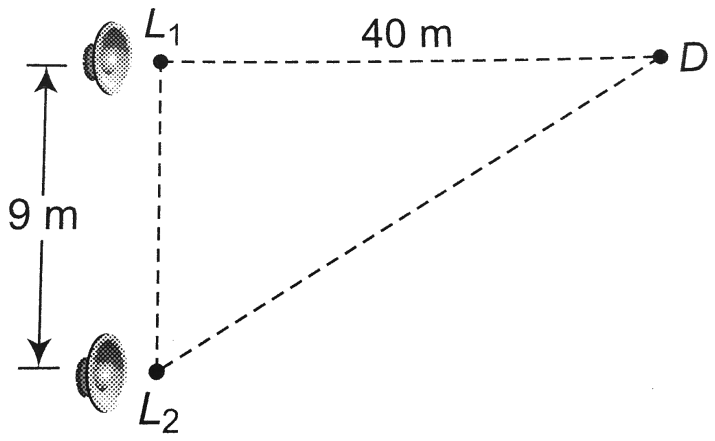

43.

Two loudspeakers L_1 and L_2 driven by a common oscillator and amplifier, are arranged as shown. The frequency of the oscillator is gradually increased from zero and the detector at D records a series of maxima and minima. If the speed of sound is $330ms^{-1}$

then the frequency at which the first maximum is observed is

A. 165 Hz

B. 330 Hz

C. 495 Hz

D. 660 Hz

Answer: B

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44. A body constrained to move along the Z-axis of a co-ordinate system is subject to a constant forece $\overrightarrow{F} = -\hat{i} + 2\hat{j} + 3\hat{k}$, where $\hat{i}, \hat{j}, \hat{k}$ are unit vectors along the X-,Y- and Z-axis of the system respectively. What is the work done by this force in moving the body a distance of 4 m along the Z-axis ?

A. 12 J

B. 13 J

C. 10 J

D. 9 J

Answer: A

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45. A wind - powered generator convets and energy into electrical energy . Assume that the generator convents a fixed fraction of the wind energy intercepited by to blades into electrical energy for wind speed V , the electrical power output will be propertional to

A. v

B. v^2

C. v^3

D. v^4

Answer: C

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