doubtnut
India's Number 1 Education App

PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 32

Physics

1. A photon collides with a stationary hydrogen atom in ground state inelastically. Energy of the colliding photon is 10.2 eV. After

a time interval of the order of micro second another photon collides with same hydrogen atom inelastically with an energy of 15eV. What wil be observed by the detector?

(a) 2 photons of energy 10.2 eV

(b) 2 photons of energy 1.4 eV

(c) One photon of energy 10.2 eV and an electron of energy 1.4 eV

(d) One photon of energy 10.2 eV and another photon of energy 1.4 eV

A. 2 photons of energy 10.2 eV

B. 2 photons of energy 1.4 eV

C. One photon of energy 10.2 eV and an electron of energy 1.4 eV

D. One photon of energy 10.2 eV and another photon of energy 1.4 eV

Answer: C

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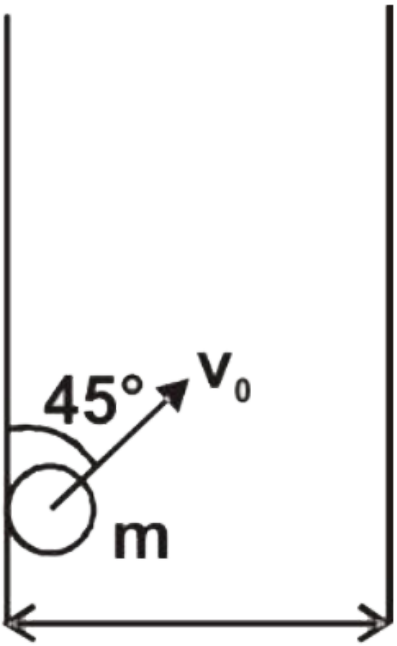
2. The adjacent figure shows an infinite frame of two sides in a gravity - free space. What is the final constant kinetic energy expected of

the ball of mass m projected as shown with an initial velocity v_0? The coefficient of restitution for the collision between the ball and the frame is $e = 0.5$.



A. $0.5mv_0^2$

B. $0.25mv_0^2$

C. $0.125mv_0^2$

D. $0.325mv_0^2$

Answer: B

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3. Particle A makes a head on elastic collision with another stationary particle B. They fly apart in opposite directions with equal speeds. The mass ratio will be

A. $\frac{1}{3}$

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

C. $\frac{1}{4}$

D. $\frac{1}{\sqrt{3}}$

Answer: A

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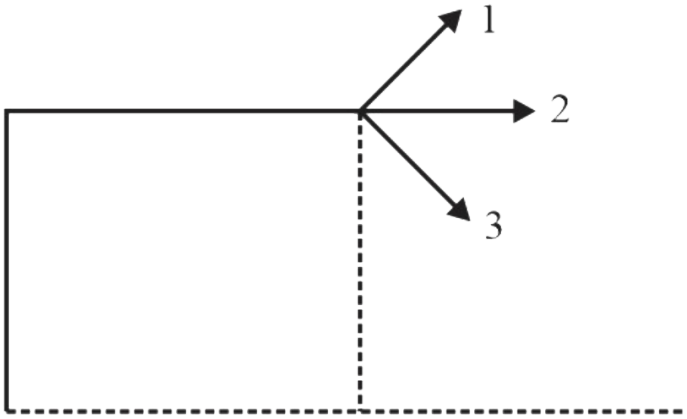
4. Three balls are dropped from the top of a building with equal speeds but at different angles. Balls strike the ground with velocities

v_1, v_2 and v_3 respectively, then



A. $v_1 > v_2 > v_3$

B. $v_3 > v_2 > v_1$

C. $v_1 = v_2 = v_3$

D. $v_2 < v_3 < v_1$

Answer: C

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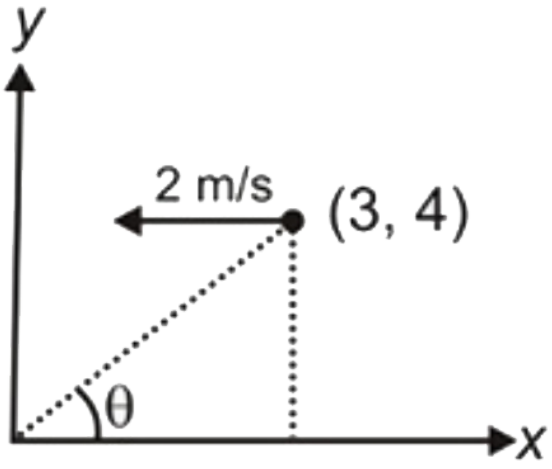
5. A particle is moving in x-y plane as shown in the figure. Angular velocity of the particle with respect to the origin is



A. $\frac{8}{25}\hat{k}rads^{-1}$

B. $-\frac{8}{25}\hat{k}rads^{-1}$

C. $\frac{19}{25}\hat{k}rads^{-1}$

D. $-\frac{19}{25}\hat{k}rads^{-1}$

Answer: A

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6. A paramagnetic material has 10^{28} atoms $/m^3$. Its magnetic susceptibility at temperature $350K$ is 2.8×10^{-4}. Its susceptibility at $300K$ is :

A. 3.726×10^{-4}

B. 2.627×10^{-4}

C. 3.267×10^{-4}

D. 3.627×10^{-4}

Answer: C

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7. The resistance of an ammeter is 13Ω and its scale is graduated for a current upto $100A$. After an additional shunt has been connected

to this ammeter it becomes possible to measure currents upto $750A$ by this meter. The value of shunt resistance is

A. 0.2Ω

B. $2k\Omega$

C. 20Ω

D. 2Ω

Answer: D

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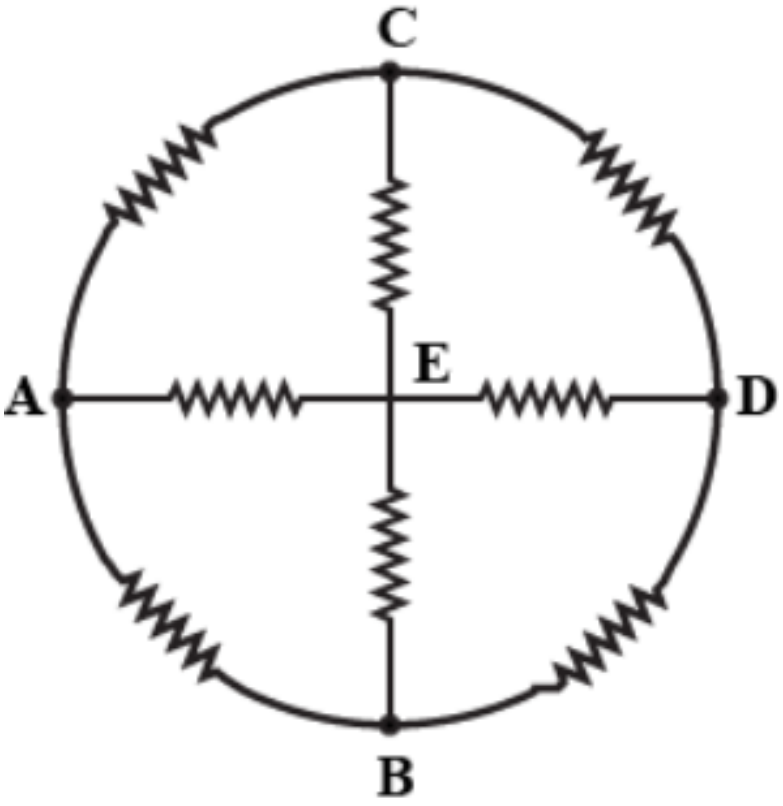
8. Eight resistances each of resistance 5Ω are connected in the circuit as shown in figure. The equivalent resistance between A and B is



A. $\frac{8}{3}\Omega$

B. $\frac{16}{3}\Omega$

C. $\frac{15}{7}\Omega$

D. $\frac{19}{2}\Omega$

Answer: A

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9. The heat produced (in calories) in a resistance R when a current I amperes flows through it for t seconds is given by the expression

A. $\frac{I^2Rt}{4.2}$

B. $\frac{IRt^2}{4.2}$

C. $\frac{4.2IR}{t^2}$

D. $\frac{IR^2t}{4.2}$

Answer: A

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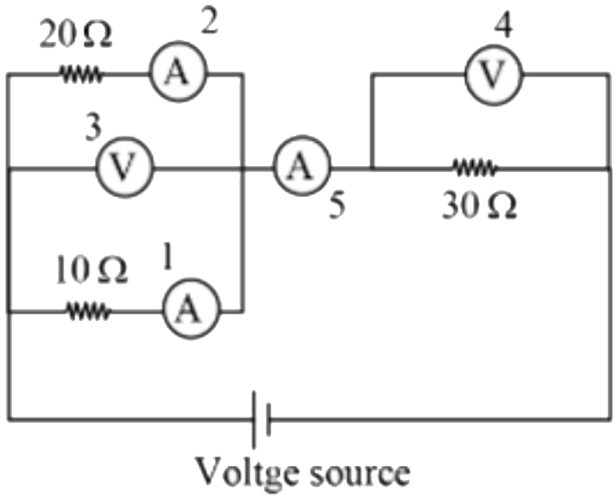
10. If all meters are ideal and the reading of the voltmeter 3 is 6 V, then power supplied by

the voltage source is



A. 10 W

B. 38 W

C. 20 W

D. 29.7 W

Answer: D

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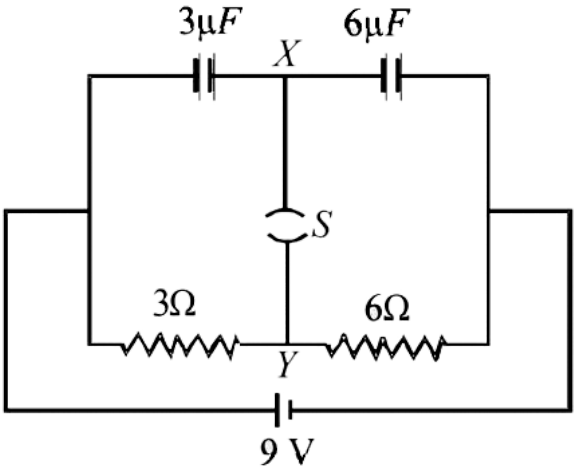
11. A circuit is connected as shown in the figure with the switch S open. When the switch is closed, the total amount of charge that flows from Y to X is



A. zero

B. $54\mu C$

C. $81\mu C$

D. $27\mu C$

Answer: D

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12. Two spheres of radii 2 cm and 3 cm are charged to the same potential. If σ and σ_2 be respectively the values of surface charge

density on the conductors, then the ratio $\frac{\sigma_1}{\sigma_2}$ will be

A. $\frac{4}{9}$

B. $\frac{2}{3}$

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

D. $\frac{9}{4}$

Answer: C

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13. The instantaneous current and volatage of an AC circuit are given by

$i = 10\sin(314t)A$ and $V = 100\sin(314t)V$

What is the power dissipation in the circuit?

A. 100 W

B. 500 W

C. 300 W

D. 200 W

Answer: B

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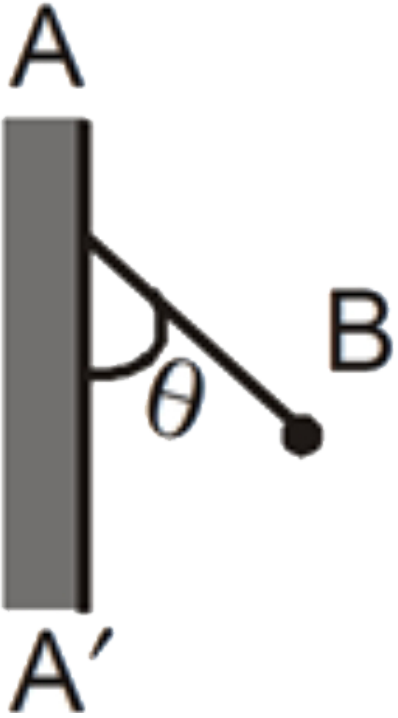
14. The line AA' is on a charged infinite conducting plane which is perpendicular to the plane of the paper. The plane has surface density of charge σ and B is a ball of mass m with a like charge of magnitude q. B is connected by a string from a point on the line AA'. The tangent of the angle (θ) formed between the line AA' and the string is (provided, the charge q does not affect the

distribution of charge on conducting plate)



A. $\frac{qsimga}{2\varepsilon_0 mg}$

B. $\frac{qsimga}{4\pi\varepsilon_0 mg}$

C. $\frac{qsimga}{2\pi\varepsilon_0 mg}$

D. $\frac{q\sigma}{\varepsilon_0 mg}$

Answer: D

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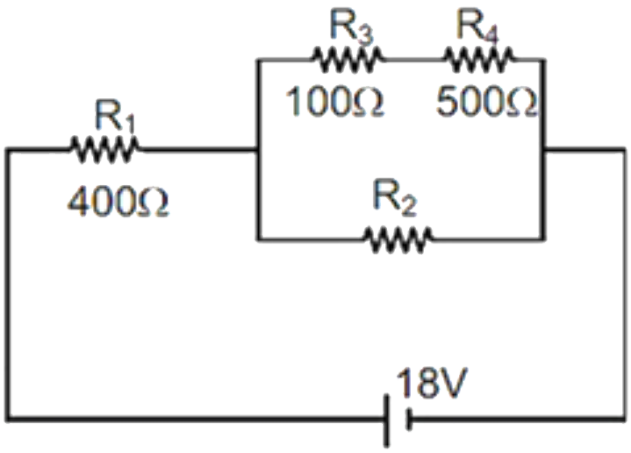
15. If the voltage across 500Ω is 5 V. then R_2 is



A. 400Ω

B. 200Ω

C. 300Ω

D. 500Ω

Answer: C

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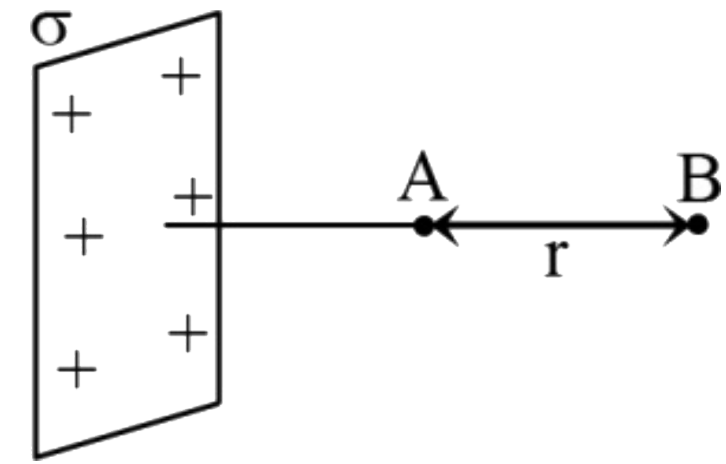
16. An infinite conducting sheet has surface charge density σ. The distance between two points is r. The potential difference $(V_A - V_B)$

between these point is



A. $\frac{\sigma r}{2\varepsilon_0}$

B. $\frac{\sigma r}{\varepsilon_0}$

C. $\frac{\sigma}{\varepsilon_0 r}$

D. $\frac{\sigma}{2\varepsilon_0 r}$

Answer: A

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17. The dimensional formula for magnetic flux is

A. $\left[ML^0T^{-2}A^{-1}\right]$

B. $\left[ML^2T^{-2}A^{-1}\right]$

C. $\left[ML^2T^{-1}A^3\right]$

D. $\left[ML^{-2}T^{-2}A^{-2}\right]$

Answer: B

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18. A cooling curve is plotted between the temperature of a hot body and time. Which of the following is not true for the cooling curve?

A. Cooling is faster from a calorimeter having a larger surface area than a smaller one.

B. Cooling is faster from a calorimeter painted black from outside than that from a polished surfaced calorimeter.

C. Cooling is faster from a copper calorimeter than from a steel calorimeter.

D. The rate of cooling remains same throughout the experiment. Hence the graph is a striagth line

Answer: D

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19. Escape velocity of a body from the surface of earth is 11.2km/sec. from the earth surface. If the mass of earth becomes double of its present mass and radius becomes half of its present radius then escape velocity will become

A. $5.6kms^{-1}$

B. $11.2kms^{-1}$

C. $22.4kms^{-1}$

D. $44.8 kms^{-1}$

Answer: C

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20. An iron rod of length 50 cm is joined at an end to an aluminum rod of length 100 cm. All measurements refer to $20^{\circ} C$. The coefficients of linear expansion of iron and aluminum are $12 \times 10^{-6} /^{\circ} C$ and $24 \times 10^{-6} /^{\circ} C$,

respectively. The average coefficient of expansion of composite system is :

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

B. $12 \times 10^{-6}.^{\circ} C^{-1}$

C. $20 \times 10^{-6}.^{\circ} C^{-1}$

D. $46 \times 10^{-6}.^{\circ} C^{-1}$

Answer: C

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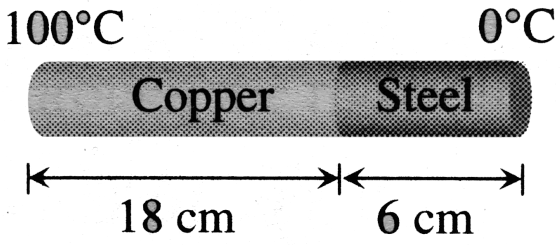

21.

The coefficient of thermal conductivity of copper is nine times that of steel. In the composite cylindrical bar shown in Fig. what will be the temperature at the junction of copper and steel ?

A. $75^{\circ}C$

B. $67^{\circ}C$

C. $25^\circ C$

D. $33^\circ C$

Answer: A

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22. A thermo-dynamical system is changed from state (P_1, V_1) to (P_2, V_2) by two different process. The quantity which will remain same will be

A. Q

B. W

C. Q + W

D. Q - W

Answer: D

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23. A current I flows along the length of an infinitely long, straight , thin - walled pipe. Then

A. The magnetic field at all point inside the pipe is the same, but not zero

B. the magnetic field at any point inside the pipe is zero

C. the magnetic field is zero only on the axis of the pipe

D. the magnetic field is different at different points inside the pipe

Answer: B

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24. A conducting rod of 1 m length and 1 kg mass is suspended by two verticle wires through its ends. An external magnetic field of 2T is applied normal to the rod. Now the current to be passed through the rod so as to make the tension in the wire zero is

[Take $g = 10ms^{-2}$]

A. 15 A

B. $5A$

C. $1.5A$

D. $2.5A$

Answer: B

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25. A straight wire of length 0.5 metre and carrying a current of 1.2 ampere is placed in a uniform magnetic field of induction 2 tesla. If the magnetic field is perpendicular to the length of the wire , the force acting on the wire is

A. 2.4 N

B. 1.2 N

C. 3.0 N

D. 2.0 N

Answer: B

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26. The minimum force required to move a body up on an inclined plane is three times the minimum force required to prevent it from

sliding down the plane.If the coefficient of friction between the body and the inclined plane is $\frac{1}{2\sqrt{3}}$ the angle of the inclined plane is

A. 60°

B. 45°

C. 30°

D. 15°

Answer: C

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27. A radioactive sample S_1 having the activity A_1 has twice the number of nucleic as another sample S_2 of activity A_2. If $A_2 = 2A_1$, then the ratio of half-life of S_1 to the half-life of S_2 is

A. 4

B. 2

C. 0.25

D. 0.75

Answer: A

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28. Half-life of a radioactive substance A is $4days$. The probability that a nuclear will decay in two half-lives is

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

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

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

D. 1

Answer: B

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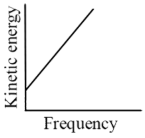
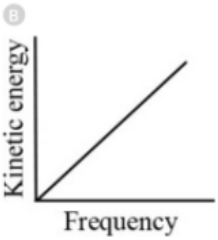
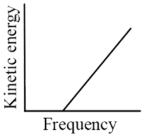
29. According to Einstein's photoelectric equation , the graph between the kinetic energy of photoelectrons ejected and the frequency of incident radiation is

A. 

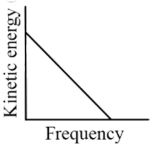
B.



C.



D.



Answer: C

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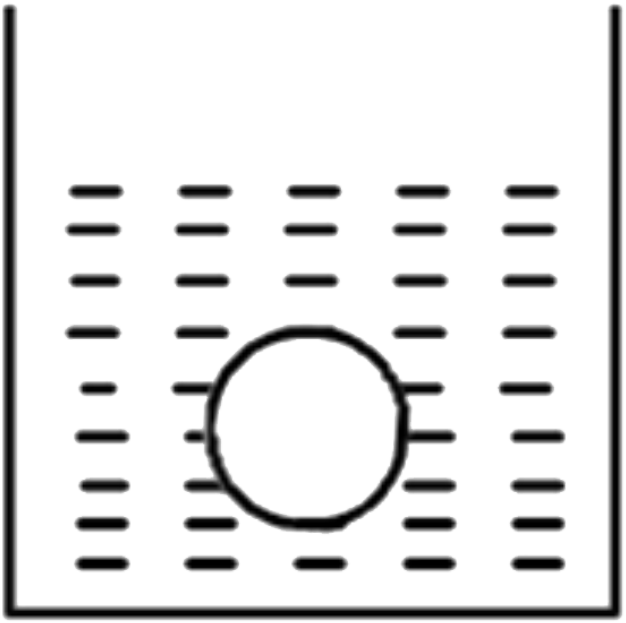
30. A smooth spherical ball of radius $1cm$ and density $4 \times 10^3 kg/m^3$ is dropped gently in a large container containing viscous liquid of density $2 \times 10^3 kg/m^3$, and $\eta = 0.1N - s/m^2$. The distance moved by the ball in $t = 0.1\,\text{sec}$ after it attains terminal

velocity is



A. $\frac{4}{5}m$ up

B. $\frac{4}{9}m$ up

C. $\frac{2}{3}m$ down

D. $\frac{4}{9}m$ down

Answer: D

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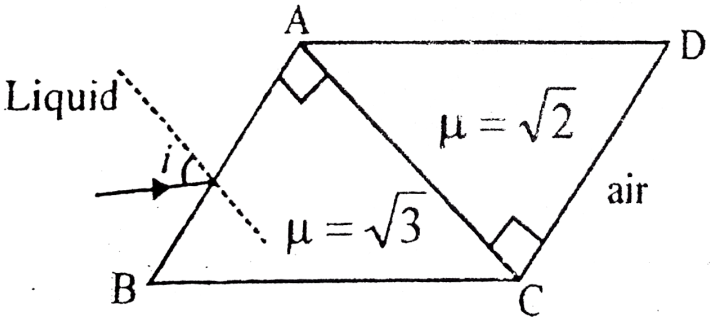
31. A ray light from a liquid $\left(\mu = \sqrt{3}\right)$ is incident on a system of two right angled prism of refractive indices $\sqrt{3}$ and $\sqrt{2}$ as shown. The ray suffers zero deviation when emerges into air from CD. The angle of incidence I is



A. 45°

B. 60°

C. 30°

D. 90°

Answer: A

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32. A microscope is having objective of focal length and eye piece of focal length 6cm. If tube length 30cm and image is formed at the

least distance of distant vision, what is the magnification prodcut by the microscope. (take D=25cm)

A. 6

B. 155

C. 25

D. 125

Answer: B

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33. Moment of inertia of a uniform quarter disc of radius R and mass M about an axis through its centre of mass and perpendicular to its plane is :

A. $\frac{MR^2}{2} - M\left(\frac{4R}{3\pi}\right)^2$

B. $\frac{MR^2}{2} - M\left(\sqrt{2}\frac{4R}{3\pi}\right)^2$

C. $\frac{MR^2}{2} - M\left(\frac{4R}{2\pi}\right)^2$

D. $\frac{MR^2}{2} - M\left(\sqrt{2}\frac{4R}{3\pi}\right)^2 \frac{9}{32\pi}$

Answer: B

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34. The radius of a wheel is R and its radius of gyration about its axis passing through its center and perpendicular to its plane is K. If the wheel is rolling without slipping. Then the ratio of its rotational kinetic energy to its translational kinetic energy is

A. $\frac{K^2}{R^2}$

B. $\frac{R^2}{K^2}$

C. $\frac{R^2}{R^2+K^2}$

D. $\frac{K^2}{R^2+K^2}$

Answer: A

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35. How many NAND gates used to form AND gate.

A. 1

B. 2

C. 3

D. 4

Answer: B

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36. If the forward voltage in a diode is increased, the width of the depletion region-

A. increases

B. decreases

C. fluctuates

D. no change

Answer: B

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37. For the same rise in temperature of one mole of gas at constant volume , heat required for a non - linear tratomic gas is K times that required for monoatomic gas . The value of K is

A. 1

B. 0.5

C. 2

D. 2.5

Answer: C

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38. In a single slit diffraction pattern, the distance between the first minimum on the left and the first minimum on the right is 5 mm. The screen on which the diffraction pattern is displayed is at a distance of 80 cm

from the silt. The wavelength is 6000 Å. The slit width (in mm) is about .

A. 0.576

B. 0.348

C. 0.192

D. 0.096

Answer: C

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39. In Young's double slit experiment , the two slits 0.20 mm apart are illuminated by monochromatic light of wavelength 600 nm . The screen 1.0 m away from the slits .

(a) Find the distance of the second (i) bright fringe , (ii) dark fringe from the central maximum .

(b) How will the fringe pattern change if the screen is moved away from the slits ?

A. 3 mm

B. 6 mm

C. 4 mm

D. 5 mm

Answer: B

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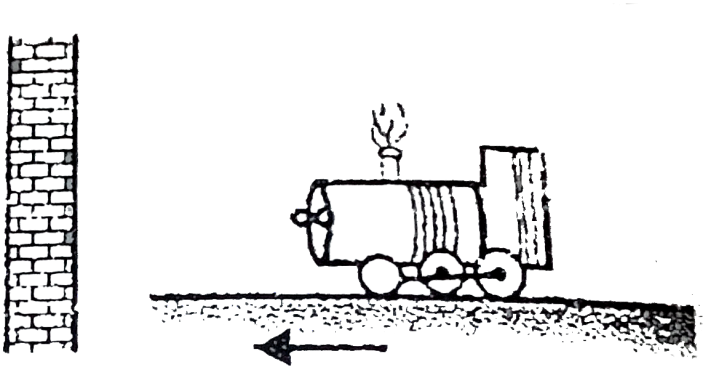
40. An engine driver moving towards a wall with velocity of $50ms^{-1}$ emits a note of frequnecy $1.2kHz$. The frequency of note after reflection from the wall as heard by the engine driver when speed of sound in air is $350ms^{-1}$

is :



A. 2.4 kHz

B. 0.24 kHz

C. 1.6 kHz

D. 1.2 kHz

Answer: C

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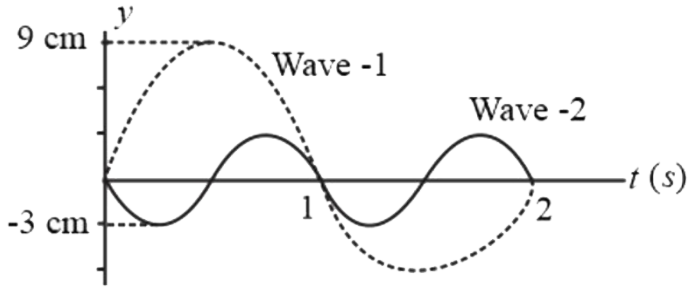
41. Displacement - time graphs for two waves, wave - 1 and wave - 2 are shown here. The ratio of the intensity of wave-1 to that of wave - 2 is



A. $1:1$

B. $9:4$

C. $16:9$

D. $9:1$

Answer: B

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42. The power of sound from the speaker of radio is 10 W. Now, the power of sound from the speaker of the radio is increased to 400 W by increasing the volume of the radio. The power increased in dB as compared to original power is nearly

A. 8

B. 12

C. 13

D. 16

Answer: D

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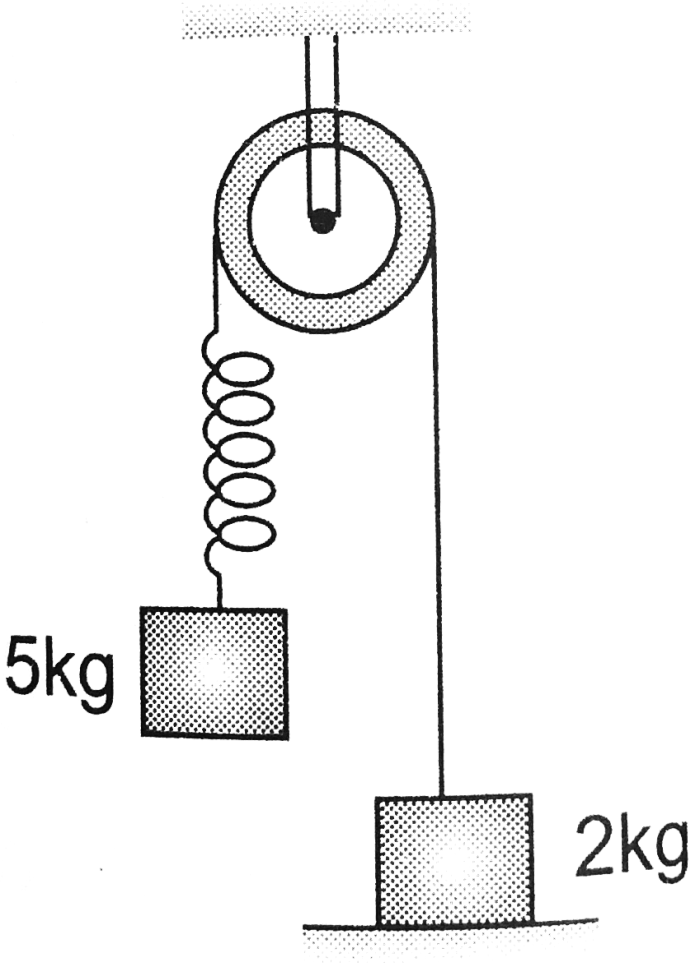
43. System shown in figure is released from rest . Pulley and spring is mass less and friction is absent everywhere. The speed of

$5kg$ block when $2kg$ block leaves the constant of with ground is (force constant of spring $k = 40N/m$ and $g = 10m/s^2$)



A. $\sqrt{2}ms^{-1}$

B. $2\sqrt{2}ms^{-1}$

C. $2ms^{-1}$

D. $4\sqrt{2}ms^{-1}$

Answer: B

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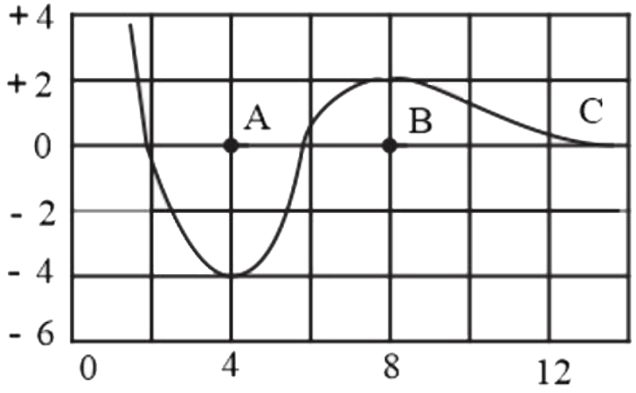
44. For the potential energy function shown in fig. there will be an unstable equilibrium at

position



A. A

B. B

C. C

D. None of the above

Answer: B

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45. A long spring is stretched by x cm its P.E. is U. If the same spring is stretched by Nx cm the P.E. stored in it will become

A. U/N

B. NU

C. N^2U

D. U / N^3

Answer: C

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