PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 105

Physics

1. Consider a beam of electrons (each electron with energy E_0) incident on a metal surface kept in an evacuated chamber. Then

A. electrons can be emitted with any energy with maximum of E_0

B. no electrons will be emitted as only photons of emit electrons

C. no electrons can be emitted but all with an energy

D. electrons can be emitted with any energy will maximum of $E_0 - \phi$ being work function

Answer: A

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2. When an electron jumps from higher orbit to the second orbit in He^+ ion,the radiation emitted out will be in $\left(R = 1.09 \times 10^7 m^{-1}\right)$

A. Ultraviolet region

B. Visible region

C. Infrared region

D. X-ray region

Answer: B

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3. A ball reaches a racket at $60m/s$ along +X direction and leaves the racket in the opposite direction with the same speed. Assuming that the mass of the ball as $50gm$ and the contact time is 0.02 second the force exerted by the racket on the ball is .

A. 300 N along + X direction

B. 300 N along -X direction

C. 300 kN along +X direction

D. 300 kN along - X direction

Answer: B

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4. A bullet of mass m moving with velocity v strikes a block of mass M at rest and gets embedded into it. The kinetic energy of the composite block will be

A. $\frac{1}{2}\frac{m^2v^2}{(m+M)}$

B. $\frac{1}{2}\frac{Mmv^2}{(m+M)}$

C. $\frac{1}{2}\frac{mv^2(M+m)}{M}$

D. $\frac{1}{2}\frac{mMv^2}{(M+m)}$

Answer: A

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5. Stone of mass 1 kg tied to the end of a string of length 1m , is whirled in horizontal circle with a uniform angular velocity $2rads^{-1}$. The tension of the string is (in newton)

A. 2

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

C. 4

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

Answer: C

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6. The magnetic induction field strength due to a short bar magnet at a distance 0.20 m on

the equatorial line is $20 \times 10^{-6} T$. The magnetic moment of the bar magnet is

A. $3.2 Am^2$

B. $6.4 Am^2$

C. $1.6 Am^2$

D. $16 Am^2$

Answer: C

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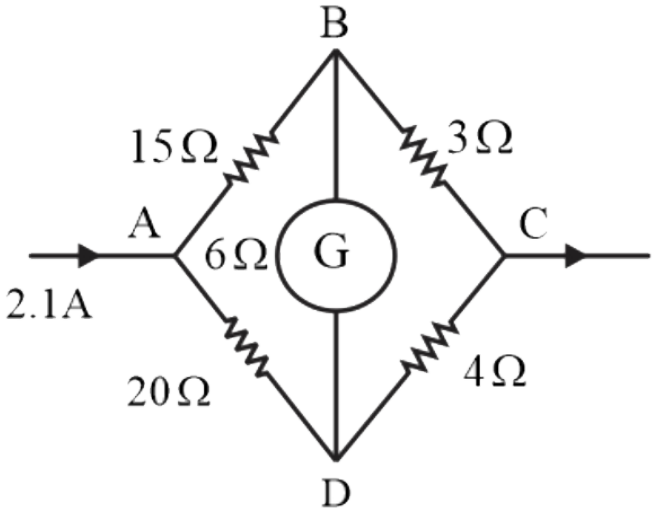
7. In the following network, the current flowing through 15Ω resistance is



A. $0.8A$

B. $1.0A$

C. $1.2A$

D. $1.4A$

Answer: C

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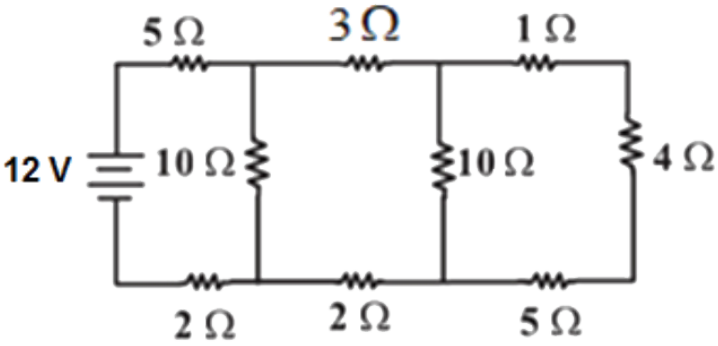
8. Consider the circuit shown below. The current in the 4Ω resistor is



A. $0.25A$

B. $0.50A$

C. $0.75A$

D. $1.00A$

Answer: A

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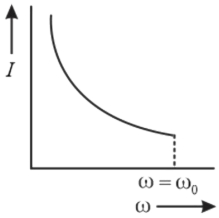
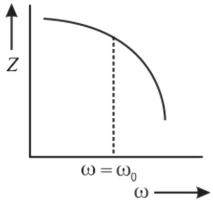
9. The current graph for resonance in LC circuit is

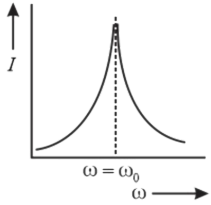
A.



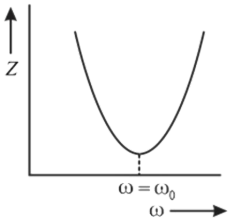
B.



C.



D.



Answer: C

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10. v34.2

A. l / L

B. l^2 / L

C. L / l

D. L^2 / l

Answer: B

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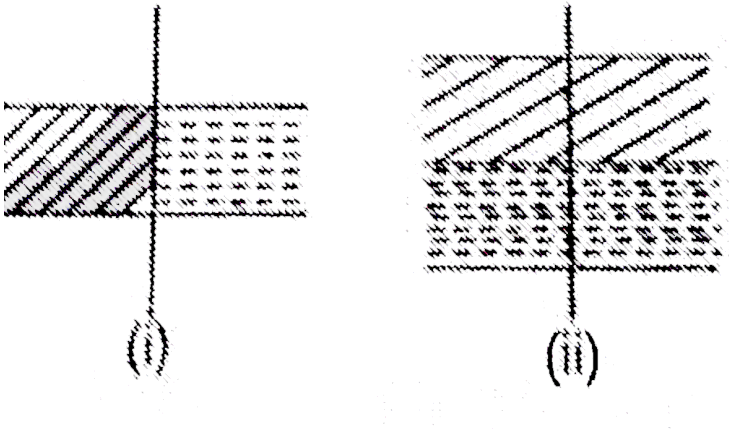
11. Calculate the ratio of capacitance of two capacitors of same dimension of same dimensions but of different values K and $\frac{K}{4}$ arranged in two ways as shown in Fig. (i) and (ii).



A. $5:2$

B. $25:16$

C. $5:4$

D. $2:5$

Answer: B

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12. The potential at a point distant x (measured in μm) due to some charges situated on the x-axis is given by

$V(x) = \frac{20}{x^2 - 4}$ V. The electric field at $x = 4\mu m$ is given by

A. $\frac{5}{3}\frac{v}{\mu m}$ and in positive x direction

B. $\frac{10}{9}\frac{v}{\mu m}$ and in negative x direction

C. $\frac{10}{9}\frac{v}{\mu m}$ and in positive x direction

D. $\frac{5}{3}\frac{v}{\mu m}$ and in negative x direction

Answer: C

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13. The radius of earth is about 6400 km and that of Mars is 3200 km . The mass of the earth is about 10 times the mass of Mars . An object weighs 200 N on te surface of Earth . Its weight on the surface of mars will be .

A. 8 N

B. 20 N

C. 40 N

D. 80 N

Answer: D

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14. The angular velocity of the earth with which it has to rotate so that the acceleration due to gravity on 60° latitude becomes zero is

A. $2.5 \times 10^{-3} rads^{-1}$

B. $5.0 \times 10^{-1} rads^{-1}$

C. $100 rads^{-1}$

D. $7.8 \times 10^{-2} rads^{-1}$

Answer: A

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15. For any material, If R , T and A represent the reflection coefficient, transparent coefficient and absorption coefficient respectively, then for a blackbody which one of the following is true

A. $R = 1, T = 0, A = 0$

B. $R = 0, T = 1, A = 1$

C. $R = 0, T = 0, A = 1$

D. R = 0, T = 1, A = 0

Answer: C

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16. At room temperature $(27^\circ C)$ the 'rms' speed of the molecules of a certain diatomic gas is found to be 1920 ms^{-1}. The gas is

A. F_2

B. Cl_2

C. H_2

D. O_2

Answer: C

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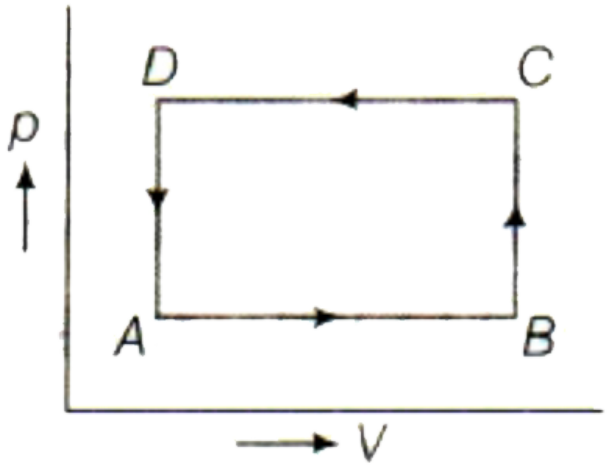
17. Choose the correct statement for an isolated system.



A. $\Delta U(C \rightarrow D)$ = negative

B. $\Delta Q(A \rightarrow B)$ = positive

C. $\Delta U(A - B - C - D - A) \neq 0$

D. $\Delta Q(D \rightarrow A) = 0$

Answer: D

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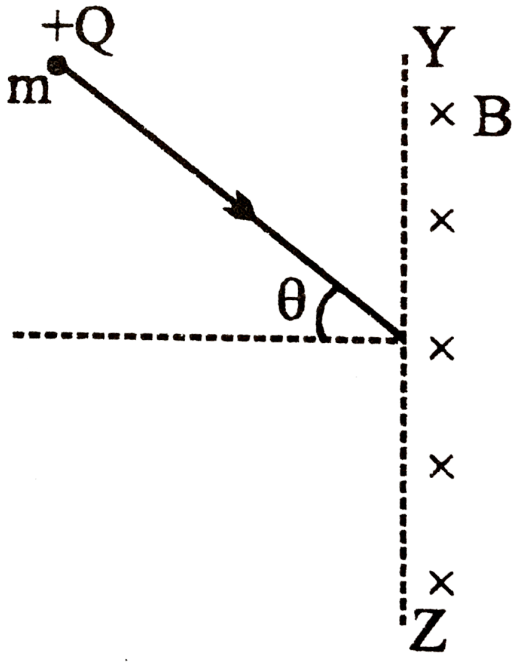
18. A particle with charge $+Q$ and mass m enters a magnetic field to magnitude B existing only of the right of the boundary YZ The direction of the motion of the particle is perpendicular to the direction of B Let $T = 2\pi\frac{m}{QB}$ The time spent by the particle in

the field will be



A. $\frac{2\pi m}{QB}$

B. $\frac{\pi m}{QB}$

C. $\frac{mv}{QB}$

D. infinite

Answer: B

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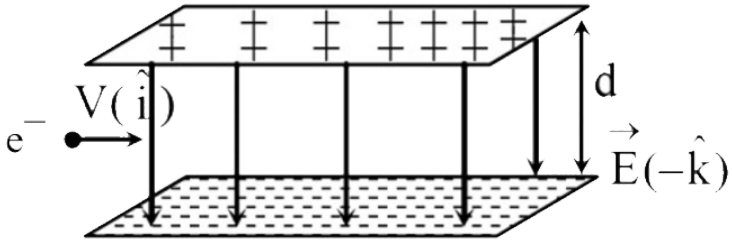
19. The parallel plate capacitor has potential difference of 100 V and separation between the plate is 1 mm. An electron is projected along x axis in between the plates. If the electron comes out of the plates along the x axis undevated then the magnitude and

direction of magnetic field that must be applied between the plates : (particle is projected with a velocity of $10^5 m/s$ along x axis)



A. $B = 1\hat{k}$ Tesla

B. $B = 1\hat{j}$ Tesla

C. $B = 1\left(-\hat{j}\right)$ Tesla

D. $B = 10\left(-\hat{j}\right)$ Tesla

Answer: B

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20. If the velocity v of a particle moving along a straight line decreases linearly with its displacement from $20m/s$ to a value approaching zero at $s = 30m$, determine the acceleration of the particle when $s = 15m$.

A. $\frac{2}{3}ms^{-2}$

B. $-\frac{2}{3}ms^{-2}$

C. $\frac{20}{3} ms^{-2}$

D. $-\frac{20}{3} ms^{-2}$

Answer: D

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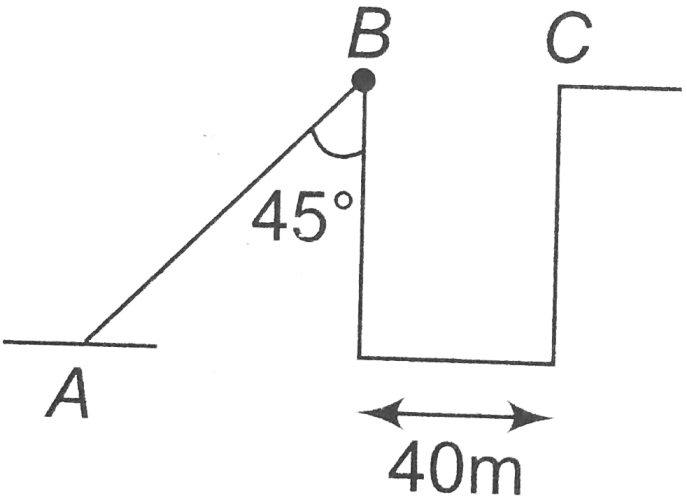
21. A body is projected up a smooth inclined plane with velocity V from the point A as shown in the figure. The angle of inclination is 45° and the top is connected to a well of diameter 40m. If the body just manages to

across the well, what is the value of V? Length of inclined plane is $20\sqrt{2}m$.



A. $20ms^{-1}$

B. $20\sqrt{2}ms^{-1}$

C. $40ms^{-1}$

D. $40\sqrt{2}ms^{-1}$

Answer: B

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22. A body moves along a circular path of radius $5m$. The coefficient of friction between the surface of the path and the body is 0.5. The angular velocity in rad/s with which the body should move so that it does not leave the path is $\left(g - 10m/s^{-2}\right)$

A. 4

B. 3

C. 2

D. 1

Answer: D

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23. A disc of mass 10 g is kept floating horizontal in the air by firing bullets, each of mass 5g, with the same velocity at the same rate of 10 bullets per second. The bullets

rebound with the same speed in positive direction . The velocity of each bullet at the time of impact is (Take $g = 9.8ms^{-2}$)

A. $196cms^{-1}$

B. $98cms^{-1}$

C. $49cms^{-1}$

D. $392cms^{-1}$

Answer: B

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24. If a star can convert all the He nuclei completely into oxygen nuclei. The energy released per oxygen nuclei is (Mass of the helium nucleus is 4.0026 amu and mass of oxygen nucleus is 15.9994 amu)

A. 7.6 MeV

B. 56.12 MeV

C. 10.24 MeV

D. 23.9 MeV

Answer: C

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25. Activity of radioactive element decreased to one third of original activity R_0 in 9 years. After further 9 years, its activity will be

A. I_0

B. $\frac{2}{3}I_0$

C. $I_0/9$

D. $I_0/3$

Answer: C

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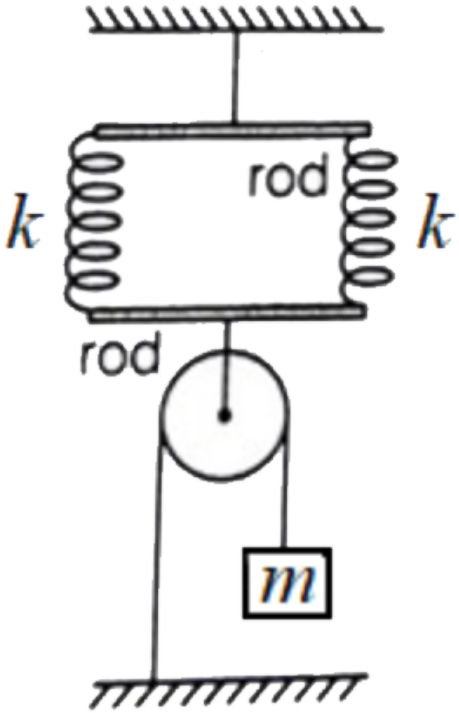
26. There are tow identical spring each of spring constant k. here springs, pulley and rods are massless and the block has mass m . What is the extension of each spring at

equilibrium?



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

B. $\frac{mg}{2k}$

C. $\frac{3mg}{4k}$

D. $\frac{mg}{k}$

Answer: D

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27. A horizontal platform with an object placed on it is executing SHM in the vertical direction . The amplitude of oscillation is 2.5 cm what must be the least period of these oscillations so that the object is not detached ?

A. πS

B. $\frac{\pi}{5}S$

C. $\frac{\pi}{10}S$

D. $\frac{\pi}{15}S$

Answer: C

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28. In a photoemissive cell, with exciting wavelength λ, the faster electron has speed v. If the exciting wavelength is changed to $3\lambda/4$, the speed of the fastest electron will be

A. Greater than $v\left(\frac{4}{3}\right)^{\frac{1}{2}}$

B. $v\left(\frac{3}{4}\right)^{\frac{1}{2}}$

C. $\left(\frac{4}{3}\right)^{\frac{1}{2}}$

D. Less than $v\left(\frac{4}{3}\right)^{\frac{1}{2}}$

Answer: A

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29. Light of wavelength A which is less than threshold wavelength is incident on a

photosensitive material. If incident wavelength is decreased so that emitted photoelectrons are moving with same velocity, then stopping potential will

A. increase

B. decrease

C. be zero

D. become exactly half

Answer: A

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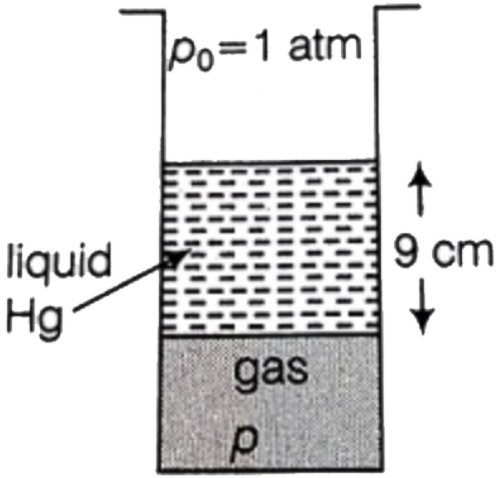
30. In the given figure, atmospheric pressure $p_0 = 1$ atm and mercury column length is 9 cm. Pressure p of the gas enclosed in the tube is



A. Pressure of 67 cm of Hg

B. Pressure of 90 cm of Hg

C. Pressure of 78 cm of Hg

D. Pressure of 85 cm of Hg

Answer: D

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31. A stream of water flowing horizontally with a speed of $15ms^{-1}$ pushes out of a tube of cross sectional area $10^{-2}m^2$ and hits a vertical wall near by what is the force exerted

on the wall by the impact of water assuming.that it does not rebound? (Density of water $= 1000 kgm^3$)

A. 2250 N

B. 2000 N

C. 1500 N

D. 1000 N

Answer: A

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32. Two transparent media A and B are separated by a plane boundary. The speed of light in medium A is $2.0 \times 10^8 ms^{-1}$ and in medium B is $2.5 \times 10^8 ms^{-1}$. The critical angle for which a ray of light going from A to B suffers total internal reflection is

A. $\sin^{-1}\left(\frac{1}{\sqrt{2}}\right)$

B. $\sin^{-1}\left(\frac{1}{2}\right)$

C. $\sin^{-1}\left(\frac{4}{5}\right)$

D. 90

Answer: C

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33. An astronomical telescope has objective and eye-piece lens of powers 0.5 D and 20 D respectively, its magnifying power will be

A. 30

B. 10

C. 40

D. 20

Answer: C

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34. A particle of mass $5g$ is moving with a uniform speed of $3\sqrt{2}cm/s$ in the $x-y$ plane along the line $y=x+4$. The magnitude of its angular momentum about the origin in gcm^2/s is

A. Zero

B. 60

C. 30

D. $\frac{30}{\sqrt{2}}$

Answer: B

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35. A unifrom sphere of mass 500 g rolls without slipping on a plants horizontal surface with its center moving at a speed of $5.00 cm / s$ .It kinetic energy is :

A. $8.75 \times 10^{-4} J$

B. $8.75 \times 10^{-3} J$

C. $6.25 \times 10^{-4} J$

D. $1.13 \times 10^{-3} J$

Answer: A

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36. Which of the following statement is wrong regarding a p - n junction diode

A. Diode may illuminate light

B. Diodes are rectifying devices

C. Diodes are unidirectional devices

D. Diodes have three terminals

Answer: D

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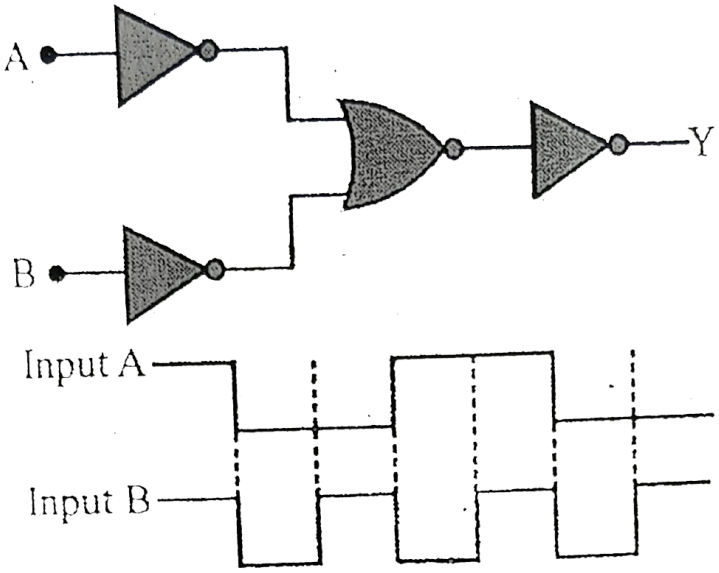
37. The logic circuit shown has the input waveforms 'A' and 'B' as shown. Pick out the

CORRECT output waveform:-



A. 

B. 

C. 

D. 

Answer: C

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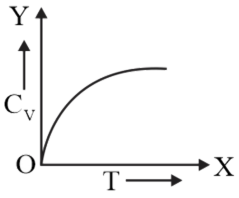
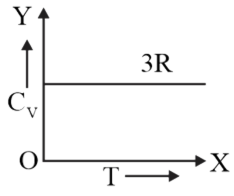
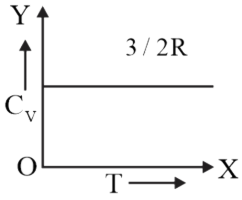
38. Graph for specific heat at constant volume for a monoatomic gas

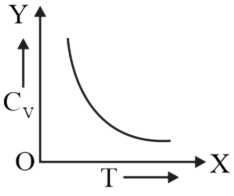
A. 

B. 

C.



D.



Answer: C

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39. The density of a solid ball is to be determined in an experiment. The diameter of the ball is measured with a screw gauge,

whose pitch is $0.5mm$ and there are 50 divisions on the circular scale. The reading on the main scale is $2.5mm$ and that on circular scale is 20 divisions. if the measured mass of the ball has a relative error of 2%, the relative percentage error in the density is

A. 0.9%

B. 2.4%

C. 3.1%

D. 4.2%

Answer: C

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40. Two periodic waves of intensities I_1 and I_2 pass through a region at the same time in the same direction.The sum of the maximum and minimum intensities is

A. $(I_1 + I_2)$

B. $2(I_1 + I_2)$

C. $\left(\sqrt{I_1} + \sqrt{I_2}\right)$

D. $\left(\sqrt{I_1} - \sqrt{I_2}\right)$

Answer: B

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41. The red light of wavelength 5400 Å from a distant source falls on a slit 0.80 mm wide. Calculate the distance between the first two dark bands on each side of the central bright band in the diffraction pattern observed on a screen place 1.4m from the slit.

A. 1.89 mm

B. 4 mm

C. 3 mm

D. 5 mm

Answer: A

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42. The equation of the progressive wave is $y = 3\sin\left[\pi\left(\frac{t}{3} - \frac{x}{5}\right) + \frac{\pi}{4}\right]$, where x and y are in metre and time in second. Which of the following is correct.

A. Velocity $V = 1.5m/s$

B. Amplitude $A = 3cm$

C. Frequency $F = 0.2Hz$

D. Wavelength $\lambda = 10m$

Answer: D

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43. A string of mass 2.50kg is under a tension os 200N. The length of the stretched string is 20.0m. If the transverse jerk is struck at one

end of the string, how long does the disturbance take to reach the other end?

A. $0.50s$

B. $0.20s$

C. $0.10s$

D. $0.40s$

Answer: A

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44. The kinetic energy K of a particle moving along a circle of radius R depends upon the distance s as $K = as^2$. The force acting on the particle is

A. $2as$

B. as

C. $2a$

D. $\sqrt{as^2}$

Answer: A

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45. The potential energy of a particle of mass 5 kg moving in the $x-y$ plane is given by $U=(-7x+24y)J$, where x and y are given in metre. If the particle starts from rest, from the origin, then the speed of the particle at $t=2$s is

A. $5ms^{-1}$

B. $14ms^{-1}$

C. $17ms^{-1}$

D. $10ms^{-1}$

Answer: D

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