



PHYSICS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 67

Physics

1. A hydrogen atom initially in the ground level absorbs a photon, which excites it to then

$n = 4$ level. Determine the wavelength and frequency of photon.

A. $8.6 \times 10^{-7} m$

B. $9.8 \times 10^{-8} m$

C. $7.4 \times 10^{-8} m$

D. $8.2 \times 10^{-8} m$

Answer: B



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2. After perfectly inelastic collision between two identical balls moving with same speed in different directions, the speed of the combined mass becomes half the initial speed. Find the angle between the two before collision.

A. 60°

B. 45°

C. 120°

D. 30°

Answer: C



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3. A light rod length L , is hanging from the vertical smooth wall of a vehicle moving with acceleration $\sqrt{3}g$ having a small mass attached at its one end is free to rotate about an axis passing through the other end. The minimum velocity given to the mass at its equilibrium position with respect to vehicle so that it can complete vertical circular motion

respect to vehical) is \sqrt{KgL} . Find the value of K .

A. $\sqrt{5gL}$

B. $\sqrt{4gL}$

C. $\sqrt{8gL}$

D. None of these

Answer: C



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4. An e.m.f. $E = 4 \cos(1000t)$ volt is applied to an LR circuit of inductance $3mH$ and resistance $4ohm$. The amplitude of current in the circuit is

A. $4\sqrt{7}A$

B. $1.0A$

C. $\frac{4}{7}A$

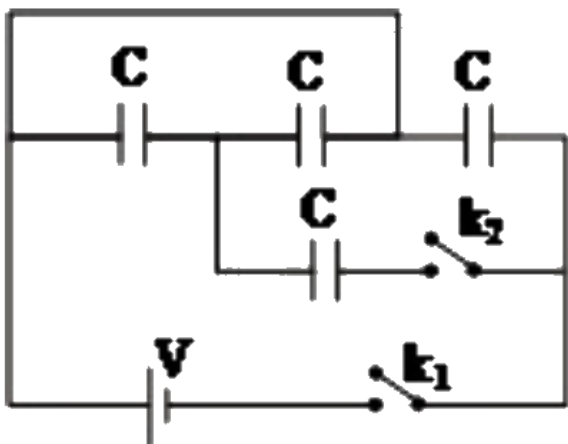
D. $0.8A$

Answer: D



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5. Four identical capacitors are connected with a battery of voltage V and two switches k_1 and k_2 as shown in the figure below. Initially, k_1 is closed, now if k_2 is also closed, find the heat loss.



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

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

C. $\frac{1}{3}CV^2$

D. $\frac{1}{4}CV^2$

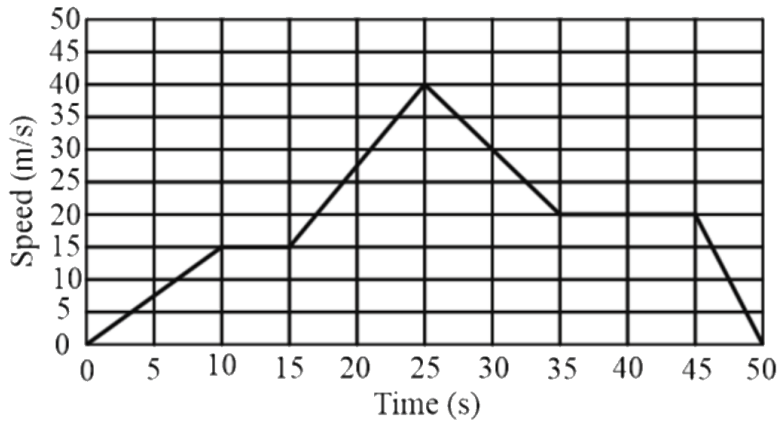
Answer: C



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6. The following figure gives the movement of an object. Select the correct statement from

the given choices.



A. The total distance travelled by the object

is 975 m

B. The maximum acceleration of the object

is 2ms^{-2}

C. The maximum deceleration happened

between 25th and 35th seconds

D. The object was at rest between
 10^{th} and 15^{th} seconds

Answer: A



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7. The escape speed of a projectile on the earth's surface is 11.2 km s^{-1} . A body is projected out with thrice this speed. What is the speed of the body far away from the

earth? Ignore the presence of the sun and other planets.

A. 56.63 km s^{-1}

B. 33 km s^{-1}

C. 39 km s^{-1}

D. 31.7 km s^{-1}

Answer: D



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8. Which of the following cylindrical rods will conduct most heat, when their ends are maintained at the same steady temperature

A. $l = 1m, r = 0.2m$

B. $l = 1m, r = 0.1m$

C. $l = 10m, r = 0.1m$

D. $l = 0.1m, r = 0.3m$

Answer: D



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9. For which combination of working temperature, the efficiency of Carnot's engine is the least ?

A. 100 K, 80 K

B. 40 K, 20 K

C. 80 K, 60 K

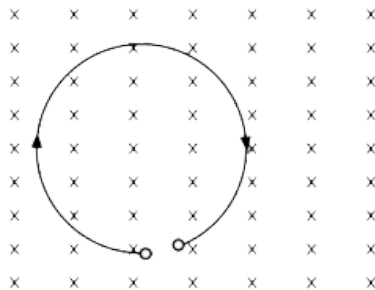
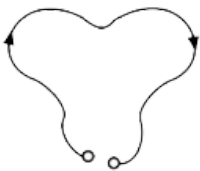
D. 60 K, 40 K

Answer: A



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10. A thin flexible wire of length L is connected to two adjacent fixed points and carries a current I in the clockwise direction, as shown in the figure. When the system is put in a uniform magnetic field of strength B going into the plane of the paper, the wire takes the shape of a circle. The tension in the wire is :



A. IBL

B. $\frac{IBL}{\pi}$

C. $\frac{IBL}{2\pi}$

D. $\frac{IBL}{4\pi}$

Answer: C



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11. A train of $150m$ length is going toward north direction at a speed of $10ms^{-1}$. A parrot flies at a speed of $5ms^{-1}$ toward south direction parallel to the railway track. The time

taken by the parrot to cross the train is equal to.

A. 12 s

B. 8 s

C. 15 s

D. 10 s

Answer: D



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12. A photon of energy 10.2 eV corresponds to light of wavelength λ_0 . Due to an electron transition from $n=2$ to $n=1$ in a hydrogen atom, light of wavelength λ is emitted. If we take into account the recoil of the atom when the photon is emitted.

A. $\lambda < \lambda_0$

B. $\lambda > \lambda_0$

C. $\lambda = \lambda_0$

D. None of these

Answer: B



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13. The level of water in a tank is 5 m high . A hole of the area 10cm^2 is made in the bottom of the tank . The rate of leakage of water from the hole is

A. $10^{-2}\text{m}^3\text{s}^{-1}$

B. $10^2\text{m}^3\text{s}^{-1}$

C. $10\text{m}^3\text{s}^{-1}$

D. $10^{-4}m^3s^{-1}$

Answer: A

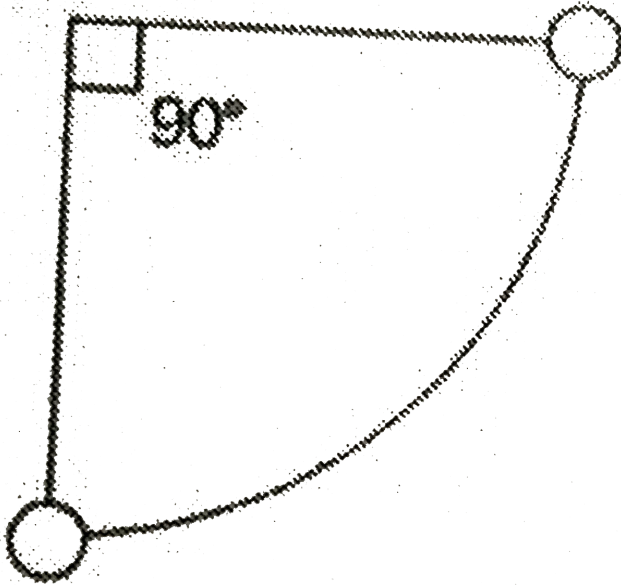


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14. A simple pendulum is vibrating with an angular amplitude of 90° as shown in figure.

For what value of α (angle between string and vertical) during its motion, the total

acceleration is directed horizontally ?



A. 0

B. 90°

C. $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$

D. $\sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$

Answer: C



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15. In CE NPN transistor 10^{10} electrons enter the emitter in 10^{-6} s when it is connected to battery. About 5% electrons recombine with holes in the base. The current gain of the transistor is ($e = 1.6 \times 10^{-19} C$)

A. 0.98

B. 19

C. 49

D. 0.95

Answer: B



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16. An 1800 W toaster, a 1.3 kW electric fan and a 100 W lamp are plugged in the same 120 V circuit i.e., all the three devices are in parallel. What is the approximate value of the total

current (i.e. the sum of current drawn by the three devices) through the circuit ?

A. 40 A

B. 120 A

C. 18 A

D. 27 A

Answer: D



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17. If $v = \frac{A}{t} + Bt^2 + Ct^3$ where v is velocity, t is time and A , B and C are constants, then the dimensional formula of B is

A. $[M^0 L T^0]$

B. $[M L^0 T^0]$

C. $[M^0 L^0 T]$

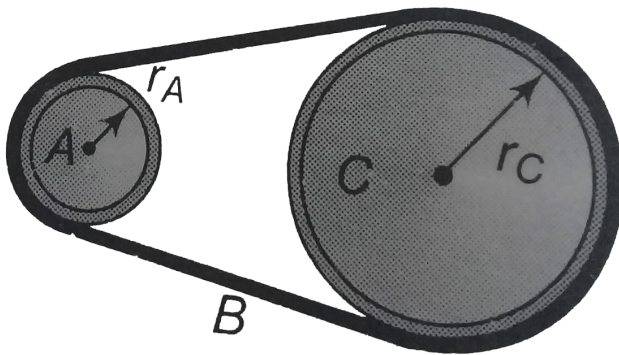
D. $[M^0 L T^{-3}]$

Answer: D



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18. In figure wheel A of radius $r_A = 10\text{cm}$ is coupled by belt B to wheel C of radius $r_C = 25\text{cm}$. The angular speed of wheel A is increased from rest at a constant rate of $1.6\text{rad}/\text{s}^2$. Find the time needed for wheel C to reach an angular speed of $12.8\text{rad}/\text{s}$, assuming the belt does not slip.



A. 4 s

B. 8 s

C. 12 s

D. 16 s

Answer: D



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19. A man is watching two trains, one leaving and the other coming in with equal speed of 4 m/s. If they sound their whistles, each of

frequency 240 Hz, the number of beats heard by the man (velocity of sound in air is $320\frac{m}{s}$) will be equal to

A. 12

B. zero

C. 6

D. 3

Answer: C



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20. A body is moved along a straight line by a machine delivering constant power . The distance moved by the body is time t is propotional to

A. $t^{1/2}$

B. $t^{3/4}$

C. $t^{3/2}$

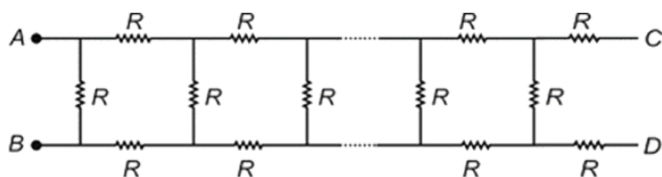
D. $t^{1/4}$

Answer: C



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21. In the circuit shown, the resistance of each of resistor is $R = 100\Omega$. Find the nearest integer, which is to be connected points C and D so that the resistance of entire circuit between A and B does not depend on the number of elementary cells.



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22. A body of weight 64 N is pushed with just enough force to start it moving across a horizontal floor and the same force continues to act afterwards. If the coefficients of static and dynamic friction are 0.6 and 0.4 respectively, the acceleration of the body will be (Acceleration due to gravity = g)



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23. A sample contains a large number of nuclei. The probability that a nucleus in the

sample will decay after four half - lives is $\frac{a}{b}$

where a and b are least positive integers.

Value of $a + b$ will be



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24. A mass $m_1 = 1kg$ connected to a horizontal spring performs S.H.M. with amplitude A . While mass m_1 is passing through mean position another mass $m_2 = 3kg$ is placed on it so that both the masses move together with amplitude A_1 . The

ratio of $\frac{A_1}{A}$ is $\left(\frac{p}{q}\right)^{1/2}$, where p and q are the smallest integers. Then what is the value of $p + q$?



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25. The maximum value of refractive index of a prism which permits the transmission of light through it when the refracting angle of the prism is 90° , is given by



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