doubtnut
India's Number 1 Education App

PHYSICS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 25

Physics

1. A radioactive sample at any instant has its disintegration rate 5000 disintegrations per minute. After 5 minutes , the rate is 1250

disintegration per minute. Then , the decay constant (per minute)

A. 0.4 In 2

B. 0.2 In 2

C. 0.1 In 2

D. 0.8 In 2

Answer: A

 Watch Video Solution

2. Young'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

Watch Video Solution

Watch Video Solution

3. Consider a sort magnetic dipole of magnetic length 10cm. Find its geometric length.

A. 12 cm

B. 5 cm

C. 3 cm

D. 4 cm

Answer: A

Watch Video Solution

4. The speed of sound in hydrogen gas at N.T.P is $1328ms^{-1}$. If the density of hydrogen is $1/16^{\text{th}}$ of that of air, then the speed of sound in air at N.T.P is

A. $340ms^{-1}$

B. $332ms^{-1}$

C. $320ms^{-1}$

D. $280ms^{-1}$

Answer: B

Watch Video Solution

5. In a potentiometer experiment the balancing with a cell is at length 240 cm. On shunting the cell with a resistance of 2Ω, the balancing length becomes 120 cm.The internal resistance of the cell is

A. 4Ω

B. 1Ω

C. 0.5Ω

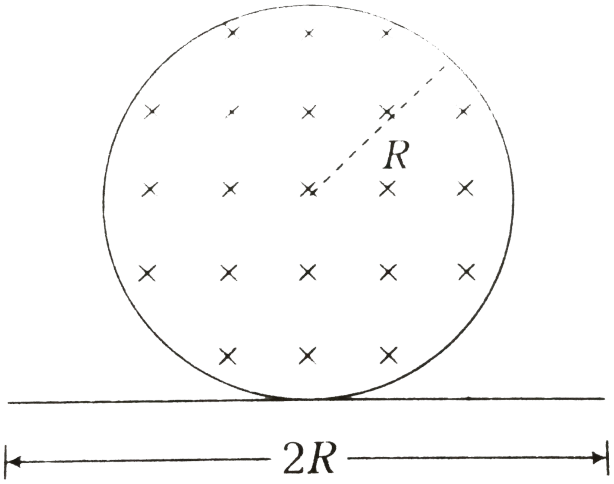
D. 2Ω

Answer: D

Watch Video Solution

6. A uniform but time varying magnetic field is present in a circular region of radius R. The magnetic field is perpendicular and into the plane of the loop and the magnitude of field is increasing at a constant rate α. There is a straight conducting rod of length 2R placed as

shown in figure.



The magnitude of induced emf across the rod is

A. $\pi R^2 \alpha$

B. $\frac{\pi R^2 \alpha}{4}$

C. $\frac{R^2 \alpha}{\sqrt{2}}$

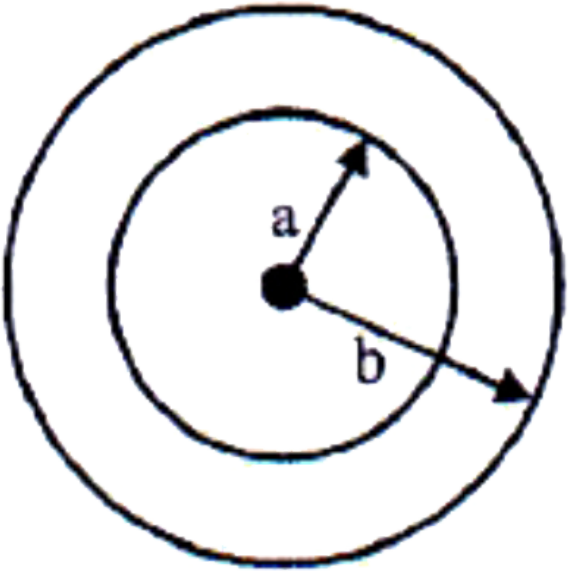
D. $\frac{\pi R^2 \alpha}{2}$

Answer: B

Watch Video Solution

7. In a spherical distribution , the charge density varies as $\rho(r) = A/r$ for $a < r < b$ (as shown) where A is constant . A point charge Q lies at the centre of the sphere at r = 0 . The electric filed in the region $a < r < b$

has a constant magnitude for



A. A = 0

B. A = Q

C. $A = \frac{Q}{2\Pi a^2}$

D. $A = \frac{Q}{4\Pi a^2}$

Answer: C

Watch Video Solution

8. Eight point charge of charge q each are placed on the eight corners of a cube of side a. A solid neutral metallic sphere of radius $a/3$ is placed with its centre at the centre of the cube . As a result charges are induced on the sphere , which form certain pattern on its surface . What is the potential at the center of the sphere .

A. $\frac{-12}{\sqrt{3}}\frac{Kq}{a}$

B. $\frac{18}{\sqrt{4}}\frac{Kq}{a}$

C. $-\frac{8}{\sqrt{2}}\frac{Kq}{a}$

D. $\frac{16}{\sqrt{3}}\frac{Kq}{a}$

Answer: D

Watch Video Solution

9. A second's pendulum clock having steel wire is calibrated at 20°C. When temperature is increased to 30°C, then calculate how much

time does the clock

$[\alpha_{Steel}=1.2 \times 10^{-6^{\circ}} C^{-1}$

A. $0.3628s$

B. 3.626

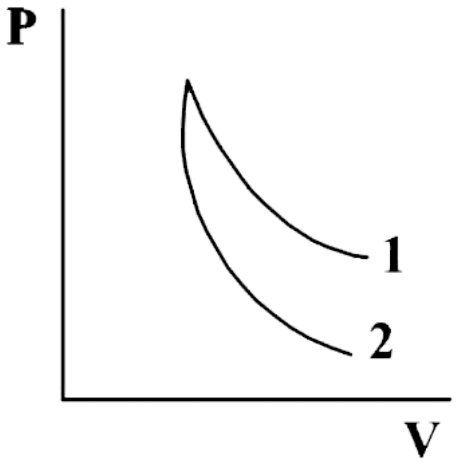
C. $362.8s$

D. $36.28s$

Answer: D

Watch Video Solution

10. P-V plots for two gases during adiabatic processes are shown in the figure. Plots 1 and 2 should corresponds respectively to



A. He and O_2

B. O_2 and He

C. He and Ar

D. O_2 and N_2

Answer: B

Watch Video Solution

11. Two bar magnets are placed in vibration magnetometer and allowed to vibrate. They make 20 oscillations per minute when their similar pole are on the same side, while they make 15 oscillations per minute when their

opposite poles lie on the same side. The ratio of their magnetic moments is

A. $4:3$

B. $25:7$

C. $7:5$

D. $25:16$

Answer: B

Watch Video Solution

12. A block of mass 2 kg rests on an inclined plane which makes an angle of 30° with the horizontal. The coefficient of friction between the block and the surface is $\sqrt{3/2}$. (i) What force should be applied on the block so that it moves down without any acceleration ? (ii) What force should be applied on the block so that it moves up without any acceleration ? (iii) Calculate the ratio of the powers in the above two cases if the block moves with uniform speed in both the cases.

A. 10 N

B. 30 N

C. 20 N

D. 25 N

Answer: D

Watch Video Solution

13. A uniform cylinder of length (L) and mass (M) having cross sectional area (A) is suspended, with its length vertical, from a

fixed point by a massless spring, such that it is half - submerged in a liquid of density ρ at equilibrium position. When the cylinder is given a small downward push and released it starts oscillating vertically with small amplitude. If the force constant of the spring is (k), the frequency of oscillation of the cylindcer is.

A. $\frac{1}{2\pi}\left(\frac{k - A\rho g}{M}\right)^{1/2}$

B. $\frac{1}{2\pi}\left(\frac{k + A\rho g}{M}\right)^{1/2}$

C. $\frac{1}{2\pi}\left(\frac{k + \rho g L^2}{M}\right)^{1/2}$

D. $\frac{1}{2\pi}\left(\frac{k+A\rho g}{A\rho g}\right)^{1/2}$

Answer: B

Watch Video Solution

14. The radius of first Bohr orbit is x, then de-Broglie wavelength of electron in 3rd orbit is nearly

A. $2\pi r$

B. $6\pi r$

C. 9x

D. $x/3$

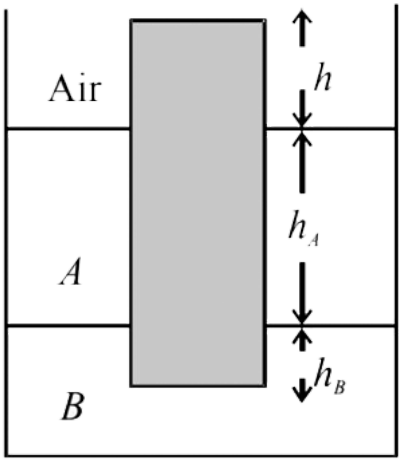
Answer: B

Watch Video Solution

15. A uniform solid cylinder of density $0.8g/cm^3$ floats in equilibrium in a combination of two non-mixing liquids A and B with its axis vertical.

The densities of the liquids A and B are

$0.7g/cm^3$ and $1.2g/cm^3$, respectively. The height of liquid A is $h_A = 1.2cm$. The length of the part of the cylinder immersed in liquid B is $h_B = 0.8cm$.



(a) Find the total force exerted by liquid A on the cylinder.

(b) Find h, the length of the part of the cylinder in air.

(c) The cylinder is depressed in such a way that its top surface is just below the upper surface of liquid A and is then released. Find the acceleration of the cylinder immediately after it is released.

A. zero

B. 84 N

C. 96 N

D. 40 N

Answer: A

Watch Video Solution

16. Two rain drops reach the earth with different terminal velocities having ratio $9:4$. Then , the ratio of their volumes is

A. $3:2$

B. $4:9$

C. $9:4$

D. $27:8$

Answer: D

Watch Video Solution

17. An infinity long rod lies along the axis of a concave mirrror of focal length f.The near end of a the rod is at a distance $u > f$ from the mirror ,Its image will have a length:

A. $\frac{f^2}{u-f}$

B. $\frac{uf}{u-f}$

C. $\frac{f^2}{u+f}$

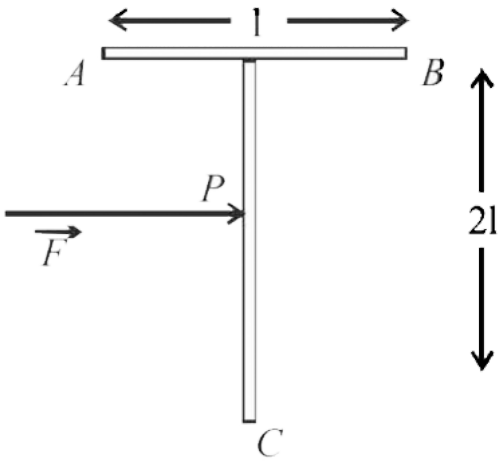
D. $\frac{uf}{u+f}$

Answer: A

Watch Video Solution

18. A 'T' shaped object with dimensions shown in the figure, is lying on a smooth floor. A force $'\vec{F}'$ is applied at the point P parallel to AB, such that the object has only the translational motion without rotation. Find the location of

P with respect C.



A. $\frac{4}{3}l$

B. l

C. $\frac{3}{4}l$

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

Answer: A

Watch Video Solution

19. The mode of propagation used by short wave broadcast services having a frequency range from a few $3MH_z$ up to $30MH_z$ is

A. ground wave

B. space wave

C. sky wave

D. all of these

Answer: C

Watch Video Solution

20. What should be the length of the dipole antenna for a carrier wave of frequency 3×10^8 Hz?

A. 0.25m

B. 1 m

C. 2 m

D. $0.1m$

Answer: A

Watch Video Solution

21. The resistance of the series combination of two resistances is S. When they are joined in parallel the total resistance is P. If S= nP then the minimum possible value of n is

Watch Video Solution

22. A car, moving with a speed of $50km/hr$, can be stopped by brakes after at least $6m$. If

the same car is moving at a speed of $100 km / hr$, the minimum stopping distance is

Watch Video Solution

23. A machine gun fires a bullet of mass 40 g with a velocity $1200 ms^{-1}$. The man holding it can exert a maximum force of 144 N on the gun. How many bullets can be fire per second at the most?

Watch Video Solution

24. Two plane progressive waves having the same wavelength λ And same frequencies with intensities $9I_0$ and $4I_0$ Suprimpose. Resulting intensity when the path difference between waves become $\frac{\lambda}{4}$ is

Watch Video Solution

25. The potential energy of a 1kg particle free to move along the x-axis is given by $V(x) = \left(\frac{x^4}{4} - \frac{x^2}{2}\right)J$ The total mechanical

energy of the particle is 2J then the maximum speed $(\in m/s)$ is

Watch Video Solution