# PHYSICS

# BOOKS - NTA MOCK TESTS

# NTA JEE MOCK TEST 71

Physics

**1.** A hydrogen atom is in ground state. In order to get six lines in its emission spectrum, wavelength of incident radiation should be

A. $800\text{Å}$

B. $825\text{Å}$

C. $975\text{Å}$

D. $1025\text{Å}$

**Answer: C**

Watch Video Solution

**2.** A ball is dropped from a height h on a floor. The coefficient of restitution for the collision between the ball and the floor is e. The total

distance covered by the ball before it comes to the rest.

A. $h\left(1-2e^2\right)$

B. $h\left[\frac{1+e^2}{1-e^2}\right]$

C. $h\left[\frac{1-e^2}{1+e^2}\right]$

D. $he^2$

**Answer: B**

Watch Video Solution

**3.** A particle moves in xy-plane. The position vector of particle at any time is $\overrightarrow{r} = \left\{(2t)\hat{i} + \left(2t^2\right)\hat{j}\right\}m.$ The rate of change of 0 at time $t = 2$ second. ( where 0 is the angle which its velocity vector makes with positive x-axis) is :

A. $\frac{2}{17}\ \text{rad s}^{-1}$

B. $\frac{1}{14}\ \text{rad s}^{-1}$

C. $\frac{4}{7}\ \text{rad s}^{-1}$

D. $\frac{6}{5}\ \text{rad s}^{-1}$

**Answer: A**

Watch Video Solution

**4.** A telephone wire of length $200km$ has a capacitance of $0.014\mu Fperkm$. If it carries an $AC$ of frequency $5kHz$ what should be the value of an inductor required to be connected in series so that impedence of the circuit is minimum ?

A. 0.35 mH

B. 3.5 mH

C. 2.5 mH

D. zero

**Answer: A**

 Watch Video Solution

**5.** What is the radius of the imaginary concentric sphere that divides the electrostatic field of a metal sphere of a radius

20 cm and change of $8\mu C$ in two regions of identical energy?

A. 30 cm

B. 40 cm

C. 60 cm

D. 80 cm

**Answer: B**

Watch Video Solution

**6.** A particle starts from the origin of coordinates at time t = 0 and moves in the xy plane with a constant acceleration $\alpha$ in the y-direction. Its equation of motion is $y = \beta x^2$. Its velocity component in the x-direction is

A. Variable

B. $\sqrt{\frac{2\alpha}{\beta}}$

C. $\frac{\alpha}{2\beta}$

D. $\sqrt{\frac{\alpha}{2\beta}}$

**Answer: D**

Watch Video Solution

**7.** How many times faster than its present speed the earth should rotate so that the apparent weight of an object at equator becomes zero ? Given radius of the earth = $6.37 \times 10^6$ m . What would be the duration of the day in that case ?

A. 5 times

B. 9 times

C. 13 times

D. 17 times

**Answer: D**

Watch Video Solution

**8.** 5 g of water at $30^\circ C$ and 5 g of ice at $-20^\circ C$ are mixed together in a calorimeter Find the final temperature of the mixure. Assume water equivalent of calorimeter to be negligible, sp. Heats of ice and water are 0.5

and $1cal/gC^\circ$, and latent heat of ice is $80cal/g$

A. $0^\circ C$

B. $10^\circ C$

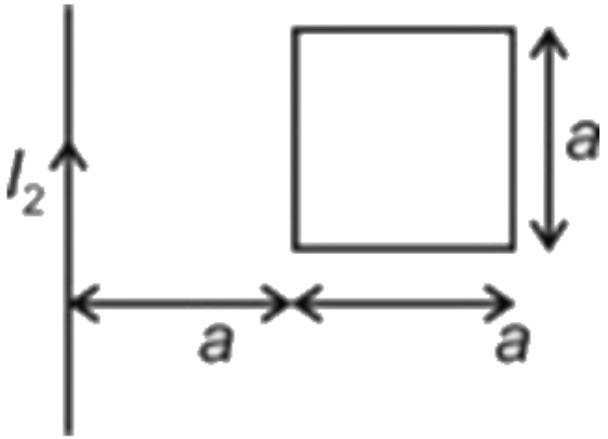
C. $-30^\circ C$

D. $> 10^\circ C$

**Answer: A**

Watch Video Solution

**9.** In the diagram shown, $I_1, I_2$ are the magnitudes of current in the squre loop and infinite long straight conductor respectively. If the net magnetic field at the centre of the loop is zero, then the relation between $I_1$ and $I_2$ is




A. $I_1 = \dfrac{I_2}{6\sqrt{2}}$

B. $I_1 = \frac{I_2}{4\sqrt{2}}$

C. $I_1 = \frac{I_2}{2\sqrt{2}}$

D. $I_1 = \frac{I_2}{\sqrt{2}}$

**Answer: A**

Watch Video Solution

**10.** The front wall of a drawer in a cabinet is a provider with two symmetrical handles. The distance between the handles is l and the length (i.e. depth) of the drawer is a. The

maximum value of the coefficient of friction between drawer and cabinet, for which drawer can be pulled out by applying a force on one handle perpendicular to the face of the drawer is : (Neglect the weight of the drawer)

A. $\left(\frac{a}{l}\right)$

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

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

D. None of these

**Answer: A**

Watch Video Solution

**11.** $C^{14}$ has a half life of 5700 yrs. At the end of 11400 years, the actual amount left is

A. 0.5 times of original amount

B. 0.25 times of original amount

C. 0.125 times of original amount

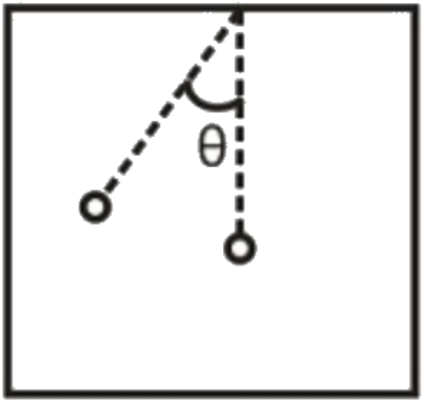
D. 0.0625 times of original amount

**Answer: B**

Watch Video Solution

**12.** An ideal pendulum was oscillating with an angular amplitude $\theta = \pi/3$ inside a stationary elevator. When the pendulum was passing through equilibrium position, the lift suddenly starts moving upward with an acceleration $a = g$. Find the new angular

amplitude of the oscillation.




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

B. $\frac{\pi}{6}$

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

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

**Answer: C**

Watch Video Solution

**13.** An electron is moving on a circular path around a stationary neutron under gravitational interaction Masses of the neutron and electron are $M$ and $m$ respectively. If Bohr's quantum condition holds here the minimum permissible de Broglie wavelength associated with the electron will be -

A. $\frac{h^2}{2\pi GMm}$

B. $\frac{h^2}{2\pi GMm^2}$

C. $\frac{h^2}{2\pi GM^2m}$

D. $\frac{h^2}{4\pi GM^2m}$

**Answer: B**

Watch Video Solution

**14.** 32 g of $O_2$ is contained in a cubical container of side 1 m and maintained at a temperature of $127^\circ C$. The isothermal bulk

modulus of elasticity of the gas is (universal gas constant = R)

A. 127 R

B. 400 R

C. 200 R

D. 560 R

**Answer: B**

Watch Video Solution

**15.** A real image is formed by a convex lens. If we put a concave lens in contact with it, the combination again forms a real image. The new image

A. is closer to the lens system

B. is farther from the lens system

C. is at the original position

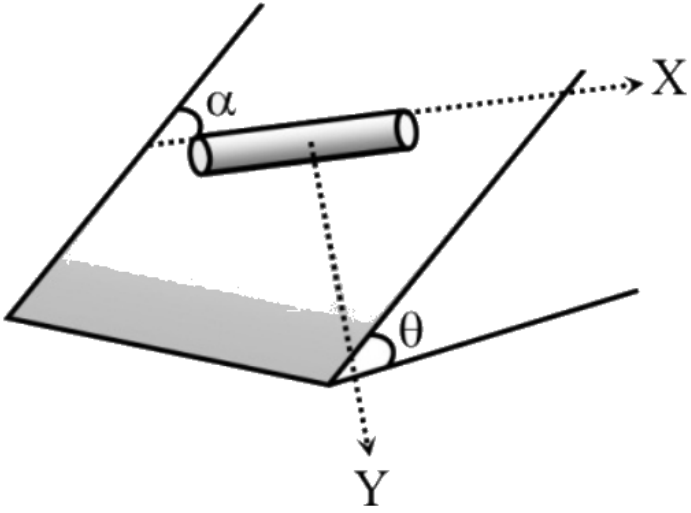
D. may be anywhere depending on the focal length of the concave lens.

**Answer: B**

Watch Video Solution

**16.** A cylinder of mass m is kept on an inclined plane haivng an angle of inclination $30^\circ$. Axis of the cylinder makes an angle $30^\circ$ with the line along the greatest slope. Assuming that cylinder rolls without slipping, the

acceleration of the cylinder is




A. $\frac{g}{6}$

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

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

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

**Answer: A**

Watch Video Solution

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

A. the depletion region is 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**

 Watch Video Solution

**18.** What should be the length of steel and copper rods at $0^\circ C$ that the length of steel rod is 5 cm longer than copper at all termperature? Given $\alpha_{Cu} = 1.7 \times 10^5 .^\circ C^{-1}$ and $\alpha_{steel} = 1.1 \times 10^5 .^\circ C^{-1}$.

A. 14.17 cm, 9.17 cm

B. 9.17 cm, 14.17 cm

C. 28.34 cm, 18.34 cm

D. 14.17 cm, 18.34 cm

**Answer: A**

Watch Video Solution

**19.** A fluid having a thermal coefficient of volume expansion $\gamma$ is filled in a cylindrical vessel up to a height $h_0$. The coefficient of

linear thermal expansion of the material of the vessel is $\alpha$ . If the fluid is heated with the vessel , then find the level of liquid when temperature increases by $\Delta\theta$.

A. $\frac{h_0(1+\gamma\Delta\theta)}{(1+2\alpha\Delta\theta)}$

B. $\frac{h_0(1+\gamma\Delta\theta)}{(1+3\alpha\Delta\theta)}$

C. $\frac{h_0(1+\gamma\Delta\theta)}{(1+\alpha\Delta\theta)}$

D. $h_0(1+\gamma\Delta\theta)$

**Answer: A**

Watch Video Solution

**20.** The wavelength of two nodes in air are $\frac{36}{195}$ m and $\frac{36}{193}$ m. Each node products $10 beats/s$ seprately with a third node of fixed frequency. The velocity of sound in air in $m/s$ is

A. 330

B. 340

C. 350

D. 360

**Answer: D**

Watch Video Solution

**21.** When a Daniel cell is connected in the secondary circuit of a potentiometer, the balancing length is found to be 540 cm. If the balancing length becomes 500 cm. When the cell is short-circuited with $1\Omega$, the internal resistance of the cell is

Watch Video Solution

**22.** There is a sample of diatomic gas in a container (whose volume is constant). The temperature of this gas was increased greatly so some molecules fell into atoms (dissociated). The pressure of the gas increased by a factor of 6 and the internal energy of the gas increased to a value of 4.4 times the original internal energy. By what factor did the temperature of the gas (measured in Kelvin) increases?

 Watch Video Solution

**23.** Two particles $A$ and $B$ located at points $\left(0, -10\sqrt{3}\right)$ and $(0, 0)$ in $xy$ plane. They start moving simultaneously at time $t = 0$ with constant velocities $\vec{V}_A = 5\hat{i}m/s$ and $\vec{V}_B = -5\sqrt{3}\hat{j}m/s$, respectively. Time when they are closest to each other is found to be $K/2$ second. Find $K$. All distance are given in meter.

Watch Video Solution

**24.** Unpolarized light of intensity 32 $Wm^{-3}$ passes through three polarizers such that the transmission axis of the last polarizer is crossed with the first. If the intensity of the emerging light is $3Wm^{-2}$, what is the angle between the transmission axces of the first two polarizers ? At what angle will the transmitted intensity be maximum ?

Watch Video Solution

**25.** A block of mass 2 kg is kept at origin at t = 0 and is having velocity $4\sqrt{5}m/s$ in positive x - direction. The only force on it is a conservative and its potential energy is defined as $U = -x^3 + 6x^2 + 15$ (SI units). Its velocity when the force acting on it is minimum (after the time t = 0 ) is

Watch Video Solution