PHYSICS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 95

Physics

1. Time period of a spring mass system is T.If this spring is cut into two parts whose lengths

are in ratio 1:3 and the same mass is attached to the longer part, the new time period will be

A. $\sqrt{\frac{3}{2}}T$

B. $\frac{T}{\sqrt{3}}$

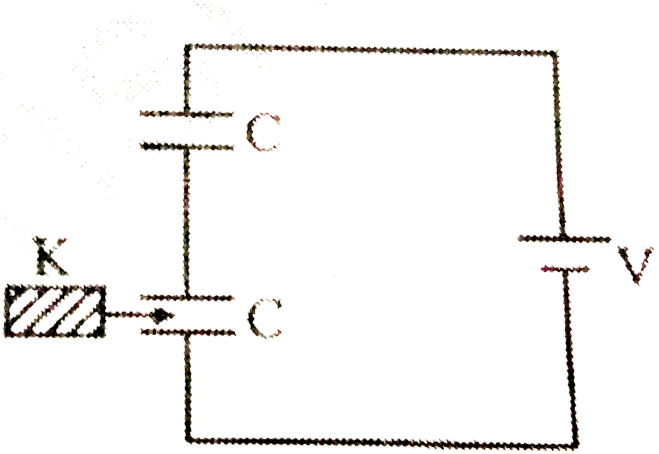
C. $\frac{\sqrt{3}T}{2}$

D. $\sqrt{3}T$

Answer: C

Watch Video Solution

2. The work done in placing the dielectric slab inside one of the capacitors as shown in diagram



A. $\frac{CV^2}{2}\left(\frac{K-1}{k+1}\right)$

B. $\frac{CV^2}{4}\left(\frac{K-1}{k+1}\right)$

C. $\frac{CV^2}{4}\left(\frac{K+1}{k-1}\right)$

D. $\frac{CV^2}{2}\left(\frac{K+1}{k-1}\right)$

Answer: B

Watch Video Solution

3. Two electrons in two hydrogen - like atoms A and B have their total energies E_A and E_B in the ratio $E_A : E_B = 1:2$. Their potential energies U_A and U_B are in the ratio $U_A : U_B = 1:2$. If λ_A and λ_B are their de-Broglie wavelengths, then $\lambda_A : \lambda_B$ is

A. $1:2$

B. $2:1$

C. $1:\sqrt{2}$

D. $\sqrt{2}:1$

Answer: D

Watch Video Solution

4. A system undergoes a reversible adiabatic process. The entropy of the system

A. Remains constant

B. May increase or may decrease

C. Increases

D. Decreases

Answer: A

Watch Video Solution

5. The potential of the electric field produced by point charge at any point (x, y, z) is given by $V = 3x^2 + 5$, where x ,y are in are in metres

and V is in volts. The intensity of the electric field at (-2,1,0) is :

A. $+17Vm^{-1}$

B. $-17Vm^{-1}$

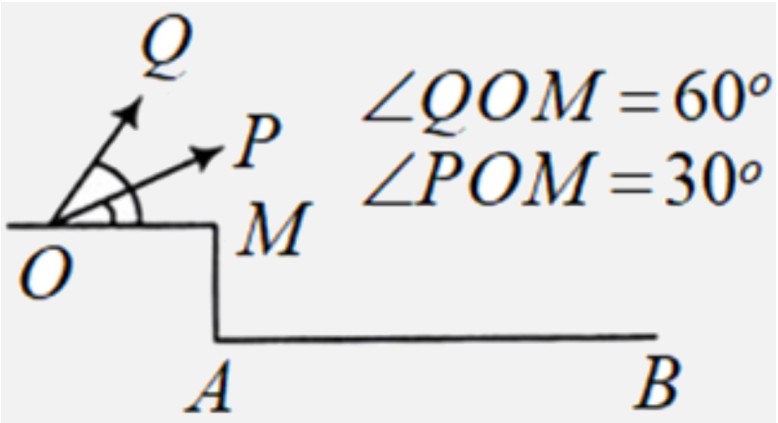
C. $+12Vm^{-1}$

D. $-12Vm^{-1}$

Answer: C

Watch Video Solution

6. Two identical balls P and Q are projected with same speeds in a vertical plane from the same point O making projection angles with horizontal 30° and 60°, respectively and they fall directly on the plane AB at points P' and Q' respectively. Which of the following statement is true about distances as given in options ?



A. $AP' > AQ'$

B. $AP' < AQ'$

C. $AP' \leq AQ'$

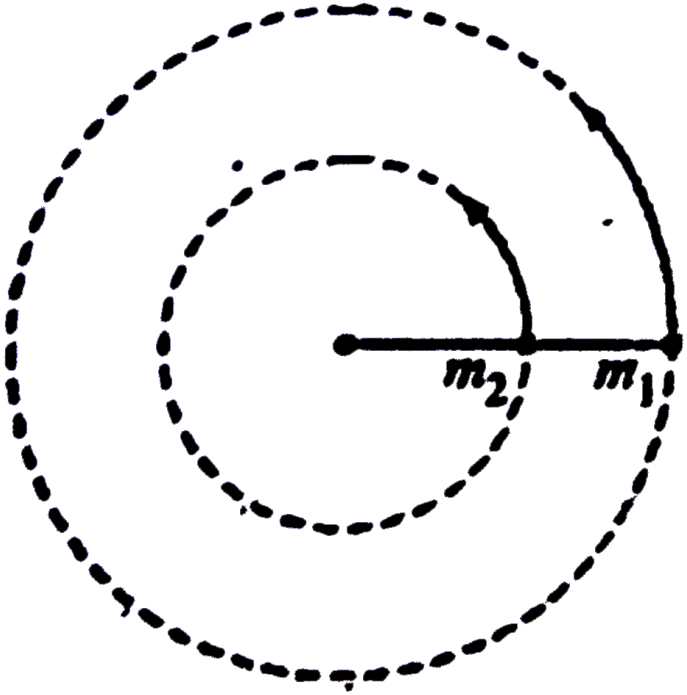
D. As there are complimentary projection angles $AP' = AQ'$

Answer: A

Watch Video Solution

7. A particle of mass m_1 is fastened to one end of a string and one of m_2 to the middle point, the other end of the string being fastened to a fixed point on a smooth horizontal table The particles are then projected, so that the two portions of the string are always in the same straight line and describes horizontal circles find the ratio of tensions in the two parts of

the string



A. $\dfrac{m_1}{m_1 + m_2}$

B. $\dfrac{m_1 + m_2}{m_1}$

C. $\dfrac{2m_1 + m_2}{2m_1}$

D. $\frac{2m_1}{m_1 + m_2}$

Answer: C

Watch Video Solution

8. An object is projected from the earth's surface with escape velocity at 30° with horizontal. What is the angle made by the velocity with horizontal when the object reaches a height 2R from the earth's surface ? R is the radius of the earth. Horizontal can be

considered as a line parallel to the tangent at the earth's surface just below the object .

A. 30°

B. 45°

C. 60°

D. 15°

Answer: C

Watch Video Solution

9. At what temperature the molecule of nitrogen will have same rms velocity as the molecule of oxygen at $127^\circ C$?

A. $457^\circ C$

B. $273^\circ C$

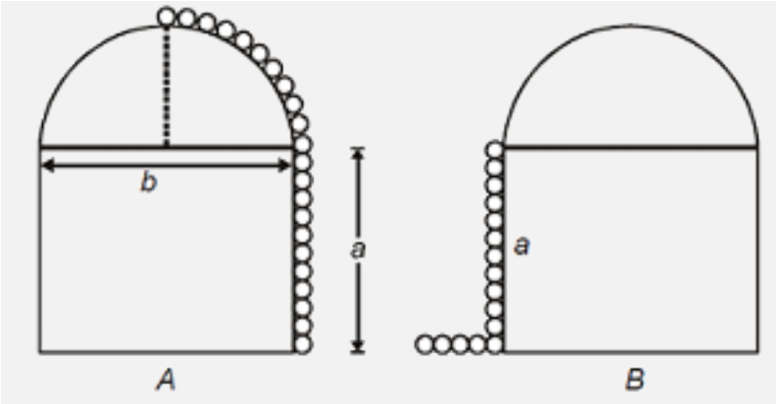
C. $350^\circ C$

D. $77^\circ C$

Answer: D

Watch Video Solution

10. A chain (mass M) is hanging from a wooden structure as shown in the figure A. It is slowly taken to a state as shown in the figure B. Calculate the work done by gravity in the process (assume that after reaching the ground, the chain does not form a heap)



A. $\frac{Mg}{4a+\pi b}\left[4a^2+b^2+ab\pi\right]$

B. $\frac{Mgb}{4a+\pi b}[b+a\pi]$

C. $\frac{2Mg}{2a+\pi b}\left[4a^2-b^2+ab\pi\right]$

D. $\frac{Mgb}{2a+\pi b}[b+a\pi]$

Answer: D

Watch Video Solution

11. Dimensional formula of capacitance is

A. $\left[A^2M^{-1}L^{-1}T^4\right]$

B. $\left[AM^{-1}L^{-2}T^4\right]$

C. $\left[A^2M^{-2}L^{-2}T^4\right]$

D. $\left[A^0M^0L^{-2}T^4\right]$

Answer: A

Watch Video Solution

12. In the YDSE arrangement shown here, the intensity on the screen due to slit -2 is four times that of slit -1. If resultant intensity at the position of central maxima O is I, the resultant intensity at point P, where the phase

difference between two waves coming from two slits is $\cos^{-1}\left(\frac{1}{4}\right)$ is

- $\frac{I}{3}$
- $\frac{2I}{3}$
- $\frac{I}{4}$
- $\frac{I}{2}$

Answer: B

Watch Video Solution

13. Calculate the resulting temperature when 20 g of boiling water is poured into an ice-cold brass vessel $\left(\text{specific heat} = 0.1 \text{ cal g}^{-1}.^{\circ} C^{-1}\right)$ of mass 100 g

A. $66.66.^{\circ} C$

B. $6.66.^{\circ} C$

C. $0.66.^{\circ} C$

D. $50.^{\circ} C$

Answer: A

Watch Video Solution

14. Inside a horizontal moving box, an experimenter finds that when an object is placed on a smooth horizontal table and is released, it moves with an acceleration of $10ms^{-2}$, in this box. If 1-kg body is suspended with a light string. The tension in the string in equilibrium position. (w.r.t. experimenter) will be (take $g = 10ms^{-2}$)

A. 10 N

B. $10\sqrt{2}N$

C. 20 N

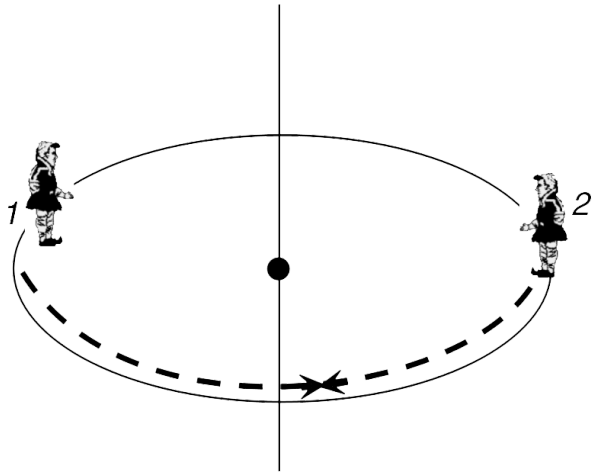
D. Zero

Answer: B

Watch Video Solution

15. A horizontal turn table of mass $90kg$ is free to rotate about a vertical axis passing through its centre. Two men -1 and 2 of mass $50kg$ and $60kg$ respectively are standing at

diametrically opposite point on the table. The two men start moving towards each other with same speed (relative to the table) along the circumference. Find the angle rotated by table by the time the two men meet. Treat the men as point masses.



A. 8.2°

B. 4.5°

C. 2.8°

D. 6.8°

Answer: B

Watch Video Solution

16. A manometer connected to a closed tap reads $3.5 \times 10^5 N/m^2$.When the value is opened, the reading of manometer fall is

$3.0 \times 10^5 N/m^2$, then velocity of flow of water is

A. $100ms^{-1}$

B. $10ms^{-1}$

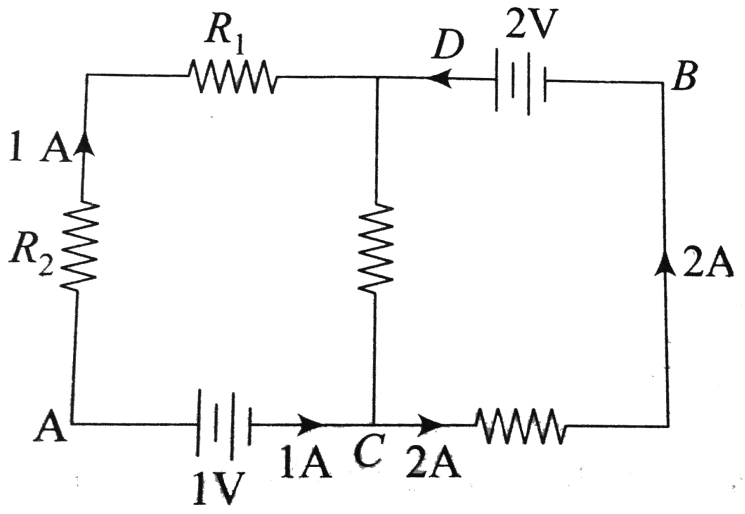
C. $1ms^{-1}$

D. $10\sqrt{10}ms^{-1}$

Answer: B

Watch Video Solution

17. In the circuit shown in the figure, if potentail at point A is taken to be zero, the potential at point B is



A. 3 V

B. 1 V

C. 4 V

D. 2 V

Answer: A

 Watch Video Solution

18. An alternating electric field of frequency f is applied across the radius R of a cyclotron to accelerate protons (mass m). The operating magnetic field B used and K.E. of the proton beam produced by it are respectively (e = charge on proton)

A. $\frac{2\pi mf}{e}, 2\pi^2 mf^2R^2$

B. $\frac{2\pi^2 mf}{e^2}, 4\pi^2 mf^2R^2$

C. $\frac{\pi mf}{e}, \pi^2 mf^2R^2$

D. $\frac{2\pi^2 m^2 f^2}{e}, 2\pi^2 m^2 f^2R^2$

Answer: A

Watch Video Solution

19. In two similar wires of tension 16 N and T, 3 beats are heard, then T=? if wire having tension 16N has a frequency of 4 Hz

A. 49 N

B. 25 N

C. 64 N

D. 80 N

Answer: A

Watch Video Solution

20. What is the value of frequency at which electromagnetic wave must be propagated for the D - region of atmosphere to have a

refractive index of 0.5. Electron density for D - region is 400 electrons/c.c.

A. 200 kHz

B. 104.2 kHz

C. 208.4 kHz

D. 312.6 kHz

Answer: C

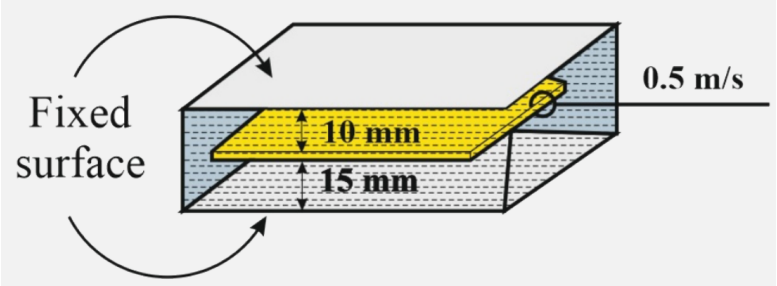
 Watch Video Solution

21. Wavelengths belonging to Balmer series lying in the range of 450 nm to 750 nm were used to eject photoelectrons from a metal surface whose work function is 2.0 eV. Find (in eV) the maximum kinetic energy of the emitted photoelectrons. $(\text{Take hc} = 1242 \text{ eV nm.})$

Watch Video Solution

22. Glycerine is filled in 25 mm wide space between two large plane horizontal surfaces. A thin plate of area $0.75m^2$ at a distance of 10 mm from one of the surfaces is in a horizontal position be the plates inside the glycerine. It is dragged horizontally at a constant speed of $0.5ms^2$. Take coefficient of viscosity $\eta = \quad 0.5\,\mathrm{Ns\,m^{-2}}$. What is the force required to drag the plate at a constant speed (in

newton) ?



Watch Video Solution

23. If 0.1 J of energy is stored for the flow of the current of 0.2 A in an inductor, then its inductance value (in H) is

Watch Video Solution

24. The half-life of a radioactive nuclide is 20 hours. What fraction of original activity will remain after 40 hours?

Watch Video Solution

25. A plano convex lens $(\mu = 1.5)$ has a maximum thickness of $1mm$ .If diameter of its aperture $4cm$ Find

(i)Radius of curvature of curved surface

(ii) its focal length in air.

Watch Video Solution