PHYSICS

NTA MOCK TESTS ENGLISH

NTA JEE MOCK TEST 44

Physics

1. In a hypothetical atom, if transition from $n = 4$ to $n = 3$ produces visible light then the possible transition to obtain infrared radiation is:

A. n=5 to n=3

B. n=4 to n=2

C. n=3 to n=1

D. n=5 to n=4

Answer: D

Watch Video Solution

2. Two particles, of masses M and 2M, moving as shown, with speeds of $10m/s$ and $5m/s$, collide elastically at the origin.After the collision, they move along the indicated directions with speeds v_1 and v_2 , respectively.The values of v_1 and v_2 are nearly :

A. $6.5ms^{-1}$ and $3.2ms^{-1}$

B. $3.2ms^{-1}$ and $12.6ms^{-1}$

C. $13.02ms^{-1}$ and $19.7ms^{-1}$

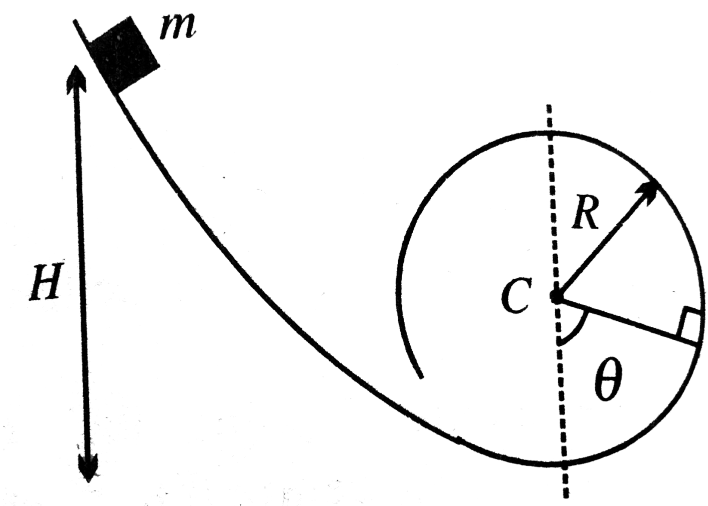
D. $3.2ms^{-1}$ and $6.3ms^{1}$

Answer: C

Watch Video Solution

3. A particle of mass m is released from a height H on a smooth curved surface which ends into a vertical loop of radius R, as shown.

Choose the correct alernative(s) if $H = 2R$.



A. the particle reaches the top of the loop

with zero velocity

B. the particle reaches the top of the loop

with a non- zero velocity

C. the particle breaks off at a height h=r from base

D. the particle breaks off at a height $r < h < 2r$

Answer: D

Watch Video Solution

4. A very small sphere having a charge q, uniformly distributed throughout its volume, is placed at the vertex of a cube of side a. The electric flux through the cube is

A. $\frac{q}{\varepsilon_0}$

B. $\frac{q}{3\varepsilon_0}$

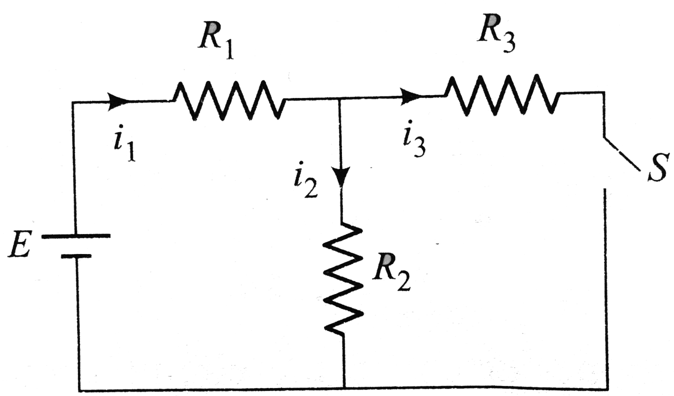
C. $\frac{q}{6\varepsilon_0}$

D. $\frac{q}{8\varepsilon_0}$

Answer: D

Watch Video Solution

5. In the circuit shows in Fig $E = 15V$, $R_1 = 1\Omega$, $R_2 = 1\Omega$, $R_3 = 2\Omega$, and $L = 1.5H$. The currents flowing through R_1, R_2, and R_3 are i_1, i_2, and i_3, respectively.



Immediately after connecting switch S,

A. $i_1 = 0A$ and $\dfrac{di_3}{dt} = 0As^{-1}$

B. $i_1 = 0A$ and $\dfrac{di_3}{dt} \neq 0As^{-1}$

C. $i_3 = 0A$, and rate at which magnetic energy stored is not zero

D. None of these

Answer: B

Watch Video Solution

6. A non-conducting ring of radius $0.5m$ carries a total charge of 1.11×10^{-10}C distributed non-uniformly on its circumference producing an electric field E everywhere is space. The value of the integral $\int_{l=\infty}^{l=0} -E.\,dI(l = 0$ being centre of the ring) in volt is

A. $+2$

B. -1

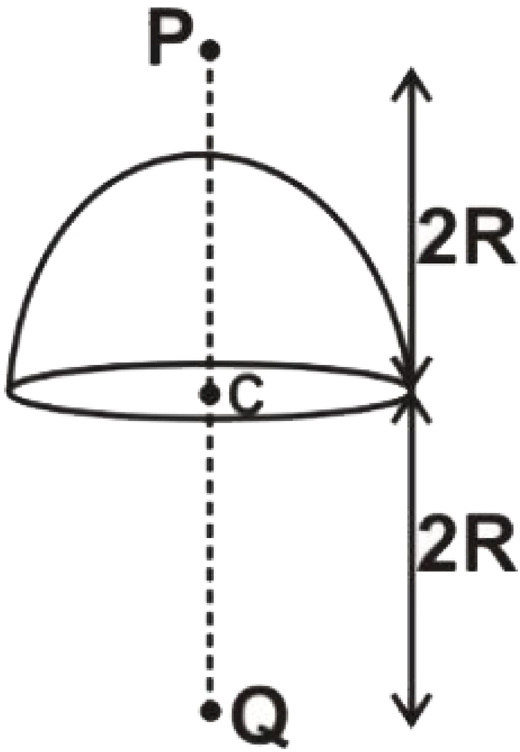
C. -2

D. Zero

Answer: A

Watch Video Solution

7. If gravitational field due to uniform thin hemispherical shell at point P is I, then the magnitude of gravitational field at Q is (Mass of hemispherical shell is M, radius is R)



A. $\frac{GM}{2R^2} - I$

B. $\frac{GM}{2R^2} + I$

C. $\frac{GM}{4R} - I$

D. $2I - \frac{GM}{2R^2}$

Answer: A

Watch Video Solution

8. Three discs, A, B and C having radii 2m, 4m and6m respectively are coated with carbon black on their outer surfaces. The wavelengths corresponding to maximum intensity are $300nm, 400nm$ and $500nm$, respectively. The power radiated by them are Q_A, Q_B and Q_C respectively

(a) Q_A is maximum (b) Q_B is maximum (c) Q_C is maximum (d) $Q_A = Q_B = Q_C$

A. Q_A is maximum

B. Q_B is maximum

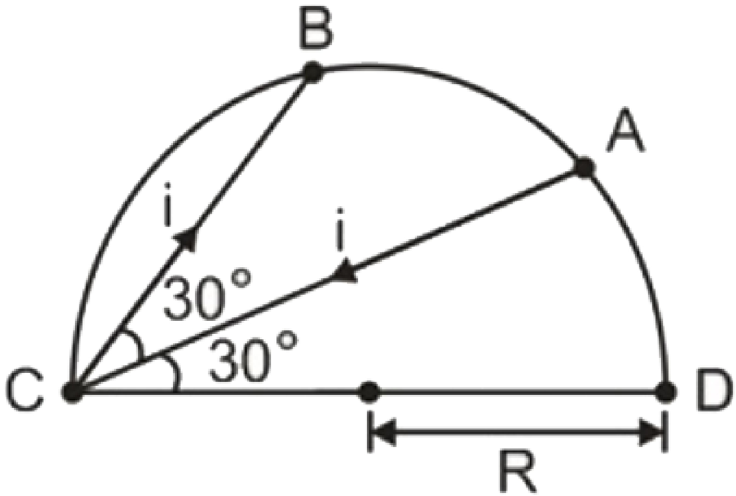
C. Q_C is maximum

D. $Q_A = Q_B = Q_C$

Answer: B

Watch Video Solution

9. A current - carrying wire is placed in the grooves of an insulating semicircular - disc of radius R as shown. The current enters at point A and leaves from point B. Determine the magnetic field at point D.



A. $\dfrac{\mu_0 l}{8\pi R\sqrt{3}}$

B. $\dfrac{\mu_0 l}{4\pi R\sqrt{3}}$

C. $\dfrac{\sqrt{3}\mu_0 l}{4\pi R}$

D. none of these

Answer: B

Watch Video Solution

10. A particle is projected at time t = 0 from a point P on the ground with a speed v_0, at an angle of 45° to the horizontal. The angular momentum of the particle about P at time t = v_0/g is

A. $0.25mv_0^3 / g$

B. $0.35mv_0^3 / g$

C. $0.50 m v_0^3 / g$

D. $0.60 m v_0^3 / g$

Answer: B

Watch Video Solution

11. Which, among the following, is a correct statement?

A. binding energy of a nucleus is always negative

B. binding energy of a nucleus may be positive

C. higher value of binding energy per nucleon means the nucleus is more unstable

D. higher value of binding energy per nucleon means the nucleus is more stable

Answer: D

Watch Video Solution

12. Light of wavelength 4000Å is allowed to fall on a metal surface having work function 2 eV. The maximum velocity of the emitted electrons is

$\left(h = 6.6 \times 10^{-34} Js\right)$

A. $1.35 \times 10^5 ms^{-1}$

B. $2.7 \times 10^5 ms^{-1}$

C. $6.2 \times 10^5 ms^{-1}$

D. $8.1 \times 10^5 ms^{-1}$

Answer: C

Watch Video Solution

13. The work done is increasing the size of a soap film from 10 cm $\times$ 6 cm to 10 cm $\times$ 11 cm is 3×10^{-4} joule. The surface tension of the film is

A. $1.5 \times 10^{-2} Nm^{-1}$

B. $3.0 \times 10^{-2} Nm^{-1}$

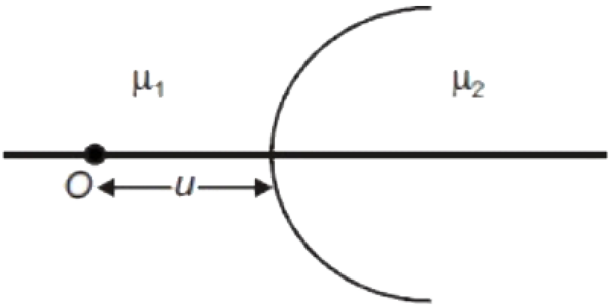
C. $6.0 \times 10^{-2} Nm^{-1}$

D. $11.0 \times 10^{-2} Nm^{-1}$

Answer: B

Watch Video Solution

14. The diagram shows a spherical surface which separates two media of refractive index, μ_1 and μ_2. Respectively. Now, a point object is placed on the principal axis as shown in the figure. Then



A. Real image will form if $\mu_1 > \mu_2$ and for all values of u

B. Real image for some values of u if $\mu_1 > \mu_2$

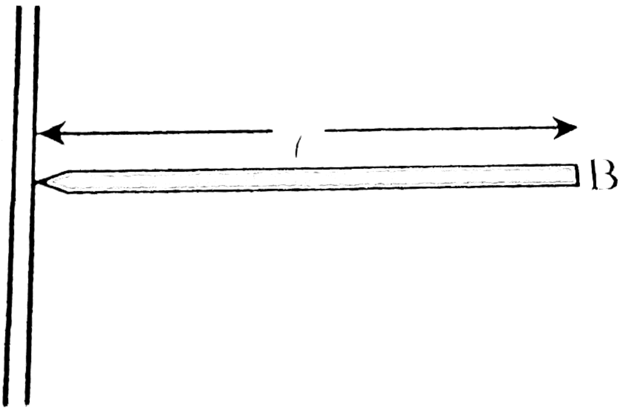
C. Virtual image will form if $\mu_1 > \mu_2$

D. Virtual image will form if $\mu_1 < \mu_2$

Answer: C

Watch Video Solution

15. A uniform rod AB of length l and mass m is free to rotate about point A. The rod is released from rest in the horizontal position. Given that the moment of inertia of the rod about A is $\frac{ml^2}{3}$, the initial angular acceleration of the rod will be:-



A. $\dfrac{2g}{3l}$

B. $\dfrac{g(l)}{2}$

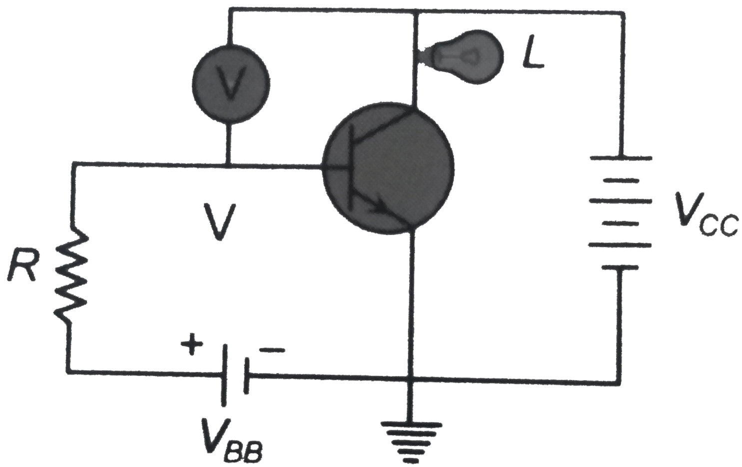
C. $\dfrac{3}{2}gl$

D. $\dfrac{3g}{2l}$

Answer: D

Watch Video Solution

16. In the following circuit, a voltmeter V is connected across a lamp L. What change would occure in voltmeter reading if the resistance R is reduced in value?



A. Increases

B. Decreases

C. Remains same

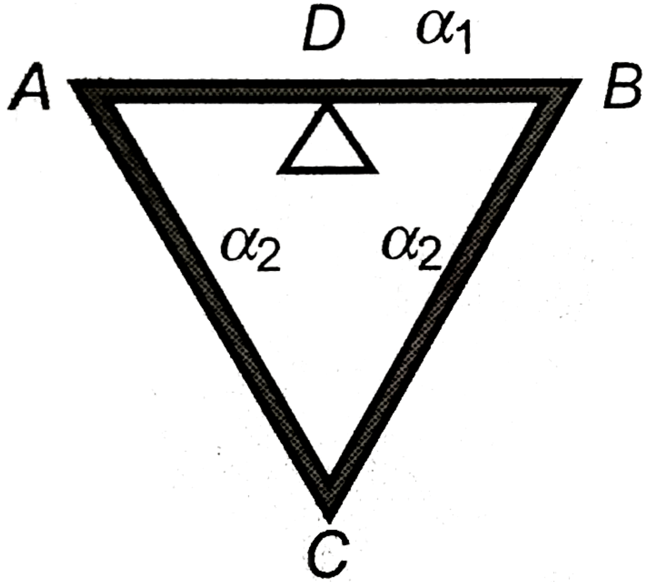
D. None of these

Answer: A

Watch Video Solution

17. Three rods of equal of length are joined to from an equilateral triangle ABC. D is the midpoint of AB. The coefficient of linear expansion is α_1 for AB and α_2 for AC and BC

. If the distance DC remains constant for small changes in temperature,



A. $\frac{l_1}{l_2} = 2\sqrt{\frac{\alpha_2}{\alpha_1}}$

B. $\frac{l_1}{l_2} = 2\sqrt{\frac{\alpha_1}{\alpha_2}}$

C. $\frac{l_1}{l_2} = \sqrt{\frac{\alpha_1}{\alpha_2}}$

D. $\frac{l_1}{l_2} = \sqrt{\frac{\alpha_2}{\alpha_1}}$

Answer: A

Watch Video Solution

18. Dimensions of permeability are

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

B. $\left[MLT^{-2}\right]$

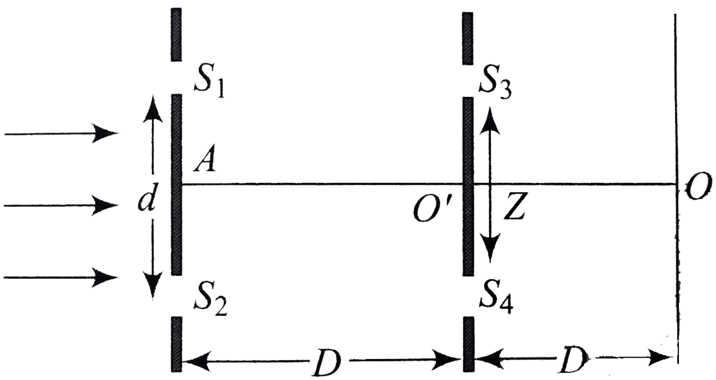
C. $\left[ML^{0}T^{-1}\right]$

D. $\left[A^{-1}MLT^{-2}\right]$

Answer: A

Watch Video Solution

19. In the arrangement shown in Fig., slits S_1 and $S_4$are having a variable separation Z. Point O on the screen is at the common perpendicular bisector of S_1S_2 and S_3S_4.



The minimum value of Z for which the intensity at O is zero is

A. $\frac{\lambda D}{d}$

B. $\frac{2\lambda D}{d}$

C. $\frac{\lambda D}{2d}$

D. $\frac{\lambda D}{3d}$

Answer: A

Watch Video Solution

20. A star is going away from the earth. An observer on the earth will see the wavelength of light coming from the star:

A. (a) $2.5 \times 10^{6} ms^{-1}$

B. (b) $2 \times 10^{6} ms^{-1}$

C. (c) $1.5 \times 10^{6} ms^{-1}$

D. (d) $0.5 \times 10^{6} ms^{-1}$

Answer: A

Watch Video Solution

21. A wire of length L and three identical cell of negligible internal resistance are connected in series. Due to the current, the temperature of wire is raised by ΔT in a time t. A number N of similar cells is now connected in series with a wire of the same material and cross section but of length 2L. The temperature of wire is raised by the same amount ΔT in the same time t. The value of N is

Watch Video Solution

22. A boy weighing 50kg eats bananas. The energy constant of banana is 100cal , if this energy is used to lift the body from ground, then the height through which it is lifted is

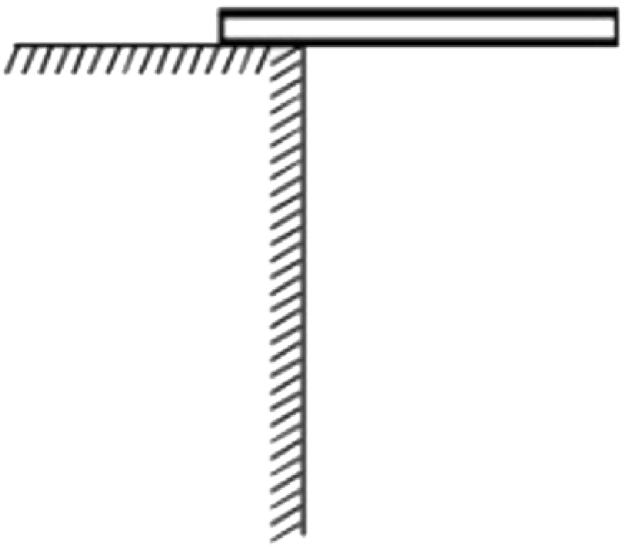
Watch Video Solution

23. A galvanometer of resistance 50Ω is connected to a battery of 8 V along with a resistance of 3950Ω in series. A full scale deflection of 30 divisions is obtained in the galvanometer. In order to reduce this deflection to 15 divisions, the resistance in series should be .... Ω.

Watch Video Solution

24. One - fourth length of a uniform rod is placed on a rough horizontal surface and it starts rotating about the edge as soon as we release it. The rod starts slipping on the edge when it has turned through an angle θ. If the coefficient of friction between rod and surface is μ, and it satisfies the relation $x \tan \theta = 4\mu$, then what is the value of x?

$\left[\text{Take } g = 10m/s^2\right]$



Watch Video Solution

25. Two particles P_1 and P_2 are performing SHM along the same line about the same mean position , initial they are at their extreme position. If the time period of each particle is 12 sec and the difference of their amplitude is $12cm$ then find the minimum time after which the separation between the particle becomes $6cm$.

Watch Video Solution