PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 109

Physics

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1. If the radius of the first orbit of the hydrogen atom is 0.53Å , then the de-Broglie

wavelength of the electron in the ground state of hydrogen atom will be

A. 0.53Å

B. 3.33Å

C. 1.67Å

D. 1.06Å

Answer: B

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2. The wavelength of light from the spectral emission line of sodium is 589 nm. Find the kinetic energy at which

A neutron, and would have the same de Broglie wavelength.

A. $3.81 \times 10^{-28} J$

B. $3.81 \times 10^{-25} J$

C. $4.81 \times 10^{-28} J$

D. $4.81 \times 10^{-30} J$

Answer: A

3. A bomb of mass $9kg$ explodes into two pieces of masses $3kg$ and $6kg$. The velocity of mass $3kg$ is $16ms^{-1}$. The kinetic energy of mass $6kg$ is

A. 192 J

B. 200 J

C. 300 J

D. 400 J

Answer: A

4. The coordinates of centre of mass of the following quarter circular arc is -

A. $\left(\dfrac{r}{2}, \dfrac{r}{2}\right)$

B. $\left(\dfrac{2r}{3}, \dfrac{2r}{3}\right)$

C. $\left(\dfrac{2r}{\pi}, \dfrac{2r}{\pi}\right)$

D. $\left(\dfrac{4r}{\pi}, \dfrac{4r}{\pi}\right)$

Answer: C

5. An airplane flying at a velocity of $900 kmh^{-1}$ loops the loop. If the maximum force pressing the pilot against the seat is five times its weight, the loop radius should be

    A. 1562 m

    B. 1402 m

    C. 1315 m

D. 1167 m

Answer: A

6. A solenoid 30 cm long is made by winding 2000 loops of wire on an iron rod whose cross-section is $1.5 cm^2$. If the relative permeability of the iron is 600. what is the self-inductance of the solenoid?
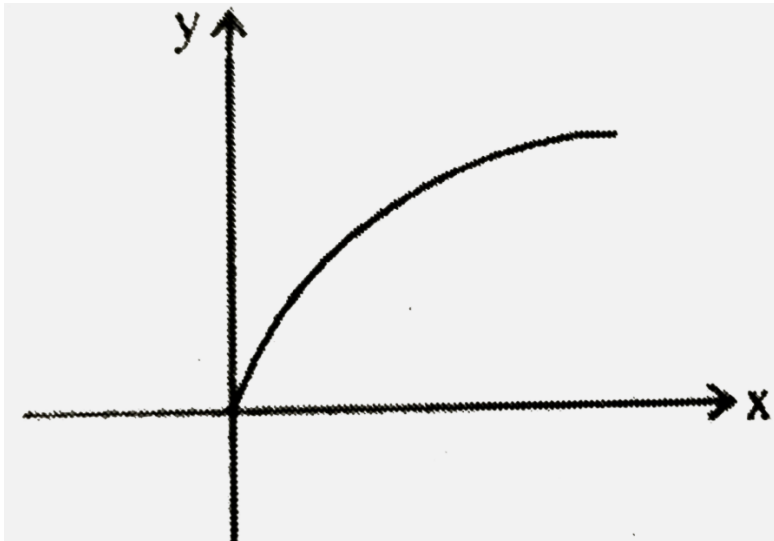
A. 1.5 H

B. 2.5 H

C. 3.5 H

D. 0.5 H

Answer: A

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7. Mark correct option

A. A

B. B

C. Both A & B

D. Neither A nor B

Answer: A

8. A resistor of $6k\Omega$ with tolerance 10% and another resistance of $4k\Omega$ with tolerance 10% are connected in series. The tolerance of the combination is about

A. 0.05

B. 0.1

C. 0.12

D. 0.15

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9. The capacitance of a parallel plate capacitor with air as medium is $3\mu F$. with the introduction of a dielectric medium between the plates, the capacitance becomes $15\mu F$. The permittivity of the medium is

A. $5C^2N^{-1}m^{-2}$

B. $15C^2N^{-1}m^{-2}$

C. $0.44 \times 10^{-10}C^2N^{-1}m^{-2}$

D. $8.854 \times 10^{-10}C^2N^{-1}m^{-2}$

Answer: C

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10. An electron and a proton are in uniform electic field. The ratio of their acceleration will be

A. Zero

B. Unity

C. Ratio of masses of proton and electron

D. Ratio of masses of electron and proton

Answer: C

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11. A square metallic wire loop of side $0.1\,\mathrm{m}$ and resistance of 1Ω is moved with a constant velocity in a magnetic field of $2wb/m^2$ as

shown in figure. The magnetic field field is perpendicular to the plane of the loop, loop is coonected to a network of resistances. what should be the velocity of loop so as to have a steady current of $1mA$ in loop?

$\vec{B}$

$3\Omega \quad 3\Omega$
3Ω
www
$3\Omega \quad 3\Omega$

P

Q

V
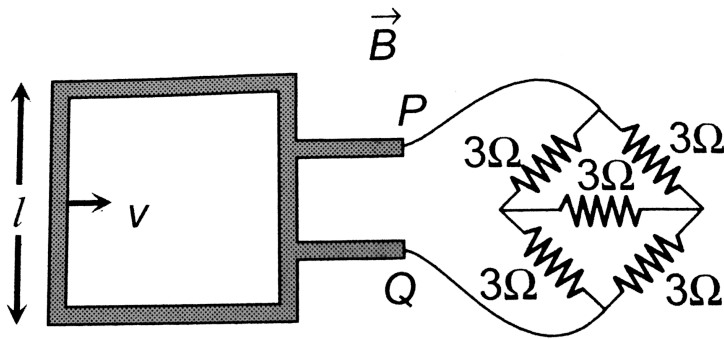
A. $0.5cms^{-1}$

B. $1cms^{-1}$
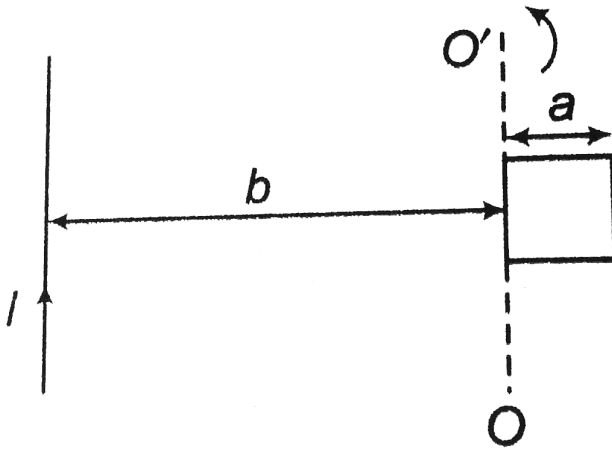
C. $2cms^{-1}$

D. $4cms^{-1}$

Answer: C

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12. A square loop of side as and a straight long wire are placed in the same plane as shown in figure. The loop has a resistance R and inductance L. The frame is turned through $180°$ about the axis OO'. What is the electric

charge that flows through the loop?

A. $\dfrac{2\mu_0 i a^2}{2\pi R b}$

B. $\dfrac{\mu_0 i}{2\pi R} \dfrac{\log_e(b+a)}{b-a}$

C. $\dfrac{\mu_0 i a}{2\pi R} \dfrac{\log_e(b+a)}{b-a}$

D. None of these

Answer: C

13. Calculat the binding energy of the - sum system . Mass of the earth $= 6 \times 10^{24}$ kg , mass of the sun $= 2 \times 10^{30}$ kg, distance between the earth and the sun $= 1.5 \times 10^{11}$ and gravitational constant $= 6.6 \times 10^{-11}$ Nm^2kg^2

    A. $8.8 \times 10^{10} J$

    B. $8.8 \times 10^{3} J$

    C. $5.2 \times 10^{33} J$

D. $2.6 \times 10^{33} J$

Answer: D

14. One goes from the centre of the earth to a distance two third the radius of the earth. The acceleration due to gravity is highest at

A. the centre of the earth

B. a distance half the radius of the earth

C. a distance one-third of the radius of the

earth

D. a distance two-third of the radius of the

earth

Answer: D

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15. On observing light from three different

stars P, Q and R, it was found that intensity

of violet colour is maximum in the spectrum of

P, the intensity of green colour is maximum in the spectrum of R and the intensity of red colour is maximum in the spectrum of Q. if T_P, T_Q and T_R are respective absolute temperature of P, Q and R. then it can be concluded from the above observation that

A. $T_P > T_Q > T_R$

B. $T_P > T_R > T_Q$

C. $T_P < T_R < T_Q$

D. $T_P < T_Q < T_R$

Answer: B

16. An ideal gas at a pressure of 1 atm and temperature of $27°C$ is compressed adiabatically until its pressure becomes 8 times the initial pressure , then final temperature is $\left(\gamma = \dfrac{3}{2} \right)$

A. $627°C$

B. $527°C$

C. $427°C$

D. $327^\circ C$

Answer: D

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17. Five moles of an ideal monoatomic gas with an initial temperature of $150^\circ C$ expand and in the process absorb 1500 J of heat and does 2500 J of work. The final temperature of the gas in $.^\circ C$ is (ideal gas constant $R = 8.314 JK^{-1}mol^{-1}$)

A. 134

B. 126

C. 144

D. 166

Answer: A

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18. The work done in rotating a magent of the

magnetic moment $2Am^2$ in a magnetic field of

induction $5 \times 10^{-3}T$ from the direction along

the magnetic field to the direction opposite to the field , is

A. zero

B. $2 \times 10^{-2} J$

C. $10^{-2} J$

D. $10 J$

Answer: B

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19. In the cyclotron, as radius of the circular path of the charged particle increase (ω = angular velocity, v = linear velocity)

A. Both ω and v increase

B. only ω increase, v remains constant

C. only v increases , ω remains constant

D. v increases, ω decreases

Answer: C

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20. The driver of a train moving at $72 kmh^{-1}$ sights another train moving at $4ms^{-1}$ on the same track and in the same direction. He instantly applies brakes to produces a retardation of $1ms^{-2}$. The minimum distance between the trains so that no collision occurs is

   A. 32 m

   B. 64 m

   C. 128 m

D. 256 m

Answer: C

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21. A person sitting in an open car moving at constant velocity throws a ball vertically up into air. The ball falls

A. Outside the car

B. In the car ahead of the person

C. In the car to the side of the person

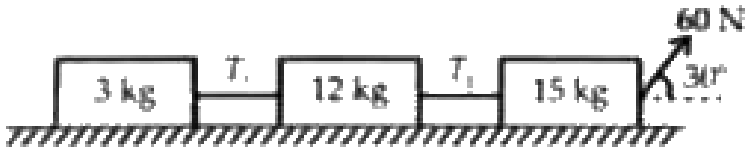D. Exactly in the hand which threw it up

Answer: D

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22. Three masses are connected as shown in figure on a horizontal frictionless surface and pulled by a force of 60 N. The tensions

T_1 and T_2 are in the ratio

A. $1 : 1$

B. $1 : 5$

C. $1 : 4$

D. $4 : 5$

Answer: B

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23. A body of mass 5 kg statrs from the origin with an initial velocity $\vec{u} = \left(30\hat{i} + 40\hat{j}\right)ms^{-1}$. If a constant force $\left(-6\hat{i} - 5\hat{j}\right)N$ acts on the body, the time in which they component of the velocity becomes zero is

A. 5s

B. 20s

C. 40s

D. 80s

Answer: C

24. Following process is known as

$$hv \rightarrow e^+ + e^-$$

A. Pair production

B. Photoelectric effect

C. Compton effect

D. Zeeman effect

Answer: A

25. The half-life period of a radio-active element X is same as the mean life time of another radio-active element Y. Initially they have the same number of atoms. Then:

   A. X will decay faster than Y

   B. Y will decay faster than X

C. X and Y have the same decay rate initially

D. X and Y decay at the same always

Answer: B

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26. In order to measure period of a simple pendulum using a stop clock a student repeated the experiment for 10 times and noted down the time period for each

experiment as 5.1, 5.0, 4.9, 5.1, 5.0, 4.9, 5.1, 5.0, 4.9 ,5.0s

the correct way of expressing the result for the period is

A. 4.99 s

B. 5.0 s

C. 5.00 s

D. 4.9 s

Answer: B

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27. A particle executes simple harmonic oscillation with an amplitudes a. The period of oscillation is T. The minimum time taken by the particle to travel half of the amplitude from the equilibrium position is

A. T/8

B. T/12

C. T/2

D. T/4

Answer: B

28. If E and B represent electric and magnetic field vectors of the electromagnetic wave, the direction of propagation of eletromagnetic wave is along.

A. $\vec{E} \times \vec{B}$

B. $\vec{B} \times \vec{E}$

C. $\vec{E}$

D. $\vec{B}$

Answer: A

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29. The maximum kinetic energy of the photoelectrons depends only on

A. Intensity of incident radiation

B. Frequency of incident radiation

C. Speed of incident radiation

D. Number of photons in the accident radiation

Answer: B

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30. In a capillary tube of radius 'R' a straight thin metal wire of radius 'r' $(R > r)$ is inserted symmetrically and one of the combination is dipped vertically in water such that the lower end of the combination Is at

same level . The rise of water in the capillary tube is [T=surface tensiono of water ρ =density of water ,g =gravitational acceleration]

A. $\dfrac{T}{(R+r)\rho g}$

B. $\dfrac{2T}{(R+r)\rho g}$

C. $\dfrac{2T}{(R-r)\rho g}$

D. $\dfrac{(R-r)\rho g}{T}$

Answer: C

31. If a block of iron (density $5 gcm^{-3}$) is size 5 cm x 5 cm x 5 cm was weight while completely submerged in water, what would be the apparent weight ?

A. 625 gf

B. 256 gf

C. 320 gf

D. 500 gf

Answer: D

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32. A wave has velocity u in medium P and velocity 2 u in medium Q . If the wave is incident in medium P at an angle of $30°$ then the angle of refraction will be
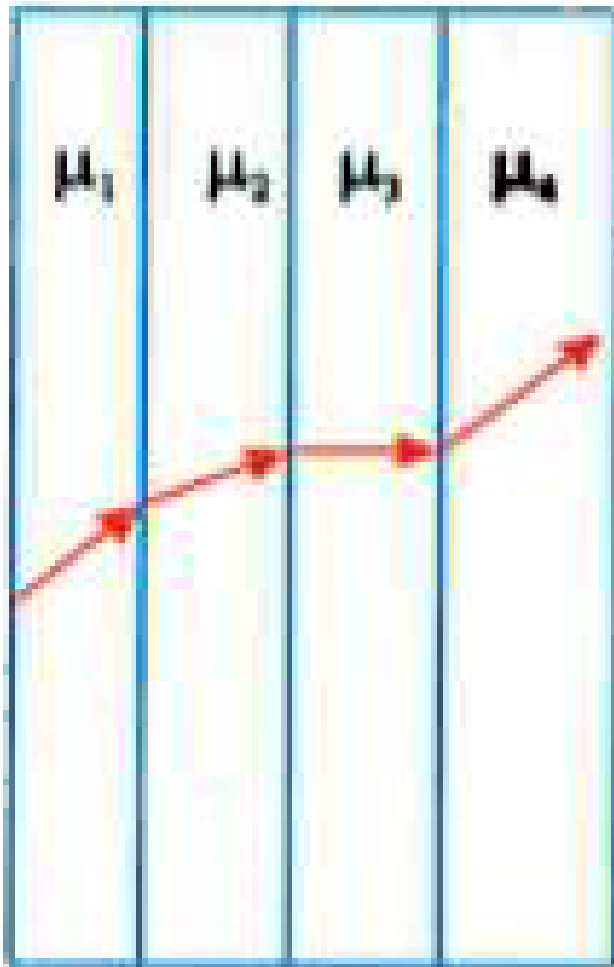
    A. $30°$

    B. $45°$

    C. $60°$

    D. $90°$

Answer: D

33. A ray of light passes through four transparent media with refractive indices μ_1, μ_2, μ_3 and μ_4 as shown in figure. The surfaces of all media are parallel. If the emergent ray is

parallel to the incident ray, we must hav

A. $n_1 = n_4$

B. $n_2 = n_4$

C. $n_3 = n_4$

D. $n_1 = \dfrac{n_2 + n_3 + n_4}{3}$

Answer: A

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34. A disc has mass 'M" and radius 'R'. How much tangential force should be applied to the rim of the disc so as to rotate with angular velocity ω in time 't'?

A. $\dfrac{MR\omega}{4t}$

B. $\dfrac{MR\omega}{2t}$

C. $\dfrac{MR\omega}{t}$

D. $MR\omega t$

Answer: B

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35. A couple produces.

A. No motion

B. Linear and rotational motion

C. Purely rotational motion

D. Purely linear motion

Answer: C

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36. For the circuit shown in the figure. The equivalent resistance between point A and B for the two cases (i) $V_A > V_B$, $(ii) V_B > V_A$

respectively   is. . . . . Ω and . . . . Ω

respectively. (D_1 and D_2 are ideal diodes)

A. 25, ∞

B. 50, ∞

C. ∞, 25

D. 25, 25

Answer: A

37. The band gap of an insulator, conductor and semiconductor are respectively E_{g1} and E_{g2} and E_{g3}. The relationship between them is given as_____.

A. $E_{g1} > E_{g2} < E_{g3}$

B. $E_{g1} > E_{g2} > E_{g3}$

C. $E_{g1} < E_{g2} > E_{g3}$

D. $E_{g1} < E_{g2} < E_{g3}$

Answer: A

38. On hilly reason, water boils at $95^\circ C$. The temperature expressed in Fahrenheit scale is

    A. $100^\circ F$

    B. $200^\circ F$

    C. $150^\circ F$

    D. $203^\circ F$

Answer: D

39. The dimensional formula for magnetic permeability μ is :

A. $\left[M^0L^{-1}T\right]$

B. $\left[M^0L^2T^{-1}\right]$

C. $\left[M^0L^2T^{-1}A^2\right]$

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

Answer: D

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40. The maximum number of possible interference maxima for slit-separation equal to twice the wavelength in Young's double-slit experiment is

A. Infinite

B. Five

C. Three

D. Zero

Answer: C

41. The Young's double slit experiment is performed with blue and with green light of wavelengths $4360A$ and $5460A$ respectively. If X is the distance of $4th$ maximum from the central one, then :

A. x(blue) = x(green)

B. x(blue) gt x(green)

C. x(blue) lt x(green)

D. $(x\text{blue})(x\text{green}) = \dfrac{5460}{4360}$

Answer: C

42. A string is vibrating in its fifth overtone between two rigid supports 2.4 m apart. The distance between successive node and antinode is

A. 0.1 m

B. 0.2 m

C. 0.6 m

D. 0.8 m

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43. 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 $\dfrac{\lambda}{4}$ is

A. $13I_0$

B. $14I_0$

C. $15I_0$

D. $16I_0$

Answer: A

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44. A body moves from a position $\overrightarrow{r_1} = \left(2\hat{i} - 3\hat{j} - 4\hat{k}\right)$ m to a position $\overrightarrow{r_2} = \left(3\hat{i} - 4\hat{j} + 5\hat{k}\right)m$ under the influence

of a constant force $\vec{F} = \left(4\hat{i} + \hat{j} + 6\hat{k}\right)N.$

The work done by the force is :

A. 57 J

B. 58 J

C. 59 J

D. 60 J

Answer: A

45. Under the action of a constant force, A particle is experiencing a constant acceleration. The power is

    A. Positive constant

    B. Negative constant

    C. Increasing uniformly with time

    D. Decreasing uniformly with time

Answer: C

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