PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 106

Physics

1. In hydrogen atom, the electron is moving round the nucleus with velocity

$2.18 \times 10^6 ms^{-1}$ in an orbit of radius 0.528 A.

The acceleration of the electron is .

A. $9 \times 10^{18} ms^{-2}$

B. $9 \times 10^{22} ms^{-2}$

C. $9 \times 10^{-22} ms^{-2}$

D. $9 \times 10^{12} ms^{-2}$

Answer: B

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2. If an alpha particle and a deuteron move with velocity v and 2v respectively, the ratio of their de-Broglie wave length will be ....

A. $1 : \sqrt{2}$

B. $2 : 1$

C. $1 : 1$

D. $\sqrt{2} : 1$

Answer: C

3. A proton of mass m collides elastically with a particle of unknown mass at rest After the collision the proton and the unknwon particle are seen moving at an angle fo $90°$ with respect to each other The mass of unknown particle is :

A. $m\left(\sqrt{3}\right)$

B. $\dfrac{m}{2}$

C. $2m$

D. m

Answer: D

4. A body of mass m_1 moving at a constant speed undergoes an elastic head on collision with a body of mass m_2 initially at rest. The ratio of the kinetic energy of mass m_1 after the collision to that before the collision is -

A. $\left(\dfrac{m_1 - m_2}{m_1 + m_2}\right)^2$

B. $\left(\dfrac{m_1 + m_2}{m_1 + m_2}\right)^2$

C. $\left(\dfrac{2m_1}{m_1 + m_2}\right)^2$

D. $\left(\dfrac{2m_2}{m_1 + m_2}\right)^2$

Answer: A

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5. A disc rotates about its aixs of symmetry in a horizontal plane at a steady rate of 3.5 revolutions per second A coin placed at a distance fo 1.25 cm form the axis of ratation remains at rest on the disc The coefficient of

friction between the coin and the disc is :

$$\left(g = 10/s^2\right)$$

A. 0.5

B. 0.7

C. 0.3

D. 0.6

Answer: D

6. Which of the following statement related to the hysteresis loop is incorrect?

A. The curve of B against H for a ferromagnetic material is called hysteresis loop

B. The area of B-H curve is a measure of power dissipated per cycle per unit, area of the specimen

C. Coactivity is a measure of the magnetic field required to destroy the residual magnetism of ferromagnetic material

D. The retentively of a speciment is the measure of magnetic field remaining in the speciment when the magnetising field is removed
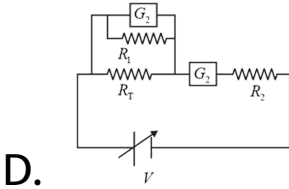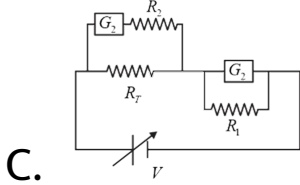
Answer: C

7. To verify Ohm's law, a student is provided with a test resistor R_T, a high resistance R_1, a small resistance R_2, two identical galvanometer G_1 and G_2, and a variable voltage source V. The correct circuit to carry out the experiment is
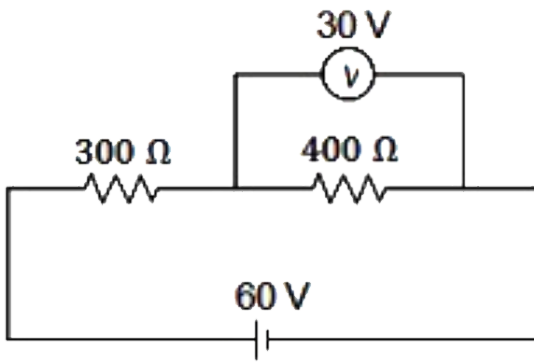

A.

B.

C.

D.
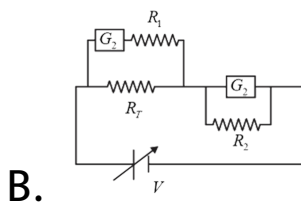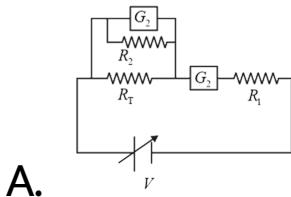
Answer: B

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8. In the circuit figure, the voltmeter reads 30 V. The resistance of the voltmeter is

30 V

300 Ω

400 Ω

60 V

A. 1200Ω

B. 700Ω

C. 400Ω

D. 300Ω

Answer: A

9. An emf of $15V$ is applied in a circuit containing $5H$ inductance and 10Ω resistance. The ratio of the currents at time $t = \infty$ and $t = 1s$ is

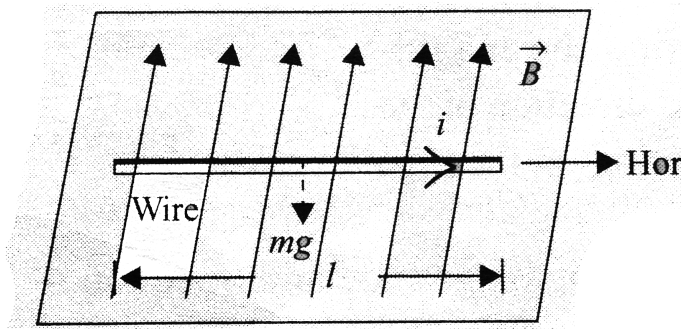A. $\dfrac{e^{1/2}}{e^{1/2} - 1}$

B. $\dfrac{e^2}{e^2 - 1}$

C. $1 - e^1$

D. e^{-1}

Answer: B

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10. A straight wire of mass 200 g and length 1.5 m carries a current of 2 A. It is suspended in mid-air by a uniform horizontal magnetic field B. What is the magnitude of the magnetic field?

A. 0.65

B. 0.55

C. 0.75

D. 0.45

Answer: A

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11. A mass of 1kg carrying a charge of 2C is accelerated through a potential of 1V. The velocity acquired by it is

A. $\sqrt{2}ms^{-1}$

B. $2ms^{-1}$

C. $\dfrac{1}{\sqrt{2}}ms^{-1}$

D. $\dfrac{1}{2}ms^{-1}$

Answer: B

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12. The magnetic field In a travelling electromagnetic wave has a peak value of

$20nT$ The peak value of electric field strength

is :

A. $3Vm^{-1}$

B. $6Vm^{-1}$

C. $9Vm^{-1}$

D. $12Vm^{-1}$

Answer: B

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13. If a man weighs 90 kg on the surface of the earth, the height above the surface of the earth of radius, R where the weight is 30 kg is

A. 0.73 R

B. $\sqrt{3}R$

C. R

D. $2R$

Answer: A

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14. Two satellites A and B go around a planet in circular orbits of radii 4 R and R respectively. If the speed of the satellite A is 3 V, then the speed of the satellite B will be

A. 12 V

B. 6 V

C. $\dfrac{4}{3}V$

D. $\dfrac{3}{2}v$

Answer: B

15. The amount of heat energy radiated by a metal at temperature T is E. When the temperature is increased to 3T, energy radiated is

A. $81E$

B. $9E$

C. $3E$

D. $27E$

Answer: A

16. A thermally insulated container is divided into two parts by a screen. In one part the pressure and temperature are P and T for an ideal gas filled. In the second part it is vacuum. If now a small hole is created in the screen, then the temperature of the gas will

A. Decrease

B. Increase

C. Remain same

D. None of these

Answer: C

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17. A Carnot engine, having an efficiency of $\eta = \dfrac{1}{10}$ as heat engine, is used as a refrigerator. If the work done on the system is

10 J, the amount of energy absorbed from the reservoir at lower temperature is
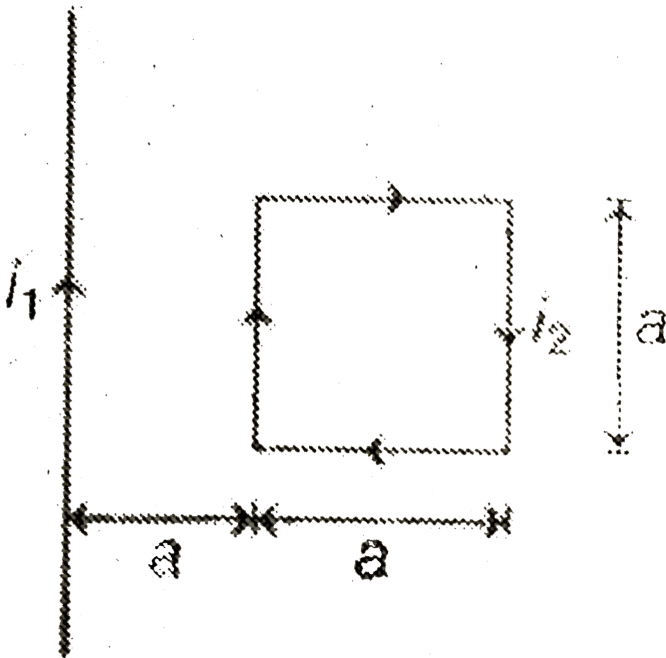
A. 99 J

B. 100 J

C. 1 J

D. 90 J

Answer: D

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18. A current carrying squre loop is placed near an infinitely long current carrying wire as shown in figure . The loop torque acting on the loop is

A. $\dfrac{\mu_0}{2\pi}i_1 i_2 r$

B. $\dfrac{\mu_0}{2\pi} i_1 i_2 \log_e 2$

C. $\dfrac{\mu_0}{2\pi} \dfrac{i_1 i_2 r}{2}$

D. Zero

Answer: D

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19. The magnetic dipole moment of current loop is independent of

A. Magnetic field in which it is lying

B. Number of turns

C. Area of the loop

D. Current in the loop

Answer: A

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20. A parachutist after bailing out falls 50m without friction. When parachute opens, it decelerates at $2m/s^2$. He reaches the ground

with a speed of $3m/s$. At what height, did the bail out?

A. 293 m

B. 111 m

C. 91 m

D. 182 m

Answer: A

21. A man throws a packet from a tower directly aiming at his friend who is standing at a certain distance from the base which is same as the height of the tower. If the packet is thrown with a speed of $4ms^{-1}$ and it hits the ground midway between the tower base & his friend than the height of the tower is $(g = 10ms^{-2})$

    A. 5m

    B. 8m

    C. 3.2 m

D. 13m

Answer: C

22. Two masses m_1 and m_2 $(m_1 > m_2)$ are connected by massless flexible and inextensible string passed over massless and frictionless pulley. The acceleration of centre of mass is

A. $\left(\dfrac{m_1 - m_2}{m_1 + m_2}\right)g$

B. $\dfrac{m_1 - m_2}{m + 1 + m_2} g$

C. $\dfrac{m_1 + m_2}{m_1 - m_2} g$

D. Zero

Answer: A

23. A bomb of mass $30kg$ at rest explodes into two pieces of mass $18kg$ and $12kg$. The velocity of mass $18 kg is 6m/s$. The kinetic energy of the other mass is

A. 324 J

B. 486 J

C. 256 J

D. 524 J

Answer: B

24. The energy released by fission of one U^{235}

atom is 200 MeV. Calculate the energy

released in kWh, when one gram of uranium undergoes fission.

A. $2.270 \times 10^4 kWh$

B. $2.278 \times 10^4 kWh$

C. $2.268 \times 10^2 kWh$

D. $2.288 \times 10^4 kWh$

Answer: B

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25. In a nuclear reactor, the fuel is consumed at the rate of $1mg/s$. The power generated in kilowatt is.

    A. 9×10^4

    B. 9×10^7

    C. 9×10^8

    D. 9×10^{12}

Answer: B

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26. The potential energy of a simple harmonic oscillator of mass 2 kg in its mean position is 5 J. If its total energy is 9 J and its amplitude is 0.01 m, its time period would be

A. $\dfrac{\pi}{10} S$

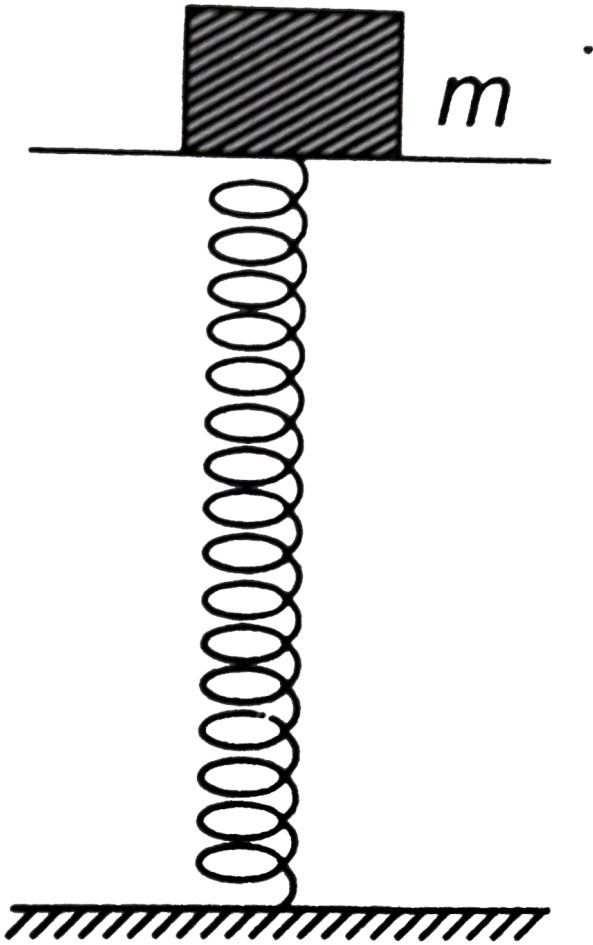B. $\dfrac{\pi}{20} S$

C. $\dfrac{\pi}{50} S$

D. $\dfrac{\pi}{100} S$

Answer: D

27. A mass of $2.0kg$ is put on a flat pan attached to a vertical spring fixed on the ground as shown in figure. The mass of the spring and the pan is negligible. When pressed slightly and realeased the mass executes a simple contant is $200N/m$. What should be the minimum amplitude of the motion, so that the mass gets the detached

from the pan? $(Takeg = 10m/s^2)$

A. 8 cm

B. 10 cm

C. Any value less than 12 cm

D. 4 cm

Answer: B

28. The electric field of certain radiation is given by the equation

$$E = 200\{\sin(4\pi \times 10^{10})t + \sin(4\pi \times 10^{15})t\}$$

falls in a metal surface having work function

2.0 eV. The maximum kinetic energy 2.0 eV. The maximum kinetic energy (in eV) of the photoelectrons is [Plank's constant $(h) = 6.63 \times 10^{-34} Js$ and electron charge $e = 1.6 \times 10^{-19} C]$

A. 3.3

B. 4.3

C. 5.3

D. 6.3

Answer: D

29. A proton and an α-particle are accelerated through same potential difference. Find the ratio of their de-Brogile wavelength.

A. $2\sqrt{2}$

B. $2\sqrt{2}$

C. $\sqrt{3}$

D. $2\sqrt{3}$

Answer: B

30. An object of mass 26 kg floats in the air and it is in the equilibrium state.Air density is $1.3 kgm^{-3}$. The volume of the object is

    A. $10m^3$

    B. $20m^3$

    C. $13m^3$

    D. $26m^3$

Answer: B

31. An air tight cage with are parrot sitting in it is suspended from the spring balance. The parrot starts flying. The reading of the spring balance will

A. increase

B. Decrease

C. Not change

D. Be zero

Answer: C

32. An object is placed at a distance 20 cm from the pole of a convex mirror of focal length 20 cm. The image is produced at

A. 13.3 cm

B. 20 cm

C. 25 cm

D. 10 cm

Answer: D

33. A transparent plastic bag filled with air forms a concave lens. Now, if this bag is completely immersed in water, then it behaves as

A. Divergent lens

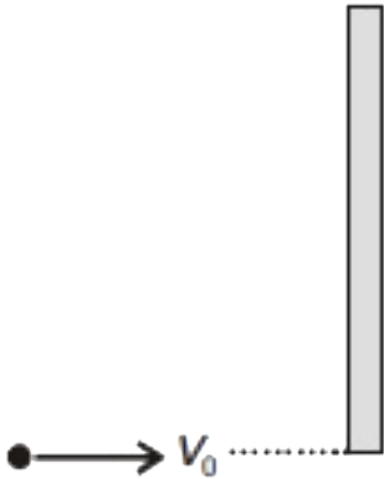B. Convergent lens

C. Equilateral prism

D. Rectangular slab

Answer: B

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34. A uniform rod of mass m and length L is at rest on a smooth horizontal surface. A ball of mass m, moving with velocity v_0, hits the rod perpendicularly at its one end and sticks to it.

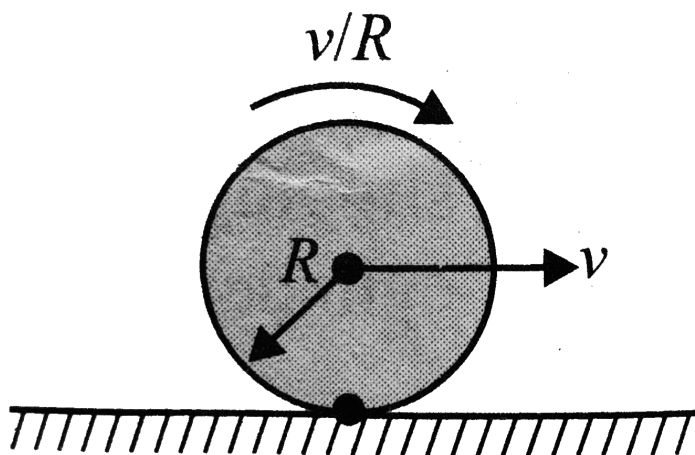The angular velocity of rod after collision is

A. $\dfrac{6v_0}{5L}$

B. $\dfrac{12v_0}{5L}$

C. $\dfrac{2v_0}{5L}$

D. $\dfrac{3v_0}{7L}$

Answer: A

35. A disc is performing pure rolling on a smooth stationary surface with constant angular velocity as shown in Fig,. At any instant, for the lower most point of the disc,

A. Velocity is v, acceleration is zero

B. Velocity is zero, acceleration is zero

C. Velocity is v, acceleration is $\dfrac{v^2}{R}$

D. Velocity is zero, acceleration is nonzero

Answer: D

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36. In an unbiased p-n junction electrons diffuse from n-region to p-region because :-

A. electrons travel across the junction due

to potential difference

B. only electrons move from n to p region

and not the vice-versa

C. electron concentration in n-region is
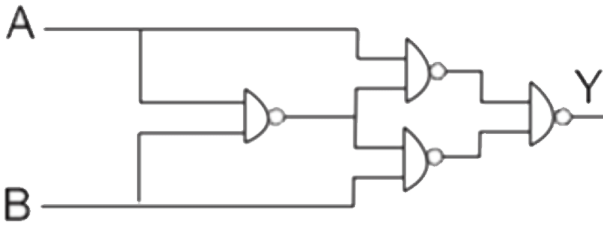
more as compared to that in p-region

D. holes in p - region attract them

Answer: C

37. Select the correct output Y

A. $A.B$

B. $A + B$

C. $A.\overline{B} + B.\overline{A}$

D. $A.B + \overline{A}.\overline{B}$

Answer: C

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38. To what temperature should the hydrogen at $327°C$ be cooled at constant pressure, so that the root mean square velocity of its molecules become half of its previous value?

A. $-123°C$

B. $123°C$

C. $-100°C$

D. $0°C$

Answer: A

39. A physical quantity x is calculated from the relation $x = \dfrac{a^2 b^3}{c\sqrt{d}}$. If the percentage error in $a, b, c,$ and d are $2\%, 1\%, 3\%,$ and 4%, respectively, what is the percentage error in x?

    A. $\pm 11\%$

    B. $\pm 13\%$

C. $\pm 12\%$

D. $\pm 14\%$

Answer: C

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40. A double-slit experiment is immersed in a liquid of refractive index 1.33. The separation between the slits is 1mm and the distance between the slits and screen is 1.33 m. If slits are illuminated by a parallel beam of light

whose wavelength is 6300Å, then fringe width will be

A. 6.3mm

B. 63 mm

C. 0.63 mm

D. None of these

Answer: C

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41. What is the width of a single slit if the first minimum is observed at an angle $2°$ with a light of wavelength 9680 Å ?

    A. 0.2 mm

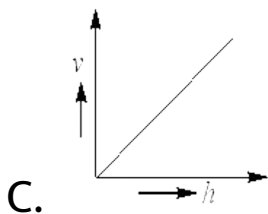   B. $2 \times 10^{-2} mm$
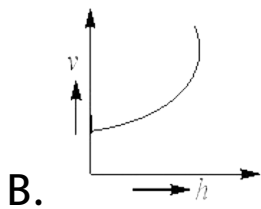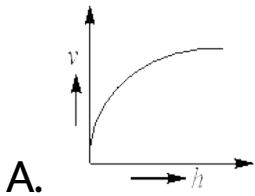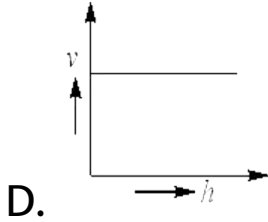
    C. $2 \times 10^{5} mm$

    D. $2mm$

Answer: B

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42. A Uniform rope having mass m hags vertically from a rigid support. A transverse wave pulse is produced at the lower end. The speed v of wave pulse varies with height h from the lower end as

A.

B.

C.

D.

Answer: A

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43. On producing the waves of frequency 1000 Hz in a kundt's tube the total distance between 6 successive nodes n 85 cm. Speed of sound in the gas filled in the tude is

A. $300ms^{-1}$

B. $350ms^{-1}$

C. $340ms^{-1}$

D. $330ms^{-1}$

Answer: C

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44. An inclined track ends in a circular loop of radius r. From what height on the track a particle should be released so that it

completes the loop, assuming there is no friction ?

A. $\dfrac{r}{2}$

B. $\dfrac{3r}{2}$

C. $2r$

D. $\dfrac{5r}{2}$

Answer: D

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45. 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

A. $8ms^{-1}$

B. $4ms^{-1}$

C. $\sqrt{24}ms^{-1}$

D. $20ms^{-1}$

Answer: A

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