PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 33

Physics

1. According to Bohr's theory, the time averaged magnetic field at the centre (i.e. nucleus) of a hydrogen atom due to the

motion of electrons in the n^{th} orbit is proportional to :

(n = principal quantum number)

A. n

B. n^{-1}

C. n^{-3}

D. n^3

Answer: A

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2. An excited He^+ ion emits two photons in succession, with wavelength 108.5 nm and 30.4 nm, in making a transition to ground state. The quantum number n, corresponding to its initial excited state is (for photon of wavelength λ, energy $E = \frac{1240eV}{\lambda(\text{in nm})}$

A. n= 6

B. n = 5

C. n = 7

D. n = 4

Answer: B

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3. A large number of particles are placed around the origin, each at a distance R from the origin. The distance of the center of mass of the system from the origin is

A. equal to R

B. less than or equal to R

C. greater than R

D. greater than or equal to R

Answer: B

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4. A proton moving with a velocity of $0.125 \times 10^5 ms^{-1}$ Collides with a stationary helium atom. The velocity of the proton after the collision is

A. $0.75 \times 10^5 ms^{-1}$

B. $7.5 \times 10^5 ms^{-1}$

C. $-0.75 \times 10^5 ms^{-1}$

D. $0 ms^{-1}$

Answer: C

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5. If

$B_H = 4 \times 10^{-5} T$ and $B_V = 2 \times 10^{-5} T$,

then the Earth's total field (in T) at the place is

A. $6 \times 10^{-5} T$

B. $2\sqrt{5} \times 10^{-5} T$

C. $4 \times 10^{-5} T$

D. $3 \times 10^{-5} T$

Answer: B

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6. The distance moved by the screw of a screw gauge is $2mm$ in four rotations and there are 50 divisions on its cap. When nothing is put

between its jaws, $20th$ divisions of circular scale coincides with reference line, and zero of linear scale is hidden from circular scale when two jaws touch each other or zero circular scale is laying above the reference line. When plate is placed between the jaws, main scale reads 2 divisions and circular scale reads 20 divisions. Thickness of plate is.

A. 1.5 mm

B. 1.2 mm

C. 1.4 mm

D. 1.6 mm

Answer: A

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7. G_1, G_2, G_3 are the conductances of three conductors. What will be their equivalent conductance when they are connected, (i) in series (ii) in parallel.

A. $\sigma_1 + \sigma_2 + \sigma_3$

B. $\frac{1}{\sigma_1}+\frac{2}{\sigma_2}+\frac{1}{\sigma_3}$

C. $\frac{\sigma_1\sigma_2\sigma_3}{\sigma_1+\sigma_2+\sigma_3}$

D. none of these

Answer: D

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8. A $4\mu F$ condenser is charged to $400V$ and then its plates are joined through a resistance of $1K\Omega$. The heat produced in the resistance is :

A. 0.16 J

B. 1.28 J

C. 0.64 J

D. 0.32 J

Answer: D

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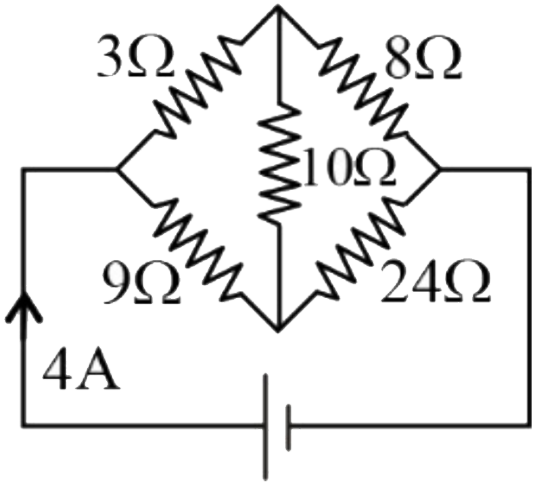
9. In the circuit shown, if the 10Ω resistance is replaced by 20Ω Then the amount of current

draw from the battery will be



A. $10A$

B. $4A$

C. $8A$

D. $2A$

Answer: B

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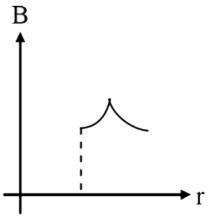
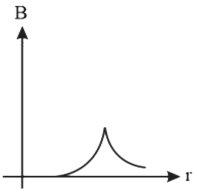
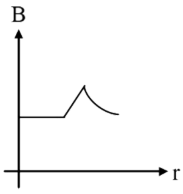
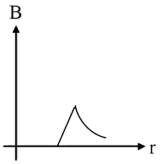
10. A current i is uniformly distributed over the cross section of a long hollow cylinderical wire of inner radius R_1 and outer radius R_2. Magnetic field B varies with distance r form the axis of the cylinder is

A. 

B. 

C. 

D. 

Answer: B

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11. The average power dissipation in a pure capacitance in AC circuit is

A. $2CV^2$

B. $\frac{1}{2}CV^2$

C. zero

D. CV^2

Answer: C

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12. The capacity of an isolated sphere is increased n times when it is enclosed by an

earthed concentric sphere. The ratio of their radii is

A. $\frac{n^2}{n-1}$

B. $\frac{n}{n-1}$

C. $\frac{2n}{n+1}$

D. $\frac{2n+1}{n+1}$

Answer: B

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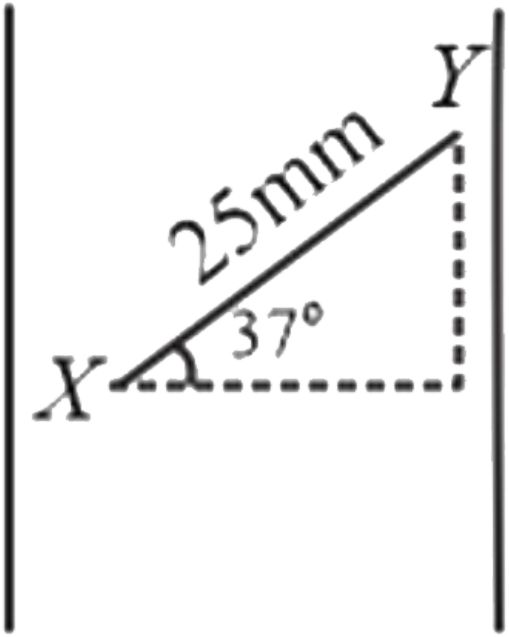
13. Two large parallel conducting plates are separated by 40 mm. The potential difference between the plates is V. Potential difference between points X and Y as indicated in the figure will be



A. $\frac{15}{40}V$

B. $\frac{V}{2}$

C. $\frac{25}{40}V$

D. V

Answer: B

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14. Calculate the daily loss of energy by the earth, if the temperature gradient in the earth's crust is $32^{\circ}C$ per km and mean

conductivity of the rock is 0.008 of CGS unit.

(Given radius of earth $= 6400km$)

A. 10^{30} cal

B. 10^{40} cal

C. 10^{20} cal

D. 10^{18} cal

Answer: D

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15. Newton's law of cooling applies when a body is losing heat to its surroundings by

A. Conducting

B. convection

C. convection and radiation

D. conduction as well as radiation

Answer: C

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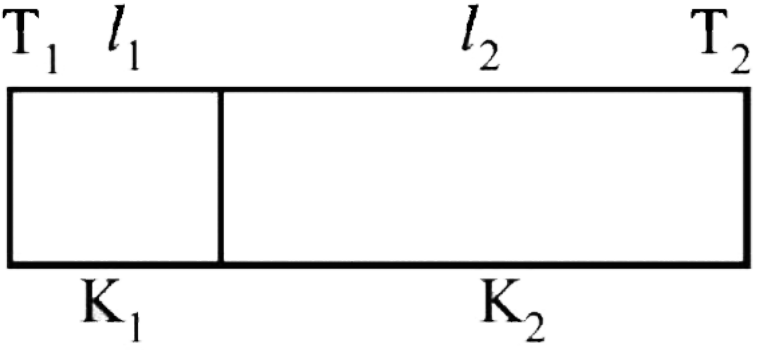
16. One end of a thermally insulated rod is kept at a temperature T_1 and the other at T_2. The rod is composed of two sections of length l_1 and l_2 and thermal conductivities K_1 and K_2 respectively. The temperature at the interface of the two section is



A. $\frac{(K_2 l_2 T_1 + K_1 l_1 T_2)}{(K_1 l_1 + K_2 l_2)}$

B. $\frac{(K_2 l_1 T_1 + K_1 l_2 T_2)}{(K_2 l_1 + K_1 l_2)}$

C. $\frac{(K_1 l_2 T_1 + K_2 l_1 T_2)}{(K_1 l_2 + K_2 l_1)}$

D. $\frac{(K_1 l_1 T_1 + K_2 l_2 T_2)}{(K_1 l_1 + K_2 l_2)}$

Answer: C

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17. One mole of a diatomic gas undergoes a thermodynamic process, whose process equation is $P \propto V^2$. The molar specific heat of the gas is

A. $\frac{17R}{3}$

B. $\frac{17R}{6}$

C. $\frac{15R}{4}$

D. $\frac{15R}{8}$

Answer: B

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18. In an adiabatic expansion of air (assume it a mixture of N_2 and O_2), the volume increases by $5\ \%$. The percentage change in pressure is:

A. 7%

B. 6%

C. 4%

D. 3%

Answer: A

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19. Two long parallel conductors carry currents I and $2I$ in the same direction. The magnetic induction at a point exactly mid way between

them is B. If the current in the first conductor is reversed in direction, the magnetic induction at the same point will be

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

B. 2B

C. 3B

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

Answer: C

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20. A uniform electric field and a uniform magneitc field exist in a region in the same direction An electron is projected with velocity pointed in the same direction the electron will

A. be deflected to the left without increase in speed

B. be deflected to the right without increase in speed

C. not be deflected but its speed will decrease

D. not be deflected but its speed will increase

Answer: C

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21. The horizontal range of an oblique projectile is equal to the distance through which a projectile has to fall freely from rest to acquire a velocity equal to the velocity of

projection in magnitude. The angle of projection is

A. 75°

B. 60°

C. 45°

D. 30°

Answer: A

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22. When a body slides down an inclined plane with coefficient of friction as μ_k, then its acceleration is given by .

A. $g(\mu_k \sin\theta + \cos\theta)$

B. $g(\mu_k \sin\theta - \cos\theta)$

C. $g(\sin\theta + \mu_k \cos\theta)$

D. $g(\sin\theta - \mu_k \cos\theta)$

Answer: D

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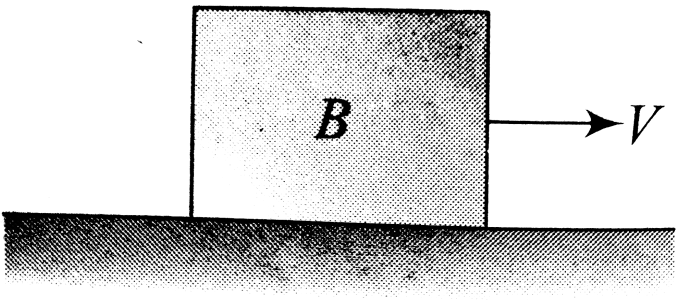
23. A block B is pushed momentarily along a horizontal surface with an initial velocity v . If μ is the coefficient of sliding friction between B and the surface, block B will come to rest after a time:



A. $g.\ \dfrac{\mu}{V}$

B. $\dfrac{g}{V}$

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

D. $\frac{V}{(g\mu)}$

Answer: D

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24. When the radioactive isotope $._{88}Ra^{228}$ decays in series by the emission of 3α and 1β particle, the isotope finally formed is

A. $._{84}X^{228}$

B. ${}_{86}X^{222}$

C. ${}_{86}X^{216}$

D. ${}_{86}X^{215}$

Answer: C

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25. In the following nuclear reaction 'x' stands for $n \to p + e^- + x.$

A. $\alpha -$ particle

B. positron

C. nutrino

D. antinutrino

Answer: D

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26. A horizontal platform with an object placed on it is executing SHM in the vertical direction . The amplitude of oscillation is 2.5 cm what

must be the least period of these oscillations so that the object is not detached ?

A. πs

B. $\frac{\pi}{5} s$

C. $\frac{\pi}{10} s$

D. $\frac{\pi}{15} s$

Answer: C

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27. In a seconds pendulum, mass of bob is 30 gm . If it is replaced by 90 gm mass. Then its time period will

A. 1 s

B. 2 s

C. 4 s

D. 3s

Answer: B

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28. A hydrogen-like atom emits radiation of frequency 2.7×10^{15} Hz when if makes a transition from $n = 2 \rightarrow n = 1$. The frequency emitted in a transition from $n = 3 \rightarrow n = 1$ will be

A. $3.2 \times 10^{15} Hz$

B. $32 \times 10^{15} Hz$

C. $1.6 \times 10^{15} Hz$

D. $16 \times 10^{15} Hz$

Answer: A

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29. Electromagnetic radiations of wavelength 2000Å are incident on a metal surface which has a work function $5.01eV$ The stopping potential for the given setup is

A. 1.19 eV

B. 6.19 eV

C. 3.19 eV

D. 4.19 eV

Answer: A

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30. The image obtained with a convex lens is erect and its length is 4 times the length of the object. If the focal length of lens is $20cm$, calculate the object and image distances.

A. u = 60cm, v = 15 cm

B. u = 20cm, v = 10 cm

C. u = 10cm, v = 20 cm

D. u = 15cm, v = 60 cm

Answer: D

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31. The instrument used by doctors for endoscopy work on the principle of

A. total internal reflection

B. reflection

C. refraction

D. none of these

Answer: A

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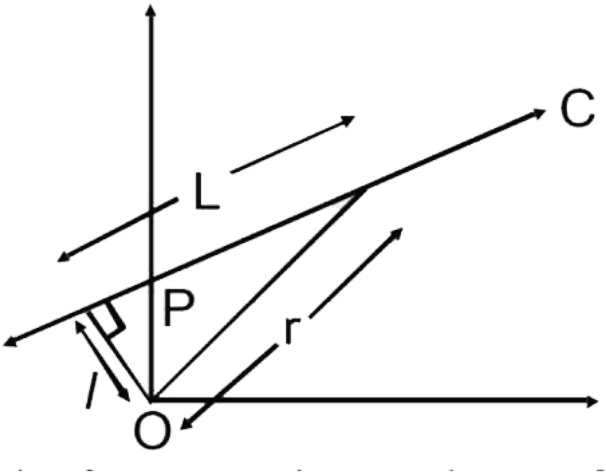
32. A particle of mass m moves along line PC with velocity v as shown. What is the angular

momentum of the particle about P?



A. mvL

B. mvl

C. mvr

D. zero

Answer: D

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33. The moment of inertia of a body about a given axis is $1.2kgm^2$. Initially, the body is at rest. In order to produce a rotational KE of $1500j$, for how much duration, an acceleration of $25rads^{-2}$ must be applied about that axis ?

A. 4 s

B. 2 s

C. 8 s

D. 10 s

Answer: B

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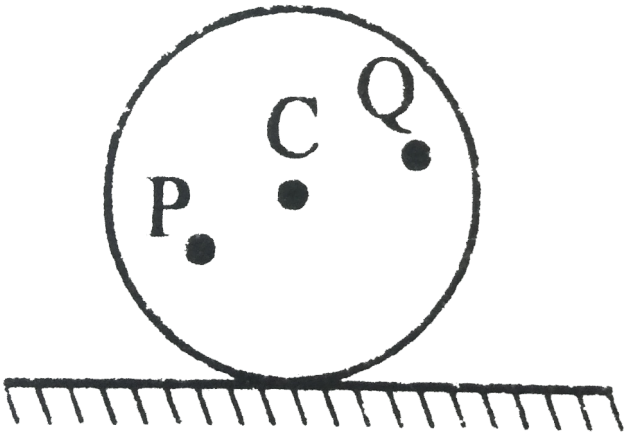
34. A disc is rolling (without slipping) on a horizontal surface. C is its center and Q and P are two points equidistant from C. Let V_P, V_Q and V_C be the magnitude of velocities

of points P, Q and C respectively, then



A. $V_Q > V_C > V_P$

B. $V_Q < V_C < V_P$

C. $V_Q = V_P, V_C = \frac{1}{2}V_P$

D. $V_Q < V_C > V_P$

Answer: A

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35. A solid homogeneous sphere is moving on a rough horizontal surface, partly rolling and partly sliding. During the king of motion of the sphere.

A. total kinetic energy is conserved

B. angular momentum of the sphere about the point of contact with the plane is conserved

C. only the rotational kinetic energy about the centre of mass is conserved

D. angular momentum about centre of mass is conversed

Answer: B

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36. An alternating current can be converted into direct current by a

A. rectifier

B. dynamo

C. transformer

D. motor

Answer: A

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37. The relation between α and β of a transistor is

A. $\frac{1}{\alpha}+\frac{1}{\beta}=1$

B. $\frac{1}{\alpha}=\beta+\frac{1}{\beta}$

C. $\frac{1}{\alpha}-\frac{1}{\beta}=0$

D. $\frac{1}{\alpha}-\frac{1}{\beta}=1$

Answer: D

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38. State the equation corresponding to $8g$ of O_2 is

A. PV = 8RT

B. $PV = \frac{RT}{4}$

C. PV =RT

D. $PV = \frac{RT}{2}$

Answer: B

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39. In Young's double slit experiment, the intensity of central maximum is I. What will be

the intensity at the same place if one slit is closed ?

A. same as

B. twice

C. four times

D. half

Answer: C

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40. The sodium yellow doubled has wavelength 5890 Å and λ Å$(\lambda > > 5890\text{Å})$ and resolving power of a grating to resolve these lines is 982, then value of λ is

A. 5896Å

B. 5880Å

C. 5869Å

D. 5876Å

Answer: A

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41. A whistle giving out $450HZ$ approaches a stationary observer at a speed of $33m/s$. The frequency heard the observer (in HZ) is (speed of sound $= 330m/s$)

A. 409

B. 429

C. 517

D. 500

Answer: D

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42. How Many times more intense is a 60 dB sound than a 30 dB sound ?

A. 1000

B. 2

C. 100

D. 4

Answer: A

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43. Two vibrating strings of the same material but lengths L and $2L$ have radii $2r$ and r respectively. They are stretched under the same tension. Both the string vibrate in their fundamental nodes, the one of length L with freuqency v_1 and the other with frequency v_2. the ratio v_1 / v_2 is given by

A. 1

B. $\frac{1}{2}$

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

D. 2

Answer: A

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44. A spring of force constant k extends by a length X on loading . If T is the tension in the spring then the energy stored in the spring is

A. $\frac{T^2}{2k}$

B. $\frac{T^2}{2k^2}$

C. $\frac{2k}{T^2}$

D. $\frac{2T^2}{k}$

Answer: A

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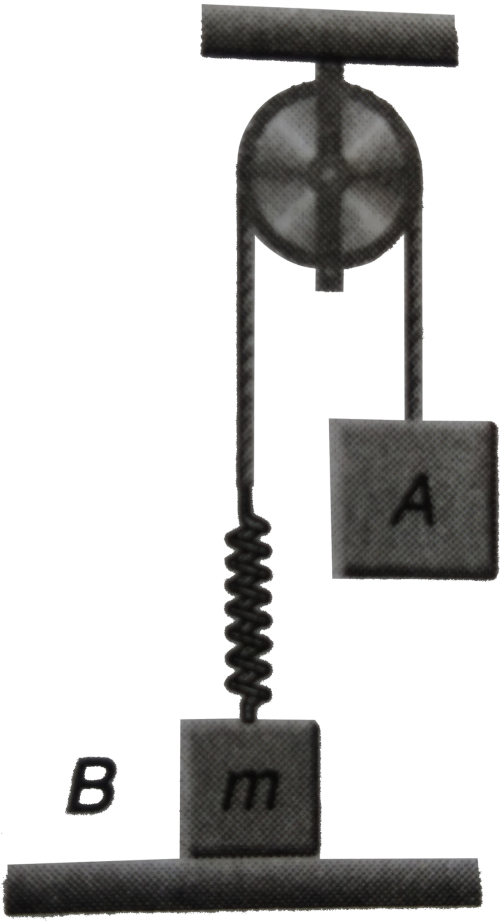
45. In the figure, block A is released from rest when the spring is its natural length for the block B of mass m to leave contact with the

ground at some stage what should be the minimum mass of block A?



A. 2M

B. M

C. $\frac{M}{2}$

D. $\frac{M}{4}$

Answer: C

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