PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 69

Physics

1. The frequency for a series limit of Balmer and paschen serial respectively are f_1 and f_3 if the frequency of the first line of Balmer

series is then the relation between f_1, f_2 and f_3 is

A. $f_1 - f_2 = f_3$

B. $f_1 + f_3 = f_2$

C. $f_1 + f_2 = f_3$

D. $f_2 - f_3 = 2f_1$

Answer: A

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2. The momentum of a photon of energy 1 MeV in kg-m/s, will be

A. 0.33×10^{6}

B. 7×10^{-24}

C. 10^{-22}

D. 5×10^{-22}

Answer: D

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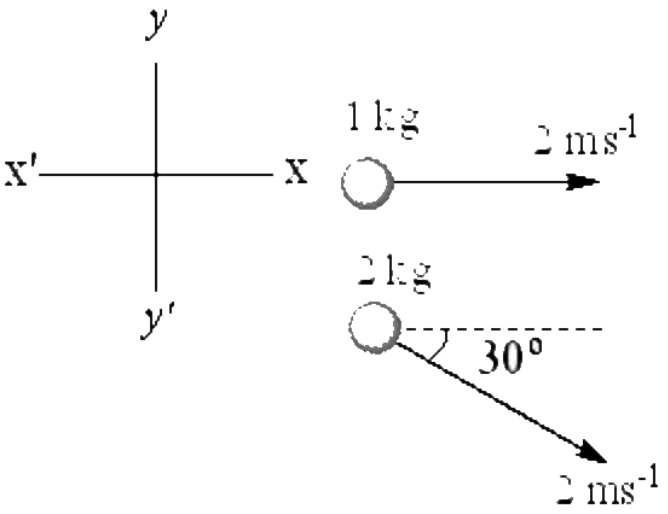
3. Find the velocity of the center of mass of the system shown in the figure .



A. $\left(\frac{2+2\sqrt{3}}{3}\right)\hat{i} - \frac{2}{3}\hat{j}$

B. $4\hat{i}$

C. $\left(\frac{2-2\sqrt{3}}{3}\right)\hat{i} - \frac{1}{3}\hat{j}$

D. None of these

Answer: A

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4. A body of mass 'm' moving with certain velocity collides with another identical body at rest. If the collision is perfectly elastic and after the collision both the bodies moves

A. 30°

B. 60°

C. 90°

D. 120°

Answer: C

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5. A disc initially at rest , is rotated about its axis with uniform angular acceleration . In the first 2 s, it rotates an angle θ . In the next 2s, the disc rotates through an angle

A. θ

B. 2θ

C. 3θ

D. 4θ

Answer: C

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6. A car is moving with speed $20ms^{-1}$ on a circular path of radius 100 m. Its speed is increasing at a rate of $3ms^{-2}$. The magnitude

of the acceleration of the car at that moment is

A. $1ms^{-2}$

B. $3ms^{-2}$

C. $4ms^{-2}$

D. $5ms^{-2}$

Answer: D

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7. The resistance of a wire is r ohm. If it is melted and stretched to n times its original length , its new resistance will be

A. $\frac{R}{n}$

B. n^2R

C. $\frac{R}{n^2}$

D. nR

Answer: B

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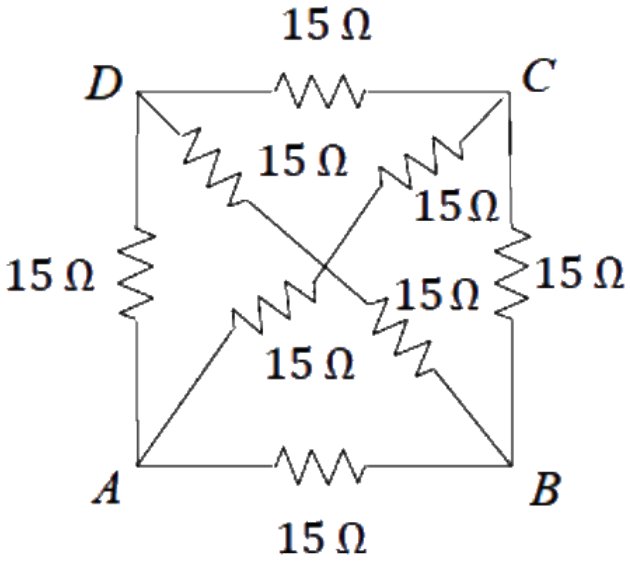
8. The equivalent resistance between the points A and B will be (each resistance is 15Ω)



A. 30Ω

B. 8Ω

C. 10Ω

D. 40Ω

Answer: B

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9. When a 10 μC charge is enclosed by a closed surface, the flux passing through the surface is ϕ. Now another 10 μC charge is placed inside the closed surface, then the flux passing through the surface is _____.

A. 4ϕ

B. ϕ

C. 2ϕ

D. zero

Answer: C

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10. For a series L - C - R circuit at resonance, the statement which is not true is

A. Peak energy stored by a capacitor = peak energy stored by an inductor

B. Average power = apparent power

C. Wattles current is zero

D. Power factor is zero

Answer: D

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11. Two point charges $A = +3nC$ and $B = +1nC$ are placed 5 cm apart in the air. The work done to move charge B towards A by 1 cm is

A. $2.0 \times 10^{-7} J$

B. $2.7 \times 10^{-7} J$

C. $12.1 \times 10^{-7} J$

D. $1.35 \times 10^{-7} J$

Answer: D

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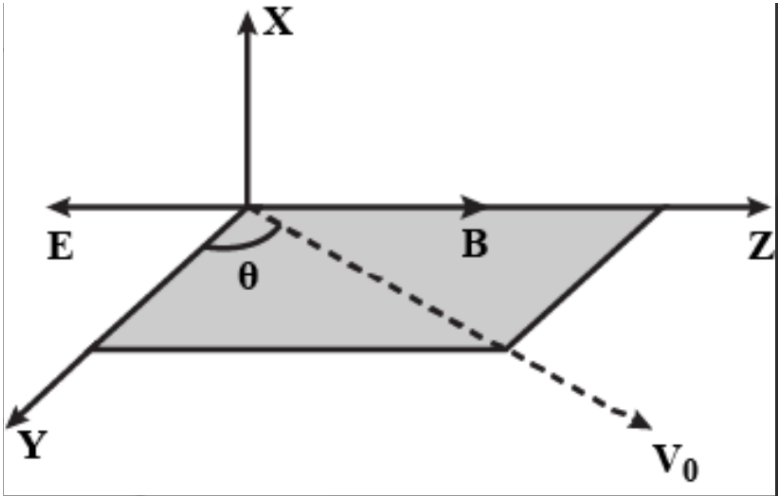
12. In a certain region uniform electric field E and magnetic field B are present in mutually opposite directions. At the instant $t = 0$, a particle of mass m carrying a charge q is given velocity v_0 at angle θ, with the $y -$ axis, in the yz plane. The time after which the speed of the

particle would be minimum is equal to



A. $\frac{2\pi m}{Bq}$

B. $\frac{mv\sin\theta}{qE}$

C. $\frac{mv\sin\theta}{qE}$

D. $\frac{mv}{qE}$

Answer: C

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13. Out of the following , the only correct statement about satellites is

A. A satellite cannot move in a stable orbit in a plane passing through the earth's center

B. Geostationary satellites are launched in the equatorial plane

C. We can use just one geostationary satellite for global communication around the globe

D. The speed of satellite increases with an increase in the radius of its orbit

Answer: B

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14. A rocket is fired from the earth towards the sun. At what distance from the earth's centre is the gravitational force on the rocket zero? Mass of the sun $= 2 \times 10^{30} kg$, mass of the earth $= 6 \times 10^{24} kg$. Neglect the effect of other planets etc. (orbital radius=$1.5 \times 10^{11} m$).

A. $2.6 \times 10^{8} m$

B. $3.2 \times 10^{8} m$

C. $3.9 \times 10^{9} m$

D. $2.3 \times 10^9 \mathrm{m}$

Answer: A

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15. A black body of temperature T is inside a chamber of temperature T_0 Now the closed chamber is slightly opened to Sun that temeperature of black body (T) and chamber (T_0) remain constant .

A. Black body will absorb more radiation

B. Black body will absorb less radiation

C. Black body will emit more energy

D. Black body will emit energy equal to energy absorbed by it

Answer: D

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16. C_v and C_p denote the molar specific heat capacities of a gas at constant volume and constant pressure, respectively. Then

A. $C_p - C_v$ is larger for a diatomic ideal gas than for a monotomic ideal gas

B. $C_p + C_v$ is larger for a diatomic ideal gas than for a monotomic ideal gas

C. $\frac{C_p}{C_v}$ is larger for a diatomic ideal gas than for a monotomic ideal gas

D. $C_p . C_v$ is smaller for a diatomic ideal gas than for a monotomic ideal gas

Answer: B

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17. Two identical containers A and B have frictionless pistons. They contain the same volume of an ideal gas at the same temperature. The mass of the gs in A is m_A and that B is m_B . The gas in each cylinder is now allowed to expand isothermally to double the intial volume. The changes in the pressure in A and B are found to be Δ and $1.5\Delta p$ respectively.

A. $4m_A = 9m_B$

B. $2m_A = 2m_B$

C. $3m_A = 2m_B$

D. $9m_A = 4m_B$

Answer: C

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18. If a current is passed in a spring then

A. Gets compressed

B. Get expanded

C. Oscillates

D. Remains unchanged

Answer: A

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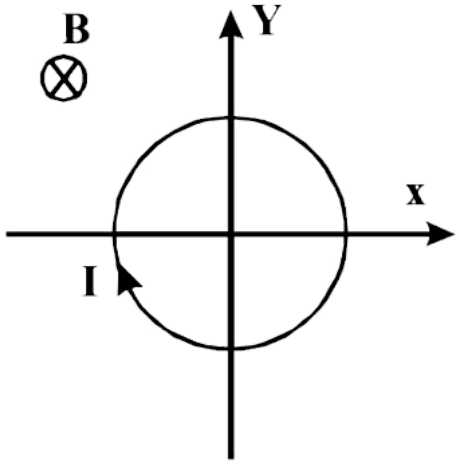
19. A conducting loop carrying a current I is placed in a uniform magnetic field ponting into the plane of the paper as shown. The loop

will have a tendency to



A. Expand

B. Move towards $+ve$ x - axis

C. Contract

D. Move towards - ve x - axis

Answer: A

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20. A thin magnetic needle vibrates in the horizontal plane with a period of 4s. The needle is cut into two halves by a plane normal to the magnetic axis of the needle. Then, the period of vibration of each half needle is approximately

A. 4 s

B. 2 s

C. 8 s

D. 1 s

Answer: B

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21. The velocity of a particle is zero at time t = 2s, then

A. displacement must be zero in the interval t = 0 to t = 2 s.

B. acceleration may be zero at t = 2 s.

C. velocity must be zero for $t > 2s$.

D. acceleration must be zero at t = 2 s.

Answer: B

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22. If a vector A is given as $A = 4\hat{i} + 3\hat{j} + 12\hat{k}$, then the angle subtended with the x - axis is

A. $\sin^{-1}\left[\frac{4}{13}\right]$

B. $\sin^{-1}\left[\frac{3}{13}\right]$

C. $\cos^{-1}\left[\frac{3}{13}\right]$

D. $\cos^{-1}\left[\frac{4}{13}\right]$

Answer: D

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23. A horizontal rod of mass $10g$ and length $10cm$ is placed on a smooth plane inclined at an angle of 60° with the horizontal with the length of the rod parallel to the edge of the inclined plane. A uniform magnetic field

induction B is applied vertically downwards. If the current through the rod is $1 \cdot 73 ampere$, the value of B for which the rod remains stationary on the inclined plane is

A. 1 T

B. 3 T

C. 2.5 T

D. 4 T

Answer: A

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24. A body weighs 6gms when placed in one pan and 24gms when placed on the other pan of a false balance. If the beam is horizontal when both the pans are empty, the true weight of the body is :

A. 15 g

B. 13 g

C. 10 g

D. 12 g

Answer: D

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25. $._{}^{65}Cu$ will turn into $._{}^{66}Cu$ if it is bombarded will

A. Protons

B. Neutrons

C. Electrons

D. Alpha particles

Answer: B

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26. A radioactive element has rate of disintegration $10,000$ disintegrations per minute at a particular instant. After four minutes it becomes 2500 disintegrations per minute. The decay constant per minute is

A. $0.2 \log_e 2$

B. $0.5 \log_e 2$

C. $0.6 \log_e 2$

D. $0.7 \log_e 2$

Answer: B

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27. Two simple pendulums A and B are made to oscillate simultaneously and it is found that A completes 10 oscillations in 20s and B completed 8 oscillations in 10 s. The ratio of the length of A and B is

A. $\frac{25}{64}$

B. $\frac{64}{25}$

C. $\frac{8}{5}$

D. $\frac{5}{4}$

Answer: B

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28. A coin is placed on a horizontal platform which undergoes vertical simple harmonic motion of angular frequency ω. The amplitude

of oscillation is gradually increased. The coin will leave contact with the platform for the first time

A. at the highest position of the platform

B. at the mean position of the platform

C. for an amplitude of $\frac{g}{\omega^2}$

D. for an amplitude of $\frac{g^2}{\omega^2}$

Answer: C

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29. In an experiment on the photoelectric effect , the slope of the cut - off voltage versus frequency of incident light is found to be $4.12 \times 10^{-15} V$ s . The value of Planck's constant is

A. 6.592×10^{-34} J s

B. 6.592×10^{-31} J s

C. 9.592×10^{-34} J s

D. 6.592×10^{-30} J s

Answer: A

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30. A radio transmitter operates at a frequency of $880kHz$ and a power of $10kW$. The number of photons emitted per second are

A. 1.72×10^{31}

B. 1.327×10^{25}

C. 1.327×10^{37}

D. 1.327×10^{45}

Answer: A

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31. A vessel completely filled with water has holes 'A' and 'B' at depths 'h' and '3h' from the top respectively. Hole 'A' is a square of side 'L' and 'B' is circle of radius 'r'. The water flowing out per second from both the holes is same. Then 'L' is equal to

A. $r^{\frac{1}{2}}(\pi)^{\frac{1}{2}}(3)^{\frac{1}{2}}$

B. $r(\pi)^{\frac{1}{4}}(3)^{\frac{1}{4}}$

C. $r(\pi)^{\frac{1}{2}}(3)^{\frac{1}{4}}$

D. $r^{\frac{1}{2}}(\pi)^{\frac{1}{3}}(3)^{\frac{1}{2}}$

Answer: C

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32. The length of a metal wire is l_1 when the tensionin it is T_1 and isl_2 when the tension is T_2. The natural length of the wire is

A. $\frac{l_1 + l_2}{2}$

B. $\sqrt{l_1 l_2}$

C. $\frac{l_1 T_2 - l_2 T_1}{T_2 - T_1}$

D. $\frac{l_1 T_2 + l_2 T_1}{T_2 + T_1}$

Answer: C

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33. Two lenses of power +10 D and - 5 D are placed in contact. Where should an object be

held from the lens, so as to obtain a virtual image of magnification 2 ?

A. 5 cm

B. $-5cm$

C. 10 cm

D. $-10cm$

Answer: D

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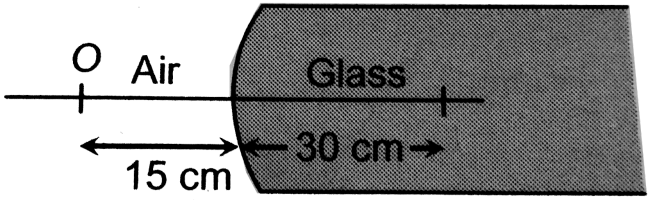
34. A poinit object O is placed in front of a glass rod having spherical end of radius of curvature $30cm$. The image would be formed at



A. 30 cm left from the pole

B. Infinity

C. 1 cm to the right from the pole

D. 18 cm to the left from the object

Answer: A

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35. If a body of moment of inertia $2kgm^2$ revolves about its own axis making 2 rotations per second, then its angular momentum (in J s) is

A. 2π

B. 4π

C. 6π

D. 8π

Answer: D

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36. A circular disc of radius R rolls without slipping along the horizontal surface with constant velocity v_0 . We consider a point A on the surface of the disc. Then, the acceleration of point A is

A. Constant in magnitude

B. Constant in direction

C. Constant in magnitude as well as direction

D. None of the above

Answer: A

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37. Forward bias characteristics of a p -n junction diode is used in which of the following devices ?

A. Voltage Regulation

B. Oscillator

C. Rectifier Circuit

D. Solar cell

Answer: C

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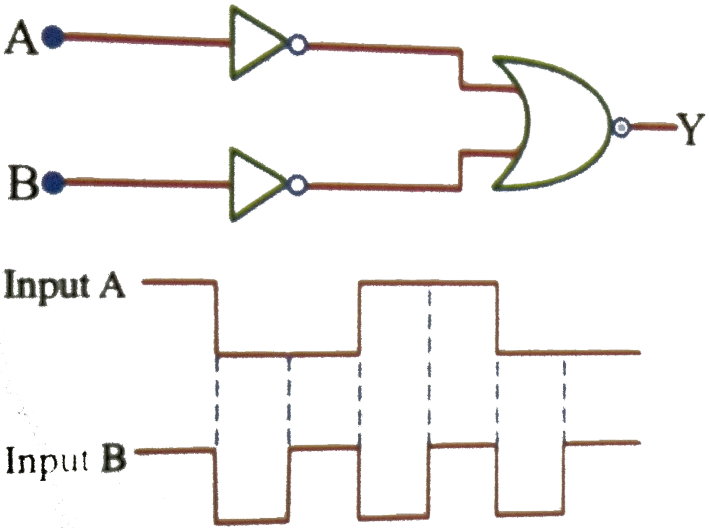
38. The logic circuit shown below has the input waveforms 'A' and 'B' as shown. Pick out the

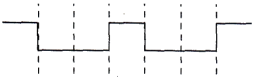
correct output waveform



A. 

B. 

C. 

D. 

Answer: A

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39. The rms speed of hydrogen molecule at a certain temperature is v. If the temperature is doubled and hydrogen gas dissociates into atomic hydrogen , the rms speed will become

A. v

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

C. $2v$

D. $\sqrt{2}v$

Answer: C

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40. If C be the capacitance and V be the electric potential, then the dimensional formula of CV^2 is

A. $\left[ML^{-3}TA\right]$

B. $\left[K^0LT^{-2}A^0\right]$

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

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

Answer: D

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41. A beam of light $(\lambda = 600nm)$ from a distant source falls on a single slit 1 mm wide and the resulting diffraction pattern is observed on a screen 2 m away. The distance

between the first dark fringes on either side of the central bright fringe is

A. 1.2 cm

B. 1.2 cm

C. 2.4 cm

D. 2.4 mm

Answer: D

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42. A two slit Young's interference experiment it done with monochromatic light of wavelength $6000A$. The slits are $2mm$ apart. The fringes are observed on a screen placed $10cm$ away from the slits. Now a transparent plate of thickness $0.5mm$ is placed in front of one of the slits and it if found that the interference pattern shifts by $5mm$. The refractive index of the transparent plate is :

A. 1.2

B. 1.5

C. 1.8

D. $4/3$

Answer: A

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43. An open organ pipe of length L vibrates in its fundamental mode. The pressure variation is maximum

A. At the two ends

B. At the middle of the pipe

C. At the distance $\frac{l}{8}$ inside the ends

D. At the distance $\frac{l}{4}$ inside the ends

Answer: B

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44. A transverse wave along a string is given by

$$y = 2\sin\left(2\pi(3t - x) + \frac{\pi}{4}\right)$$

where x and y are in cm and t in second. Find

acceleration of a particle located at x = 4 cm at t = 1s.

A. $36\sqrt{2}\pi^2 cms^{-2}$

B. $36\pi^2 cms^{-2}$

C. $-36\sqrt{2}\pi^2 cms^{-2}$

D. $-36\pi^2 cms^{-2}$

Answer: C

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45. An ideal spring with spring constant k is hung from the ceiling and a block of mass M is attached to its lower end. The mass is released with the spring initially unstretched. Then the maximum extension in the spring is

A. $\frac{4Mg}{k}$

B. $\frac{2Mg}{k}$

C. $\frac{Mg}{k}$

D. $\frac{Mg}{2k}$

Answer: B

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