PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 107

Physics

1. An alpha nucleus of energy $\frac{1}{2}m\nu^2$ bombards a heavy nucleus of charge Ze . Then

the distance of closed approach for the alpha nucleus will be proportional to

A. v^2

B. $1/m$

C. $1/Ze$

D. $1/v^2$

Answer: B

Watch Video Solution

2. If an electron has an energy such that its de Broglie wavelength is 5500Å, then the energy value of that electron is $\left(h = 6.6 \times 10^{-34}\right)$ Js, $m_c = 9.1 \times 10^{-31}$ kg

A. $8 \times 10^{-20} J$

B. $8 \times 10^{-10} J$

C. 8J

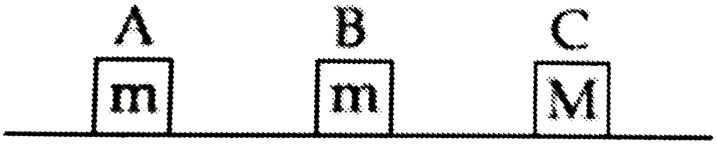
D. $8 \times 10^{-25} J$

Answer: D

Watch Video Solution

Watch Video Solution

3. Three blocks A, B and C are lying on a smooth horizontal surface, as shown in the figure. A and B have equal masses, m while C has mass M. Block A is given an inita speed v towards B due to which it collides with B perfectly inelastically. The combined mass collides with C, also perfectly inelastically $\frac{5}{6}th$ of the initial kinetic energy is lost in whole process. What is balue of M//M?



A. 3

B. 4

C. 5

D. 2

Answer: B

Watch Video Solution

4. A ball of mass m approaches a heavy wall of mass M with speed 4 m/s along the normal to the wall. The speed of wall before collision is

1m/s towards the ball. The ball collides elastically with the wall. What can you say about the speed of the ball after collision? Will it be slightly less than or slightly higher than 6 m/s ?

A. $5 \mathrm{m\ s}^{-1}$ away from the wall

B. $9 \mathrm{m\ s}^{-1}$ away from the wall

C. $3 \mathrm{m\ s}^{-1}$ away from the wall

D. $6 \mathrm{m\ s}^{-1}$ away from the wall

Answer: D

Watch Video Solution

5. A particle of mass 100 g tied to a string is rotated along the circle of radius 0.5 m. The breaking tension of the string is 10 N. The maximum speed with which particle can be rotated without breaking the string is

A. $10 \quad \mathrm{ms}^{-1}$

B. $9.8 \mathrm{m\,s}^{-1}$

C. $7.7 \quad \mathrm{m\,s}^{-1}$

D. $7.07 \quad \mathrm{m\,s}^{-1}$

Answer: D

Watch Video Solution

6. At a certain place, the angle of dip is 60° and the horizontal component of the earth's magnetic field (B_H) is 0.8×10^{-4} T. The earth's overall magnetic field is

A. $1.5 \times 10^{-4} T$

B. $1.6 \times 10^{-3} T$

C. $1.5 \times 10^{-3} T$

D. $1.6 \times 10^{-4} T$

Answer: D

Watch Video Solution

7. A galvanometer of resistance 25Ω measures $10^{-3} A$. shunt required to increase range up tow 2 A is

A. $12.5 m\Omega$

B. $0.125 m\Omega$

C. 0.125Ω

D. $1.25m\Omega$

Answer: A

Watch Video Solution

8. The emf of a cell is 6 V and internal resistance is $0.5k\Omega$ The reading of a Voltmeter having an internal resistance of $2.5k\Omega$ is

A. 6 V

B. 10 V

C. 5 V

D. 0.5 V

Answer: C

Watch Video Solution

9. If the current in the toroidal solenoid increases uniformly from zero to 6.0 A in $3.0\mu s$ Self-inductance of the toroidal solenoid is 40μ H The magnitude of self-induced emf is

A. 80 V

B. 160 V

C. 24 V

D. 48 V

Answer: A

Watch Video Solution

10. Two coils P and Q are kept near each other. When no current flows through coil P and current increases in coil Q at the rate $10A/s$,

the emf in coil P is 15 mV. When coil Q carries no current and current of $1.8A$ flows through coil P, the magnetic flux linked with the coil Q is

A. $1.4mWb$

B. $2.2mWb$

C. 2.7 mWb

D. 2.9 mWb

Answer: C

Watch Video Solution

11. Two large parallel metal carry charges +Q and –Q respectively . A test charge q_0 placed between them experiences a force F. If the separation between the plants is doubled, then the force on the test charge will be

A. F

B. 2F

C. $F/2$

D. $F/4$

Answer: A

View Text Solution

12. The amount of work done in increasing the voltage across the plates of capacitor from 5 V to 10 V is W. The work done in increasing it from 10 V to 15 V will be

A. W

B. 0.6W

C. 1.25 W

D. 1.67 W

Answer: D

 Watch Video Solution

13. If the radius of the earth were to shrink by 1% its mass remaining the same, the acceleration due to gravity on the earth's surface would

A. Decreases by 2%

B. Remain unchanged

C. Increase by 2%

D. Become zero

Answer: C

Watch Video Solution

14. The change in the gravitational potential energy when a body of a mass m is raised to a height nR above the surface of the earth is (here R is the radius of the earth)

A. mgR

B. $mgR\frac{n}{(n+1)}$

C. $mgR\frac{n^2}{(n^2+1)}$

D. $\frac{mgR}{n}$

Answer: B

Watch Video Solution

15. Consider an expanding sphere of instantaneous radius ? whose total mass remains constant. The expansion is such that

the instantaneous density ρ remains uniform throughout the volume. The rate of fractional change in density $\left(\frac{dp}{\rho dt}\right)$ is constant. The velocity v of any point on the surface of the expanding sphere is proportional to

A. R^3

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

C. R

D. $R^{\frac{2}{3}}$

Answer: C

Watch Video Solution

16. An ideal gas at $27^\circ C$ is compressed adiabatically to $8/27$ of its original volume. If $\gamma = 5/3$, then the rise in temperature is

A. 450K

B. 375K

C. 225K

D. 405K

Answer: B

Watch Video Solution

17. Two spheres of the same material have radii 1m and 4m and temperatures 4000K and 2000K respectively. The ratio of the energy radiated per second by the first sphere to that by the second is

A. $1:1$

B. $16:1$

C. $4:1$

D. $1:9$

Answer: A

 Watch Video Solution

18. 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

Watch Video Solution

19. A long solenoid carrying a current produces a magnetic field B along its axis. If the current is doubled and the number of turns per cm is halved, the new vlaue of the magnetic field is

A. B

B. 2B

C. 4B

D. B/2

Answer: A

Watch Video Solution

20. The position x of a particle varies with time t as $x = at^2 - bt^3$. The acceleration at time t of the particle will be equal to zero, where (t) is equal to .`

A. $2at - 3bt^2$

B. $2a - 6bt$

C. $2a - 6b$

D. None of these

Answer: B

Watch Video Solution

21. Ship A is sailing towards north-east with velocity $\overrightarrow{r} = 30\hat{i} + 50\hat{J}\,km/hr$ where $\hat{i}$ points east and $\hat{j}$, north. Ship B is at a

distance of $80km$ east and $150km$ norht of Ship A and is sailing towards west at $10km/hr$. A will be at minimum distance from B in:

A. 4.2 h

B. 3.2 h

C. 2.6 h

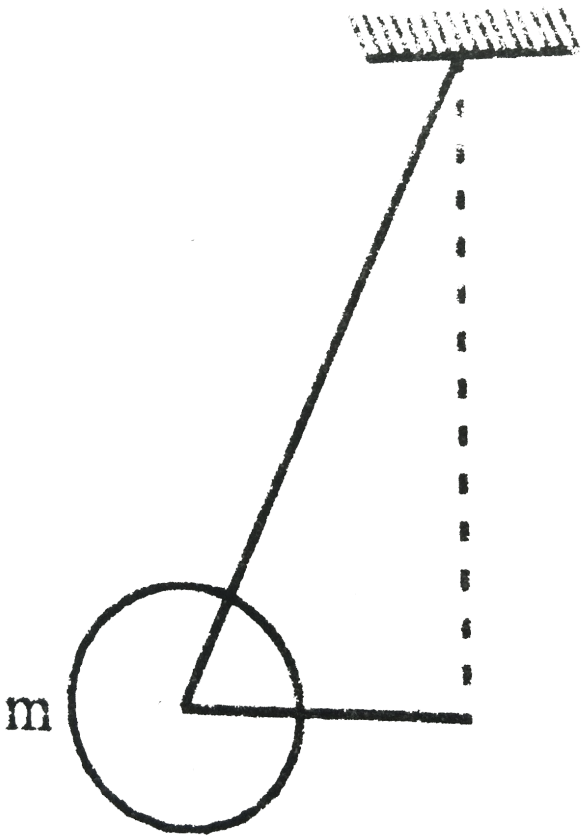
D. 2.2 h

Answer: C

Watch Video Solution

22. A ball of mass $(m)0.5kg$ is attached to the end of a string having length $(L)0.5m$. The ball is rotated on a horizontal circular path about vertical axis. The maximum tension that the string can bear is $324N$. The maximum possible value of angular velocity of ball (in

radian//s) is -



A. 9

B. 8

C. 27

D. 36

Answer: D

Watch Video Solution

23. A mass m moving horizontal (along the x-axis) with velocity v collides and stricks to mass of $3m$ moving vertically upward (along the y-axis) with velocity $2v$. The final velocity of the combination is

A. $\frac{1}{4}v\hat{i} + \frac{3}{2}v\hat{j}$

B. $\frac{1}{3}v\hat{i} + \frac{2}{3}v\hat{j}$

C. $\frac{2}{3}v\hat{i} + \frac{1}{3}v\hat{j}$

D. $\frac{3}{2}v\hat{i} + \frac{1}{4}v\hat{j}$

Answer: A

Watch Video Solution

24. A nucleus disintegrated into two nucleus which have their velocities in the ratio of $2:1$. The ratio of their nuclear sizes will be

A. $2^{\frac{1}{3}}:1$

B. $1:3^{\frac{1}{2}}$

C. $3^{\frac{1}{2}}:1$

D. $1:2^{\frac{1}{3}}$

Answer: D

Watch Video Solution

25. A radioactive nucleus A with a half life T, decays into a nucleus B. At t = 0, there is no nucleus B. At sometime t, the ratio of the

number of B to that of A is 0.3. Then, t is given by :

A. $t = \frac{T}{\log(1.3)}$

B. $t = \frac{T}{2}\frac{\log 2}{\log 1.3}$

C. $t = T\frac{\log 1.3}{\log 2}$

D. $t = T\log(1.3)$

Answer: C

Watch Video Solution

26. A particle of mass (m) is executing oscillations about the origin on the (x) axis. Its potential energy is $V(x) = k|x|^3$ where (k) is a positive constant. If the amplitude of oscillation is a, then its time period (T) is.

A. Proportional to $\frac{1}{\sqrt{2}}$

B. Independent to a

C. Proportional to $\sqrt{a}$

D. Proportional to $a^{\frac{3}{2}}$

Answer: A

Watch Video Solution

27. The shortest distance travelled by a particle executing SHM from mean position in 2 s is equal to $\left(\sqrt{3}/2\right)$ times its amplitude. Determine its time period.

A. 11 s

B. 12 s

C. 13 s

D. 14 s

Answer: B

Watch Video Solution

28. If the directions of electric and magnetic field vectors of a plane electromagnetic wave are along positive y- direction and positive z- direction respectively , then the direction of propagation of the wave is along

A. Positive z - direction

B. Negative z - direction

C. Negative y - direction

D. Positive x - direction

Answer: D

Watch Video Solution

29. The frequencies of X-rays, γ-rays and ultraviolet rays are respectively a, b and c .Then

A. $a < b, b < c$

B. $a < b, b > c$

C. $a > b, b > c$

D. $a > b, b < c$

Answer: B

Watch Video Solution

30. A capillary tube of the radius 0.5 mm is immersed in a beaker of mercury . The level inside the tube is 0.8 cm below the level in beaker and angle of contact is 120° . What is

the surface tension of mercury , if the mass density of mercury is $\rho = 13.6 \times 10^3 kgm^3$ and acceleration due to gravity is g = 10 m s^{-2} ?

A. 0.225N m^{-1}

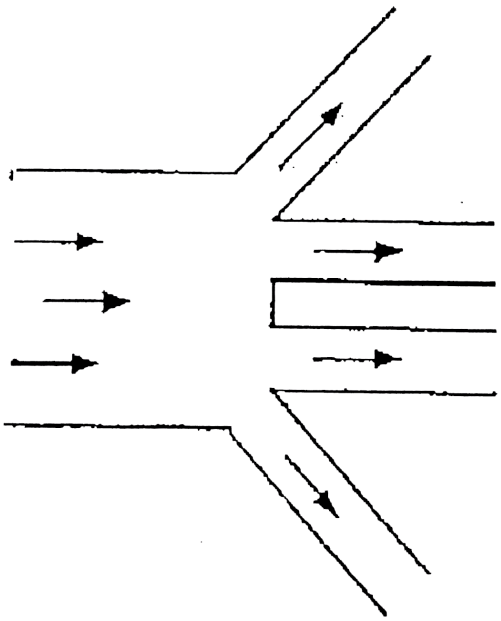
B. 0.544N m^{-1}

C. 0.285N m^{-1}

D. 0.375N m^{-1}

Answer: B

Watch Video Solution



31.

Water is flowing through a channel that is 12 m wide with a speed of 0.75m/s. the water then flows into four identical channels that have a width of 4.0 m the depth of the water does not change as it flows into the four

channels. What is the speed of the water in one of the smaller channels?

A. $0.56ms^{-1}$

B. $2.3ms^{-1}$

C. $0.25ms^{-1}$

D. $0.75ms^{-1}$

Answer: A

Watch Video Solution

32. A ray of light is incident on the plane mirror at rest. The mirr starts turning at a uniform angular acceleration of $\pi rads^{-2}$. The reflected ray at the end of $\frac{1}{4}$ s must have turned through

A. 90°

B. 45°

C. 22.5°

D. 11.25°

Answer: D

Watch Video Solution

33. A beam of parallel rays is brought to focus by a planoconvex lens. A thin Concave lens of the same focal length is joined to the first lens. The effect of this is

A. The focus shifts to infinity

B. The focal point shifts towards the lens by a small distance

C. The focal point shifts away from the lens by a small distance

D. The focus remains undisturbed

Answer: A

 Watch Video Solution

34. By keeping moment of inertia of a body constant, if we double the time period, then angular momentum of body

A. Remains constant

B. Becomes half

C. Doubles

D. quadruples

Answer: B

Watch Video Solution

35. A body of mass m slides down an incline and reaches the bottom with a velocity v. If the same mass were in the form of a ring

which rolls down this incline, the velocity of the ring at the bottom would have been

A. v

B. $\sqrt{2}v$

C. $\frac{v}{\sqrt{2}}$

D. $\sqrt{\frac{2}{5}}v$

Answer: C

Watch Video Solution

36. A silicon specimen is made into a P-type semiconductor by dopping, on an average, one helium atoms per 5×10^7 silicon atoms. If the number density of atoms in the silicon specimen is $5 \times 10^{28} atom/m^3$ then the number of acceptor atoms in silicon per cubic centimeter will be

A. $2.5 \times 10^{30} \text{atom cm}^{-3}$

B. $2.5 \times 10^{35} \text{atom cm}^{-3}$

C. $1 \times 10^{13} \text{atom cm}^{-3}$

D. $1 \times 10^{15} \text{atom cm}^{-3}$

Answer: D

Watch Video Solution

37. If the forward voltage in a diode is increased, the width of the depletion region-

A. Increase

B. Decrease

C. Not change

D. Initially increase and then decrease

Answer: A

Watch Video Solution

38. An ideal gas heat engine operates in a Carnot cycle between $227^\circ C$ and $127^\circ C$. It absorbs $6Kcal.$ of heat at higher temperature. The amount of heat in $kcal$ rejected to sink is

A. 4.8

B. 2.4

C. 1.2

D. 6.0

Answer: A

Watch Video Solution

39. The dimensions of coefficient of self inductances are

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

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

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

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

Answer: A

Watch Video Solution

40. In Young's experiment, the ratio of maximum to minimum intensities of the fringe system is $4:1$. The amplitudes of the coherent sources are in the ratio

A. $1:1$

B. $3:1$

C. $1:4$

D. $5:1$

Answer: B

Watch Video Solution

41. In a single - slit diffraction pattern , the position of first secondary maximum is at 30° ,

then what will be the angular position of second minima ?

A. $\sin^{-1}(2/3)$

B. $\sin^{-1}(1)$

C. $\sin^{-1}(1/2)$

D. None

Answer: A

Watch Video Solution

42. A pulse of a wavetrain travels along a stretched string and reaches the fixed end of the string. It will be reflected back with

A. The same phase as the incident pulse but with velocity reversed

B. A phase change of 180° with no reversal of velocity

C. The same phase as the incident pulse with no reversal of velocity

D. A phase change of 180° with velocity reversed

Answer: D

Watch Video Solution

43. A motor car is approaching towards a crossing with a velocity of $72\ \mathrm{km\,h^{-1}}$. The frequency of the sound of its horn as heard by a policeman standing on the crossing is 260 Hz. The frequency of horn is

A. 200 Hz

B. 244 Hz

C. 150 Hz

D. 80 Hz

Answer: B

 Watch Video Solution

44. If linear momentum if increased by $50\,\%$ then kinetic energy will be increased by

A. $50\ \%$

B. $100\ \%$

C. $125\ \%$

D. $25\ \%$

Answer: C

Watch Video Solution

45. A bucket full of water weighs 5 kg, it is pulled from a well 20 m deep. There is a small hole in the bucket through which water leaks

at a constant rate. If it is observed that for every metre the bucket loses 0.2 kg mass of water, then the total waork done in pulling the bucket up from the well is $[g = 10ms^{-2}]$

A. 600 J

B. 400 J

C. 100 J

D. 500 J

Answer: A

Watch Video Solution