PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 61

Physics

1. The ratio of minimum to maximum wavelength in Balmer series is

A. $5 : 9$
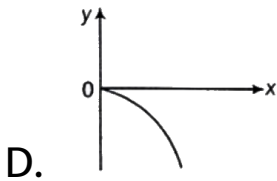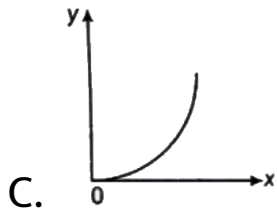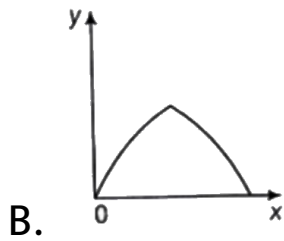
B. $5:36$

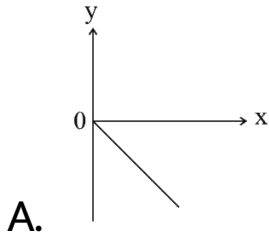C. $1:4$

D. $3:4$

Answer: A

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2. Two particles of mass m and 2m have their position vectors as a function of time as $r_1(t) = \hat{i} - t^3\hat{j} + 2t^2\hat{k}$ and $r_2(t) = t\hat{i} - t^3\hat{j} - t^2\hat{k}$ respectively (where t is the time). Which one of

the following graphs represents the path of the

centre of mass ?

A.

B.

C.

D.

Answer: D

3. A particle of mass m rotates in a circle of radius a with uniform angular speed ω_0. It is viewed from a frame rotating about the z-axis with a uniform angualr speed ω. The centrifugal force on the particle is

A. $m\omega^2 a$

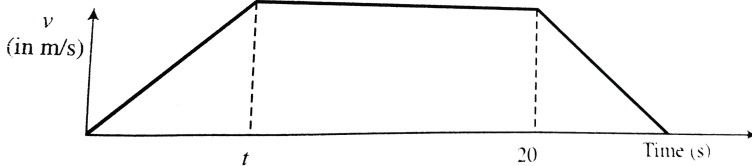B. $m\omega_0^2 a$

C. $m\left(\dfrac{\omega + \omega_0}{2}\right)^2 a$

D. $m\omega\omega_0$

Answer: A

4. The velocity-time graph of a particle moving along a straight line is shown is Fig. The rate of acceleration and deceleration is constant and it is equal to $5ms^{-2}$. If the a average velocity during the motion is $20ms^{-1}$, Then

The maximum velocity of the particle is .

A. $20ms^{-1}$

B. $25ms^{-1}$

C. $30ms^{-1}$

D. $40ms^{-1}$

Answer: B

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5. If a wire of resistance R is melted and recasted in to half of its length, then the new resistance of the wire will be

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

B. R

C. 2R

D. $\dfrac{R}{4}$

Answer: D

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6. The conducting circular loops of radii R_1 and R_2 are placed in the same plane with their centres coinciding. If $R_1 > > R_2$, the

mutual inductance M between them will be directly proportional to

A. $\dfrac{R_1}{R_2}$

B. $\dfrac{R_2}{R_1}$
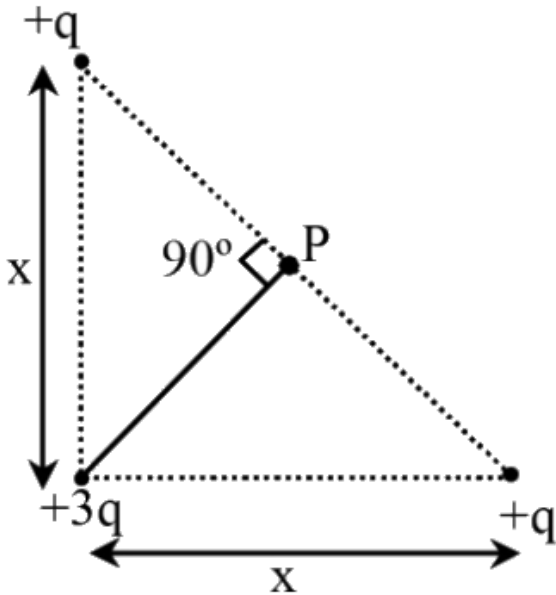
C. $\dfrac{R_1^2}{R_2}$

D. $\dfrac{R_2^2}{R_1}$

Answer: D

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7. The magnitude and direction of the electric field at point P can be best represented by

A. $\dfrac{3kq}{x^2}\left(\hat{i} + \hat{j}\right)$

B. $\dfrac{\sqrt{2}kq}{x^2}\left(\hat{i} + \hat{j}\right)$

C. $\dfrac{3\sqrt{2}kq}{x^2}\left(-\hat{i} - \hat{j}\right)$

D. $\dfrac{3\sqrt{2}kq}{x^2}\left(\hat{i}+\hat{j}\right)$

Answer: D

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8. Two balls of radius r each are placed at a distance R and released . The speed of each ball when they collide
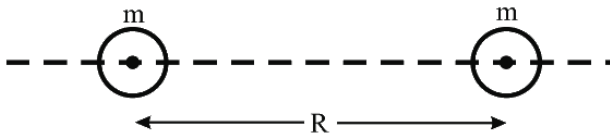
A. $v = \sqrt{2 - Gm\left(\dfrac{1}{R} + \dfrac{1}{r}\right)}$

B. $v = \sqrt{-Gm\left(\dfrac{1}{R} - \dfrac{1}{2r}\right)}$

C. $v = \sqrt{-2Gm\left(\dfrac{1}{R} + \dfrac{1}{2r}\right)}$

D. $v = \sqrt{-Gm\left(\dfrac{1}{2R} + \dfrac{1}{2r}\right)}$

Answer: B

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9. 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. Block body will absorb more radiation

B. Block body will absorb less radiation

C. Block body will emit more energy

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

Answer: D

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10. For the adiabatic expansion of a perfect monoatomic gas, when volume increases by 24% , what is the percentage decrease in pressure ?

Given : $\left(\dfrac{25}{31}\right)^{5/3} = 0.7$

   A. 24 %

   B. 40 %

   C. 48 %

   D. 71 %

Answer: B

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11. A charged particle moving in a uniform magnetic field penetrates a layer of lead and there by loses one-half of its kinetic energy. How does the radius of curvature of its path change?

A. The radius reduces to $r\sqrt{2}$

B. The radius reduces to $\dfrac{r}{\sqrt{2}}$

C. The radius remains the same

D. The radius becomes $r/2$

Answer: B

12. A boat which has a speed of $5km/hr$ in steel water crosses a river of width $1km$ along the shortest possible path in 15 minutes. The velocity of the river water in km/hr is

A. 3

B. 4

C. $\sqrt{21}$

D. 1

Answer: A

13. A cyclist turns around a curve at 15 miles/hour. If he turns at double the speed, the tendency to overturn is

    A. Doubled

    B. Quadrupled

    C. Halved

    D. Unchanged

Answer: B

14. If a simple pendulum oscillates with an amplitude of 50 mm and time period of 2 sec, then its maximum velocity is

A. $0.10ms^{-1}$

B. $0.15ms^{-1}$

C. $0.8ms^{-1}$

D. $0.26ms^{-1}$

Answer: B

15. In photoelectric emission process from a metal of work function $1.8eV$, the kinetic energy of most energetic electrons is $0.5eV$. The corresponding stopping potential is

    A. 1.8 V

    B. 1.3 V

    C. 0.5 V

    D. 2.3 V

Answer: C

16. The SI unit of the coefficent of viscosity is

A. $N \, s \, m^{-2}$

B. $N \, s^{-1} m^2$

C. $N \, s \, m^{-3}$

D. $N \, s^{-2} m$

Answer: A

17. A ray of light travelling in the direction $\frac{1}{2}\left(\hat{i} + \sqrt{3}\hat{j}\right)$ is incident on a plane mirror. After reflectiion, it travels along the direction $\frac{1}{2}\left(\hat{i} - \sqrt{3}\hat{j}\right)$. The angle of incidence is

A. $45°$

B. $75°$

C. $30°$

D. $60°$

Answer: C

18. A cylinder is rolling down on a inclined plane of inclination$60°$. What is iths acceleration?

A. $\dfrac{g}{3}$

B. g

C. $\dfrac{g}{2}$

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

Answer: A

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19. A transistor is used as a common emitter amplifier with a load resistance of $2k\Omega$. The input resistance is 150Ω. Base current is changed by $20\mu A$ which results in change in collector current by 1.5 mA. The voltage gain of the amplifier is

  A. 900

  B. 1000

  C. 1100

  D. 1200

Answer: B

20. A point near the equator has: (H and V are horizontal and vertical components of Earth's magnetic field at a point)

A. $H > > V$

B. $V = H \neq 0$

C. $V > > H$

D. $V = H = 0$

Answer: A

21. The dimensional formula $\mu_0\varepsilon_0$ is

A. $M^0L^{-2}T^2$

B. $M^0L^2T^{-2}$

C. $M^0L^1T^{-1}$

D. $M^0L^{-1}T^1$

Answer: A

22. For an interference pattern, the maximum and minimum intensity ratio is 64 : 1 , then what will be the ratio of amplitudes ?

A. $8:1$

B. $9:7$

C. $1:8$

D. $7:9$

Answer: B

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23. A transverse wave is described by the equation $y = A \sin 2\pi \left(vt - \dfrac{x}{\lambda} \right)$. The maximum particle velocity is equal to four times the wave velocity if

A. $\lambda = \dfrac{\pi y_0}{4}$

B. $\lambda = 2\pi y_0$

C. $\lambda = \dfrac{\pi}{y_0}$

D. $\lambda = \dfrac{\pi y_0}{2}$

Answer: D

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24. A body of mass 10 kg is moving on a horizonal surface be applying a force of 10 N in the forward direction. The body moves with a constant velocity of $0.2ms^{-1}$. Work done by the force of friction in the first 10 seconds is

A. $-20J$

B. 10 J

C. 20 J

D. $-5J$

Answer: A

25. The acceleration of electron in the first orbits of hydrogen atom is

A. $\dfrac{4\pi^2 m}{h^3}$

B. $\dfrac{h^2}{4\pi^2 mr}$

C. $\dfrac{h^2}{4\pi^2 m^2 r^3}$

D. $\dfrac{m^2 h^2}{4\pi^2 r^3}$

Answer: C

26. A bullet of mass m leaves a gun of mass M kept on a smooth horizontal surface . If the speed of the bullet relative to the gun is v , the magnitude of recoil speed of the gun will be

A. $\dfrac{m}{M}v$

B. $\dfrac{m}{M+m}v$

C. $\dfrac{m}{M-m}v$

D. $\dfrac{M}{m}v$

Answer: B

27. A chain of 125 links is 1.25 m long and has mass of 2 kg with the ends fastened together. It is set for rotating at 50 revolutions per second. The centripetal force on each link is
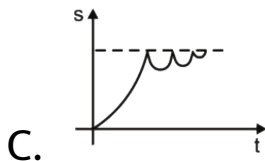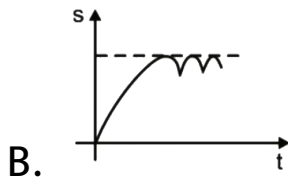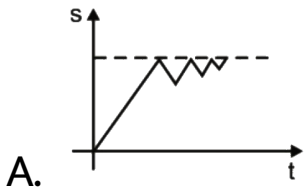
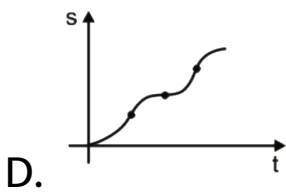A. 3.14 N

B. 0.314 N

C. 314 N

D. None of these

Answer: C

28. A ball is dropped from a certain height on a horizontal floor. The coefficient of restitution between the ball and the floor is $\frac{1}{2}$. The displacement time graph of the ball will be.

A.

B.

C.

D.

Answer: C

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29. Resistors of 1, 2, 3 ohm are connected in the form of a triangle. If a $1.5V$ cell of negligible internal resistance is connected across 3 ohm resistor, the current flowing through this resistance will be

A. 0.25 A

B. 0.5 A

C. 1.0 A

D. 1.5 A

Answer: B

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30. The current in self -inductance $L = 40$ mH is

to be be increased uniformly from 1 A to 11 A is 4

millisecond . The emf induce in inductor during

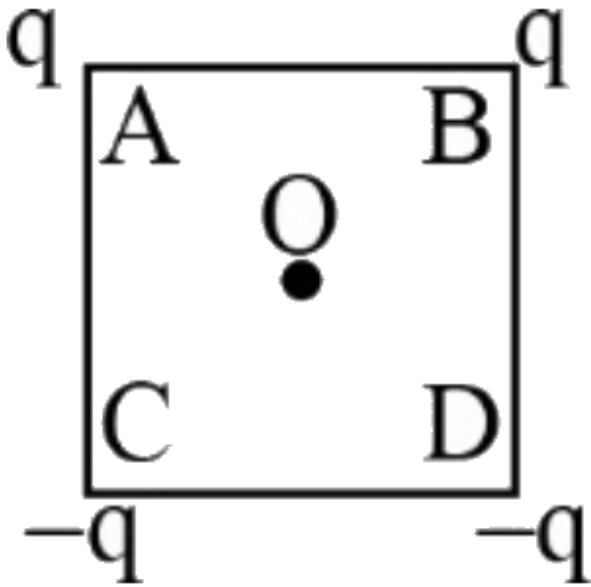the process is

A. 100 V

B. 0.4 V

C. 440 V

D. 40 V

Answer: A

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31. Charges are placed at the vertices of a square as shown in the diagram . If charges at A and B are interchanged with C and D respectively , then,

A. Only magnitude of electric field will change

   at the centre

B. Both magnitude and direction of electric

   field will change at the centre

C. Only direction of electric field at centre will

   change

D. Both magnitude and direction of electric

   field will remain unchanged

Answer: C

32. Two particles of same mass m go around a circle of radius R under the action of their mutual gravitational attraction. The speed of each particle is ,

A. $V = \dfrac{1}{2R}\sqrt{\dfrac{1}{Gm}}$

B. $V = \sqrt{\dfrac{GM}{2R}}$
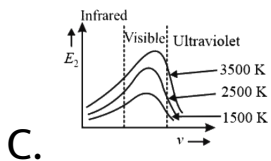
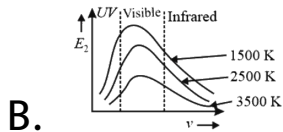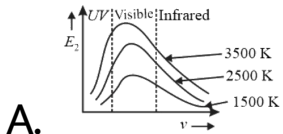C. $V = \dfrac{1}{2}\sqrt{\dfrac{Gm}{R}}$

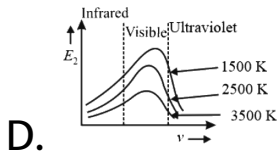D. $V = \sqrt{\dfrac{4Gm}{R}}$

Answer: C

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33. Following graphs shows the variation in the intensity of heat radiations by the the black body and frequency at a fixed temperature . Choose the correct option.

A.

B.

C.

D.

Answer: C

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34. For a gas $\dfrac{R}{C_V}$ = 0.4, where R is the universal gas constant and C, is molar specific heat at constant volume. The gas is made up of molecules which are

A. rigid diatomic

B. monoatomic

C. non - rigid diatomic

D. polyatomic

Answer: A

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35. Magnetic field at the center (at nucleus) of the hydrogen like atom $(\text{atomic number} = z)$ due to the motion of electron in nth orbit is proporional to

A. $\dfrac{n^3}{Z^5}$

B. $\dfrac{n^4}{Z}$

C. $\dfrac{Z^2}{n^3}$

D. $\dfrac{Z^3}{n^5}$

Answer: D

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36. Two bodies are projected at angle θ and ($90 - \theta$) to the horizontal with the same speed. Find the ration of their time of flight.

A. $\sin\theta : 1$

B. $\cos\theta : 1$

C. $\sin\theta - \cos\theta$

D. $\cos\theta : \sin\theta$

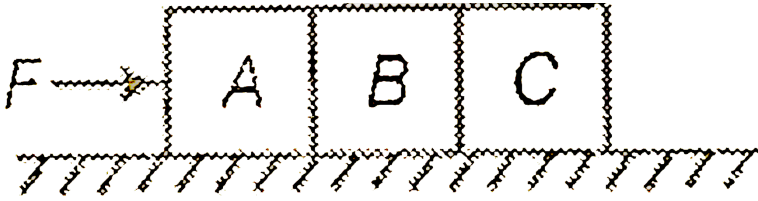**Answer: C**

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37. Three identical blocks each of mass M are

along a frictionless table and a force F is acting

as shown. Which of the following statements is

false ?

A. Th net vertical force on block A is zero

B. The net force on block A is $\dfrac{F}{3}$

C. The acceleration of block C is $\dfrac{F}{3M}$

D. The force of interaction between A and B is

$\dfrac{F}{3}$

Answer: D

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38. Time period of pendulum, on a satellite orbiting the earth, is

A. Zero

B. T

C. Infinite

D. $\dfrac{T}{\sqrt{6}}$

Answer: C

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39. Sodium and copper have work functions $2.3eV$ and $4.5eV$ respectively . Then the ratio of the wavelength is nearest

    A. $1:2$

    B. $4:1$

    C. $2:1$

    D. $1:4$

Answer: C

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40. When one end of the capillary is dipped in water, the height of water column is $'h'$. The upward force of 105 dyne due to surface tension is balanced by the force due to the weight of water column . The inner circumference of the capillary is

(Surface tension of water $= 7 \times 10^{-2} N/m$)

    A. 1.5 cm

    B. 2 cm

    C. 2.5 cm

    D. 3 cm

Answer: A

41. An object is placed at a distance of 20 cm from a concave mirror of focal lenght 10 cm. What is the image distance?

A. $+20cm$

B. $+10cm$

C. $-20cm$

D. $-10cm$

Answer: C

42. A particle of mass m is projected with a velocity v making an angle of $45°$ with the horizontal. The magnitude of the angular momentum of the projectile abut the point of projection when the particle is at its maximum height h is.

A. Zero

B. $\dfrac{mvh^2}{\sqrt{2}}$

C. $\dfrac{mv^2h}{\sqrt{2}}$

D. $\dfrac{mvh}{\sqrt{2}}$

Answer: D

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43. In the middle of the depletion layer of a reverse - biased $p - n$ junction , the

A. electric field is zero

B. potential is maximum

C. electric field is maximum

D. potential is zero

Answer: A

44. An iron rod is placed parallel to magnetic field of intensity $2000 Am^{-1}$. The magnetic flux through the rod is 6×10^{-1} Wb and its cross-sectional area is $3cm^2$. The magnetic permeability of the rod in Wb $A^{-1}m^{-1}$ is

A. 10^{-1}

B. 10^{-2}

C. 10^{-3}

D. 10^{-4}

Answer: C

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45. The temperature at which the speed of sound in air becomes double of its value at $27°C$ is

A. $-123^\circ C$

B. $927^\circ C$

C. $327^\circ C$

D. $54^\circ C$

Answer: B