PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 82

Physics

1. When electronic transition occurs from higher energy state to lower energy state with energy difference equal to ΔE electron volts ,

the wavelength of the line emitted is approxmately equal to

A. $\dfrac{12375}{\Delta E} m$

B. $\dfrac{12375}{\Delta E} nm$

C. $\dfrac{12375}{\Delta E} \text{pm}$

D. $\dfrac{12375}{\Delta E} \text{Å}$

Answer: D

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2. The transition from the state $n = 4$ to $n = 3$ in a hydrogen-like atom results in ultraviolet radiation. Infared radiation will be obtained in the transition

    A. $2 \rightarrow 1$

    B. $3 \rightarrow 2$

    C. $4 \rightarrow 2$

    D. $5 \rightarrow 4$

Answer: D

3. Two bodies A and B having masses in the ratio of 3 : 1 possess the same kinetic energy. The ratio of their linear momenta is then

A. $1 : 3$

B. $3 : 1$

C. $1 : \sqrt{3}$

D. $\sqrt{3} : 1$

Answer: C

4. A truck of mass 10 metric ton runs at $3ms^{-1}$ along a level track and collides with a loaded truck of mass 20 metric ton, standing at rest. If the trucks couple together , the common speed after the collision is

A. $1ms^{-1}$

B. $0.2ms^{-1}$

C. $0.5ms^{-1}$

D. $0.3ms^{-1}$

Answer: A

5. A particle moves in a circle of radius $30cm$. Its linear speed is given by $v = 2t$, where t in second and v in m/s. Find out its radial and tangential acceleration at $t = 3s$.

    A. $220ms^{-2}, 50ms^{-2}$

    B. $100ms^{-2}, 5ms^{-2}$

    C. $120ms^{-2}, 5ms^{-2}$

D. $110ms^{-2}, 10ms^{-2}$

Answer: C

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6. In a non - uniform circular motaion the ratio of tangential to radial acceleration is (where, r= radius of circle, v= speed of the particle, $\alpha =$ angular acceleration)

A. $\dfrac{\alpha^2 r^2}{u}$

B. $\dfrac{\alpha^2 r}{u^2}$

C. $\dfrac{\alpha r^2}{u^2}$

D. $\dfrac{u^2}{r^2 \alpha}$

Answer: C

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7. A current of 2A flows through a 2Ω resistor when connected across a battery. The same battery supplies a current of 0.5A when

connected across a 9Ω resistor The internal resistance of the battery is

A. $\dfrac{1}{3}\Omega$

B. $\dfrac{1}{4}\Omega$

C. 5Ω

D. 0.5Ω

Answer: A

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8. A potentiometer wire 10 long has a resistance of 40Ω. It is connected in series with a resistances box and a 2 v storage cell. If the potential gradient along the wire is $0.01\dfrac{V}{m}$ the resistance unplugged in the box is

A. 260Ω

B. 760Ω

C. 960Ω

D. 1060Ω

Answer: B

9. An a.c. source of angular frequency ω is fed across a resistor R and a capacitor C in series. The current registered is I. If now the frequency of the source is changed to $\omega/3$ (but maintaining the same voltage), the current in the circuit is found to be halved. calculate the ratio of reactance to resistance at the original frequency ω.

A. $\sqrt{\dfrac{3}{5}}$

B. $\sqrt{\dfrac{2}{5}}$

C. $\sqrt{\dfrac{1}{5}}$

D. $\sqrt{\dfrac{4}{5}}$

Answer: A

10. In an AC circuit , current is $3A$ and voltage $210V$ and power is $63W$. The power factor is

A. 0.11

B. 0.09

C. 0.08

D. 0.10

Answer: D

11. Seven capacitors each of capacitance $2\mu F$ are to be connected in a configuration to obtain an effective capacitance of $\left(\dfrac{10}{11}\right)\mu F$.

Which of the combination (s) shown in figure will achieve the desired result?

A.

B.

C.

D.

Answer: A

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12. The net force acting on q_0 is

A. $\dfrac{kqq_0}{\sqrt{2}a^2}$

B. $\dfrac{kqq_0}{(a/2)^2}$

C. zero

D. $\dfrac{kqq_0}{a^2}$

Answer: D

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13. Mass M is split into two parts m and $(M - m)$, which are then separated by a certain distance. What is the ratio of (m/M) which maximises the gravitational force between the parts ?

    A. $1:4$

    B. $1:2$

    C. $4:1$

    D. $2:1$

Answer: B

14. If a new planet is discovered rotating around Sun with the orbital radius double that of earth, then what will be its time period (in earth's days)
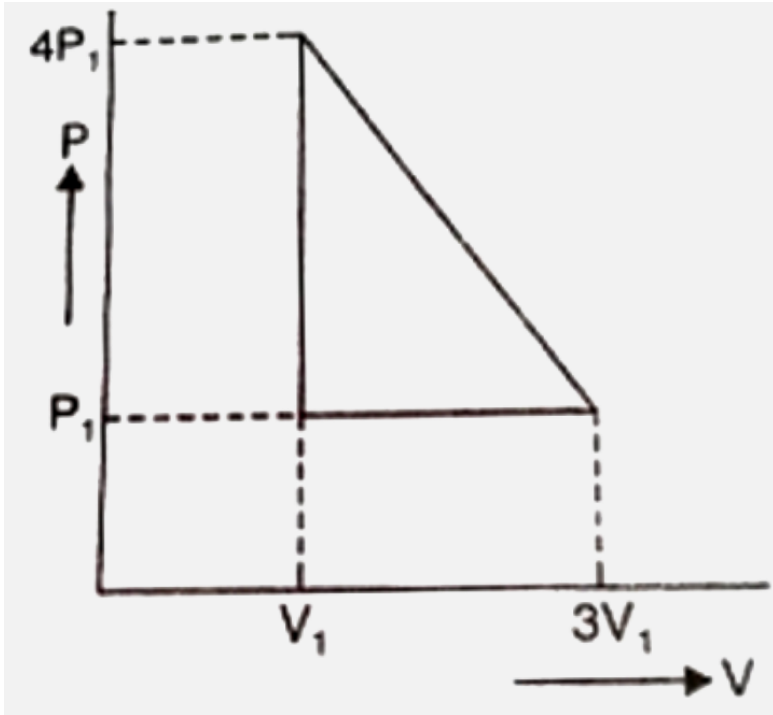
A. 1032

B. 1023

C. 1024

D. 1043

Answer: A

15. An ideal gas is taken through a series of

changes , from $P_1, V_1 \rightarrow 4P_1, V_1 \rightarrow P_1, 3V_1$

represented in the figure . The net work done

by the gas at the end of the cycle is equal to

A. P_1V_1

B. $3P_1V_1$

C. $6P_1V_1$

D. $12P_1V_1$

Answer: B

16. An ideal gas is expanding such that $PT^2 =$ constant. The coefficient of volume expansion of lthe gas is:

A. $\dfrac{1}{T}$

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

C. $\dfrac{3}{T}$

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

Answer: C

17. If the temperature of sink is at absolute zero, then the efficiency of carnot engine will be

A. Zero

B. 300K

C. 273K

D. 400 K

Answer: A

18. Two electron beams having velocities in the ratio 1: 2 are subjected to the same transverse magnetic field. The ration of the radii is

A. $1:2$

B. $2:1$

C. $4:1$

D. $1:4$

Answer: A

19. A current I flows along the length of an infinitely long, straight , thin - walled pipe. Then

    A. The magnetic field is zero only on the axis of the pipe

    B. The magnetic field is different at different points inside the pipe

C. The magnetic field at any point inside

the pipe is zero

D. The magnetic field at all points inside

the pipe is the same, but not zero

Answer: C

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20. When a bar magnet is placed at $90°$ to a

uniform magnetic field, it is acted upon by a

couple which is maximum. For the couple to

be half of the maximum value, at what angle should the magnet be inclined to the magnetic field (B)?

A. $30°$

B. $45°$

C. $60°$

D. $90°$

Answer: A

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21. A motorboat covers a given distance in $6h$ moving downstream on a river. It covers the same distance in $10h$ moving upstream. The time it takes to cover the same distance in still water is

    A. 6

    B. 7.5

    C. 10

    D. 15

Answer: B

22. A particle is moving with velocity $\vec{v} = k\left(y\hat{i} + x\hat{j}\right)$, where k is a constant . The general equation for its path is

A. $y = x^2 +$ constant

B. $y^2 = x +$ constant

C. xy = constant

D. $y^2 = x^2 +$ constant
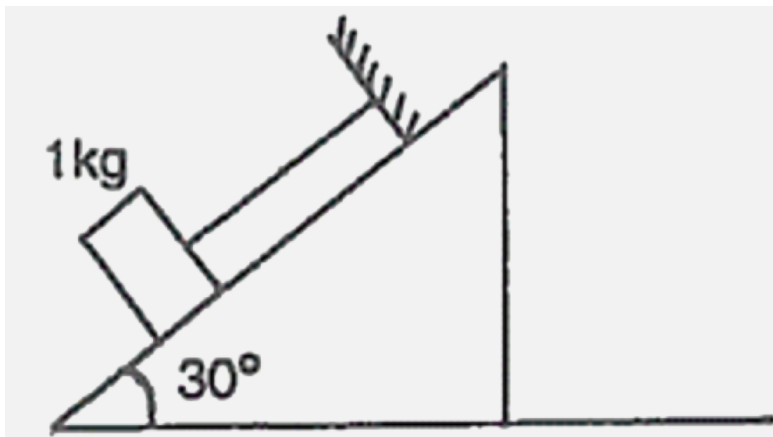
Answer: D

23. The coefficient of friction between two surface is $\mu = 0.8$. The tension in the string as shown in the figure is

A. 0 N

B. 6 N

C. 4 N

D. 8 N

Answer: A

24. A block of mass M is resting on a smooth horizontal plane. One end of a uniform rope of mass $\dfrac{M}{4}$ is fixed to the block , which pulled it in the horizontal direction by applying a force

F at the other ends . The tension in the middle

of the rope is

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

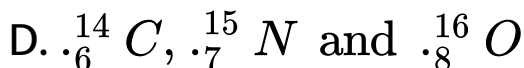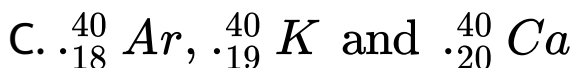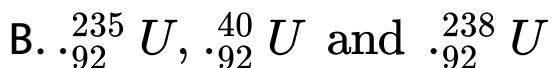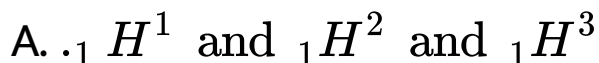B. $\dfrac{F}{5}$

C. $\dfrac{9}{10}F$

D. F

Answer: C

25. The triad of nuclei that is isotonic is

A. $._1H^1$ and $_1H^2$ and $_1H^3$

B. $._{92}^{235}U$, $._{92}^{40}U$ and $._{92}^{238}U$

C. $._{18}^{40}Ar$, $._{19}^{40}K$ and $._{20}^{40}Ca$

D. $._6^{14}C$, $._7^{15}N$ and $._8^{16}O$

Answer: D

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26. A sample of $^{131}_{53}$I, as iodine ion, was administered to a patient in a carrier consisting of 0.10 mg of stable iodide ion. After 4.00 days, 67.7 % of the initial radioactivity was detected in the thyroid gland of the patient. What mass of the stable iodide ion had migrated to the thyroid gland ? ($t_{1/2}=8$ days.)

    A. 65.8 %

    B. 95.7 %

    C. 85.8 %

D. 75.8 %

Answer: B

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27. A particle of mass m is executing osciallations about the origin on the x-axis with amplitude A. its potential energy is given as $U(x) = \alpha x^4$, where α is a positive constant. The x-coordinate of mass where

potential energy is one-third the kinetic energy of particle is

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

B. $\pm \dfrac{A}{\sqrt{2}}$

C. $\pm \dfrac{A}{3}$

D. $\pm \dfrac{A}{\sqrt{3}}$

Answer: B

28. The displacement x(in metres) of a particle performing simple harmonic motion is related to time t(in seconds) as $x = 0.05 \cos\left(4\pi t + \dfrac{\pi}{4}\right)$ .the frequency of the motion will be

A. 0.5 Hz

B. 1.0 Hz

C. 1.5 Hz

D. 2.0 Hz

Answer: D

29. Ultraviolet light of $6.2eV$ falls on an aluminium surface (work function $= 4.2eV$). The kinetic energy (in joule) of the fastest electron emitted is approximately.

    A. $3.2 \times 10^{-15} J$

    B. $3.2 \times 10^{-17} J$

    C. $3.2 \times 10^{-19} J$

    D. $3.2 \times 10^{-21} J$

Answer: C

30. Light of two different frequencies whose photons have energies 1eV and 2.5 eV respectively illuminate a metallic surface whose work function is 0.5 eV successively. Ratio of maximum kinetic energy of emitted electrons will be:

A. $1:4$

B. $1:2$

C. $1:1$

D. $1:5$

Answer: B

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31. The rate of steady volume flow of water through of capillary tube of length 1 and radius r, under a pressure difference of p is V. This tube is connected with another tube of

the same length but half the radius, in series.

Then, the rate of steady volume flow through

them is (The pressure difference across the

combination is p)

A. $\dfrac{V}{16}$

B. $\dfrac{V}{17}$

C. $\dfrac{16V}{17}$

D. $\dfrac{17V}{16}$

Answer: B

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32. A given quantity of a ideal gas is at pressure P and absolute temperature T. The isothermal bulk modulus of the gas is

A. $\dfrac{2}{3}P$

B. P

C. $\dfrac{3}{2}P$

D. 2P

Answer: B

33. A slab of glass of refractive index 1.5 and thickness $3cm$ is placed with the faces perpendicular to the principle axis of a concave mirror. If the radius of curvature of the mirror is $10cm$, the distance at which an object must be placed from the mirror so that the image coincides with the object is

A. 9 cm

B. 10 cm

C. 11 cm

D. 12 cm

Answer: C

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34. Two convex lenses of focal lengths $0.3m$ and $0.05m$ are used to make a telescope. The distance kept between the two is

A. 0.35 m

B. 0.25 m

C. 0.175 m

D. 0.15 m

Answer: A

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35. When a celling fan is switched off, its angular velocity falls to half while it makes 36 rotations. How many more rotations will it make before coming to rest ?

A. 24

B. 36

C. 18

D. 12

Answer: D

36. A thin horizontal circular disc is roating about a vertical axis passing through its centre. An insect is at rest at a point near the

rim of the disc. The insect now moves along a diameter of the disc to reach its other end. During the journey of the insect, the angular speed of the disc.

A. Continuously decreases

B. Continuously increases

C. first increases and then decreases

D. Remains unchanged

Answer: C

37. In an n-p-n transistor, the collector current is 10 mA. If 90% of the electrons emitted reach the collector, then the emitter current will be

A. 9 mA

B. 11 mA

C. 1 mA

D. 0.1 mA

Answer: B

38. When LED is forward biased, then

A. electrons from the n - type side cross the

   p - n junction and recombine with holes

   in the p - type side

B. electrons and holes neutralise each

   other in depletion region

C. at junction electrons and holes remains

   at rest

D. none of these

Answer: A

39. The end of two rods of different materials with their thermal conductivities, area of cross-section and lengths all in the ratio 1:2 are maintained at the same temperature difference. If the rate of flow of heat in the first rod is $4cal/s$. Then, in the second rod rate of heat flow in cal/s will be

A. 1

B. 2

C. 8

D. 16

Answer: C

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40. The square root of the product of inductance and capacitance has the dimension of

A. Length

B. Mass

C. Time

D. Frequency

Answer: C

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41. The central fringe shifts to the position of fifth bright fringe, if a thin film of refractive index 1.5 is introduced in the path of light of

wavelength 5000Å. The thickness of the glass plate is

A. $1\mu m$

B. $5\mu m$

C. $3\mu m$

D. $4\mu m$

Answer: B

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42. A linear aperture whose width is $0.02cm$ is placed immediately in front of a lens of focal length $60cm$. The aperture is illuminated normally by a parallel beam of wavelength $5 \times 10^{-5}cm$. The distance of the first dark band of the diffraction pattern from the centre of the screen is
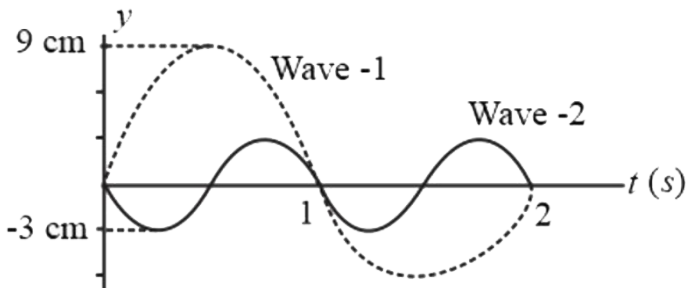
    A. 0.10 cm

    B. 0.25 cm

    C. 0.20 cm

D. 0.15 cm

Answer: D

43. Displacement - time graphs for two waves, wave - 1 and wave - 2 are shown here. The ratio of the intensity of wave-1 to that of wave - 2 is

A. $1:1$

B. $9:4$

C. $16:9$

D. $9:1$

Answer: B

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44. An open pipe is suddenly closed at one end with the result that the frequency of third harmonic of the closed pipe is found to be

higher by $100 Hz$ then the fundamental

frequency of the open pipe. The fundamental

frequency of the open pipe is

A. 200

B. 300

C. 240

D. 480

Answer: A

45. Power supplied to a particle of mass 4 kg varies with time as $P = \dfrac{3t^2}{2}$ watt. Here t in second. If velocity of particle at t = 0 is v = 0, the velocity of particle at time t = 2s will be

A. $1ms^{-1}$

B. $4ms^{-1}$

C. $2ms^{-1}$

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

Answer: C

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