PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 87

Physics

1. The binding energy per nucleon of deuterium and helium nuclei are 1.1 MeV and 7.0 MeV respectively. When two deuterium

nuclei fuse to form a helium nucleus the energy released in the fusion is

A. 13.9 MeV

B. 26.9 MeV

C. 23.6 MeV

D. 19.2 MeV

Answer: C

 Watch Video Solution

2. The ratio of areas within the elctron orbits for the first excited state to the ground sate for hydrogen atom is

A. $4:1$

B. $16:1$

C. $8:1$

D. $2:1$

Answer: B

Watch Video Solution

3. In a gravity free space, man of mass M standing at a height h above the floor, throws a ball of mass m straight down with a speed u. When the ball reaches the floor, the distance of the man above the floor will be.

A. $h\left(1+\frac{m}{M}\right)$

B. $h\left(2-\frac{m}{M}\right)$

C. 2h

D. a function of M, h and u

Answer: A

Watch Video Solution

4. A steel ball strikes a fixed smooth steel plate placed on a horizontal surface atan angle θ with the vertical. If the coefficient of restitution is e, the angle at which the rebound will take place is:

A. θ

B. $\tan^{-1}\left[\frac{\tan\theta}{e}\right]$

C. $e\tan\theta$

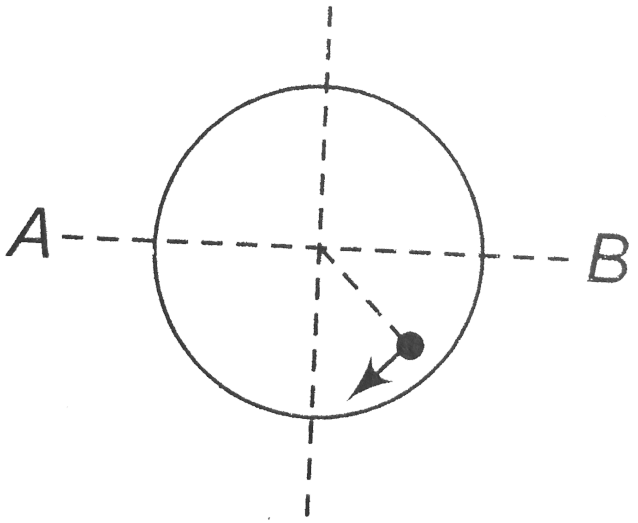
D. $\tan^{-1}\left[\frac{e}{\tan\theta}\right]$

Answer: B

Watch Video Solution

5. A partical of mass m oscillates along the horizontal diameter AB inside a smooth spherical AB inside a smooth sperical shell of radius R. At any instate $K.E.$ of the partical is K. Then force applied by partical on the on

the shell at this instant is:



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

B. $\frac{2K}{R}$

C. $\frac{3K}{R}$

D. $\frac{K}{2R}$

Answer: C

Watch Video Solution

6. The real angle of dip, if a magnet is suspended at an angle of 30° to the magnetic meridian and the dip needle makes an angle of 45° with horizontal, is:

A. $\tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$

B. $\tan^{-1}(\sqrt{3})$

C. $\tan^{-1}\left(\sqrt{\frac{3}{2}}\right)$

D. $\tan^{-1}\left(\frac{2}{\sqrt{3}}\right)$

Answer: D

Watch Video Solution

7. The resistivity of a potentiometer wire is $40 \times 10^{-8}\Omega - m$ and its area of cross section is $8 \times 10^{-6}m^2$. If 0.2 A current is flowing through the wire, the potential gradient will be

A. $0.1Vm^{-1}$

B. $10^{-2}Vm^{-1}$

C. $10^{-3}Vm^{-1}$

D. $10^{-4}Vm^{-1}$

Answer: B

Watch Video Solution

8. An ionization chamber with parallel conducting plates as anode and cathode has 5×10^7 electrons and the same number of singly-charged positive ions per cm^2. The

electrons are moving at $0.4m/s$. The current density from anode to cathodes $4\mu A/m^2$. The velocity of positive ions moving towards cathode is

A. $0.1ms^{-1}$

B. $0.4ms^{-1}$

C. Zero

D. $1.6ms^{-1}$

Answer: A

Watch Video Solution

9. A charge of 1μC is divided into parts such that their charges are in the ratio of 2: 3. These two charges are kept at a distance 1 m apart in vacuum. Then, the electric force between them (in N) is

A. 0.216

B. 0.00216

C. 0.0216

D. 2.16

Answer: B

Watch Video Solution

10. Two identical small conducting balls have positive charges q_1 and q_2 respectively. The force between the balls when they are placed at a separation is F. The balls are brought together so that they touch and then put back in their original positions. Prove that the force between the balls now, cannot be less than F.

A. Less than that before the balls touched

B. Greater than that before the balls touched

C. Same as that before the balls touched

D. Zero

Answer: B

Watch Video Solution

11. The primary winding of a transformer has 100 turns and its secondary winding has 200 turns. The primary is connected to an ac supply of $120V$ and the current flowing in it is $10A$. The voltage and the current in the secondary are

A. 240 V, 5 A

B. 240 V, 10 A

C. 60 V, 20 A

D. 120V, 20 A

Answer: A

Watch Video Solution

12. A voltage of peak value 283 V and varying frequency is applied to series LCR combination in which $R = 3\Omega, L = 25mH$ and $C = 400\mu F$. Then the frequency (in Hz) of the source at which maximum power is dissipated in the above is

A. 48.4

B. 52.7

C. 47.4

D. 50.3

Answer: D

 Watch Video Solution

13. A planet of mass 4 times earth spins about itself and completes one rotation is 96 hours . The radius of a secondary stationary satellite

about this planet in comparisons to the radius of the geostationary orbit around the earth is

A. 4 times

B. $\left(\frac{1}{4}\right)$ times

C. 2 times

D. $\left(\frac{1}{2}\right)$ times

Answer: A

Watch Video Solution

14. Two satellites of masses m_1 and $m_2(m_1 > m_2)$ are revolving around earth in circular orbits of radii r_1 and $r_2(r_1 > r_2)$ respectively. Which of the following statements is true regarding their velocities V_1 and V_2

A. $v_1 = v_2$

B. $v_1 > v_2$

C. $v_1 < v_2$

D. $\frac{v_1}{r_1} = \frac{v_2}{r_2}$

Answer: C

Watch Video Solution

15. The total energy radiated from a block body source at constant temperature is collected for one minute and is used to heat a quantity of water. The temperature of water is found to increase from $20^{\circ}C$ to $20.5^{\circ}C$. If the absolute temperature of the blackbody is doubled and the experiment is repeated with

the same quantity of water of $20^\circ C$, the temperature of water will be:

A. $21^\circ C$

B. $22^\circ C$

C. $24^\circ C$

D. $28^\circ C$

Answer: D

Watch Video Solution

16. In a Carnot engine when $T_2 = 0^\circ C$ and $T_1 = 200^\circ C$ its efficiency is η_1 and when $T_1 = 0^\circ C$ and $T_2 = -200^\circ C$. Its efficiency is η_2, then what is η_1 / η_2?

A. 0.577

B. 0.733

C. 0.638

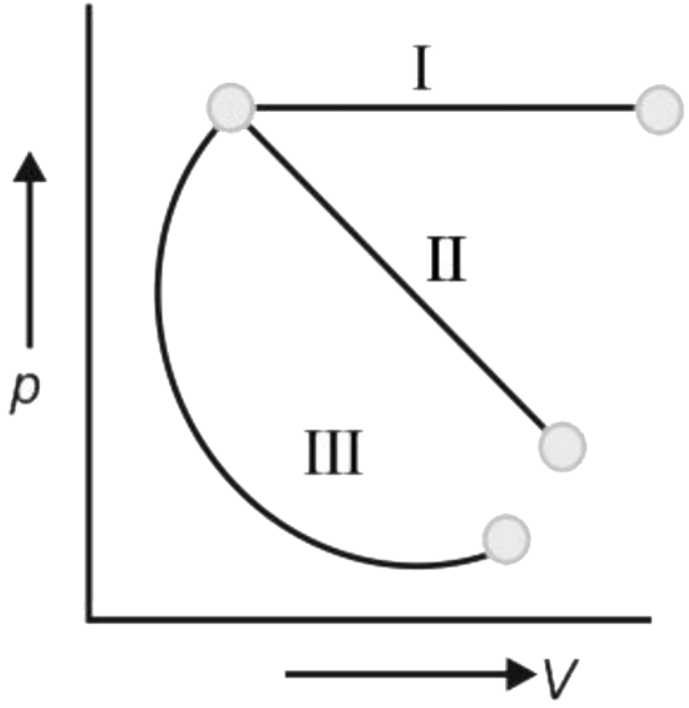
D. Cannot be calculated

Answer: A

Watch Video Solution

Watch Video Solution

17. Shown in the figure are three P – V diagrams. The case in which the work done is minimum



A. I

B. II

C. III

D. Work done is same in all the cases

Answer: C

Watch Video Solution

18. A magnetic dipole of magnetic moment $6 \times 10^{-2} Am^2$ and moment of inertia $12 \times 10^{-6} kgm^2$ performs oscillations in a

magnetic field of 2×10^{-2} T. The time taken by the dipole to complete 20 oscillations is $(\pi \approx 3)$

A. 18 s

B. 6 s

C. 36 s

D. 12 s

Answer: D

Watch Video Solution

19. A wire loop that encloses an area of $20cm^2$ has a resistance of 10Ω The loop is placed in a magnetic field of 2.4 T with its plane perpendicular to the field . The loop is suddenly removed from the field. How much charge flows past a given point in the wire ?

A. $12 \times 10^{-4}C$

B. $3.6 \times 10^{-1}C$

C. $4.8 \times 10^{-4}C$

D. $2.4 \times 10^{-3}C$

Answer: C

Watch Video Solution

20. A coil of inductive reactance $1/\sqrt{3}\Omega$ and resistance 1Ω is connected to a $200V, 50Hz$ A.C. supply. The time lag between maximum voltage and current is

A. $\frac{1}{200}s$

B. $\frac{1}{300}s$

C. $\frac{1}{500}s$

D. $\frac{1}{600}s$

Answer: D

Watch Video Solution

21. An eagle flies at constant velocity horizontally across the sky, carrying a mouse and releases the mouse while in flight . From the eagle's perspective , the mouse falls vertically with speed v_1 From an observer on the ground's perspective , the mouse falls at

an angle with speed v_2 what is the speed of the eagle with respect to the observer on the ground ?

A. $v_1 + v_2$

B. $v_1 - v_2$

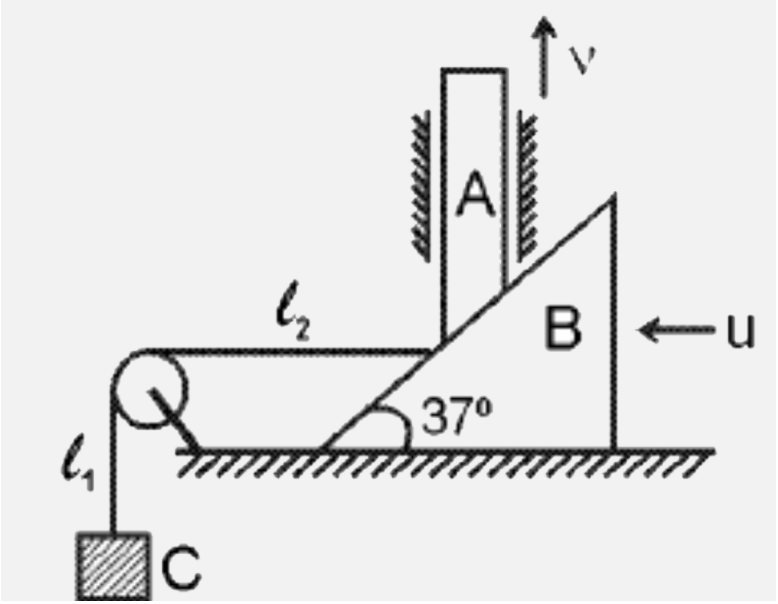
C. $\sqrt{v_1^2 - v_2^2}$

D. $\sqrt{v_2^2 - v_1^2}$

Answer: D

Watch Video Solution

22. In the given figure , if the velocity of the block C at a particular instant is $-20ms^{-1}\hat{J}$, then the velocity of the rod (A) that instant will be : (string is attached to wedge)



A. $15ms^{-1}\hat{j}$

B. $-15ms^{-1}\hat{j}$

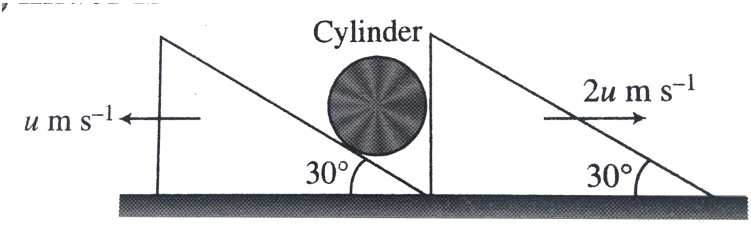
C. $20ms^{-1}\hat{j}$

D. $-20ms^{-1}\hat{j}$

Answer: A

Watch Video Solution

23. A system is shown in fig. Assume that the cylinder remains in contact with the two wedge. Then the velocity of cylinder is



A. $\sqrt{(19-4)\sqrt{3}}\frac{u}{2}ms^{-1}$

B. $\frac{\sqrt{13u}}{2}ms^{-1}$

C. $\sqrt{3}ums^{-1}$

D. $\sqrt{7}ums^{-1}$

Answer: D

Watch Video Solution

24. During β^{-} emission

A. A neutron in the nucleus decays emitting an electron

B. An electron already present within the nucleus is ejected

C. A part of the binding energy of the nucleus is converted into an electron

D. A proton in the nucleus decays emitting an electron

Answer: A

Watch Video Solution

25. A nuclear transformation is denoted by $X(n, \alpha) \rightarrow {}_{3}^{7}Li$. Which of the following is the nucleus of element X

A. ${}_{5}Be^{11}$

B. ${}_{5}B^{10}$

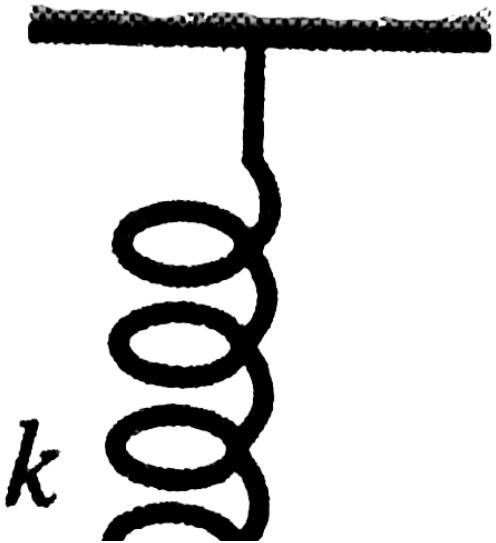
C. ${}_{5}B^{9}$

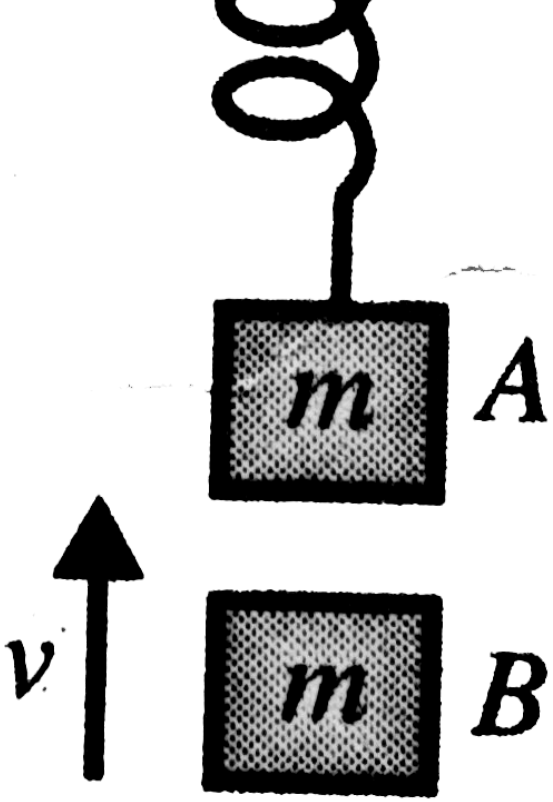
D. ${}_{6}C^{12}$

Answer: B

Watch Video Solution

26. Block A is hanging from a vertical spring and is at rest. Block B strikes the block A with velocity v and sticks to it. Then the value of v for which the spring just attains natural length is





A. $\sqrt{\frac{60mg^2}{k}}$

B. $\sqrt{\frac{6mg^2}{k}}$

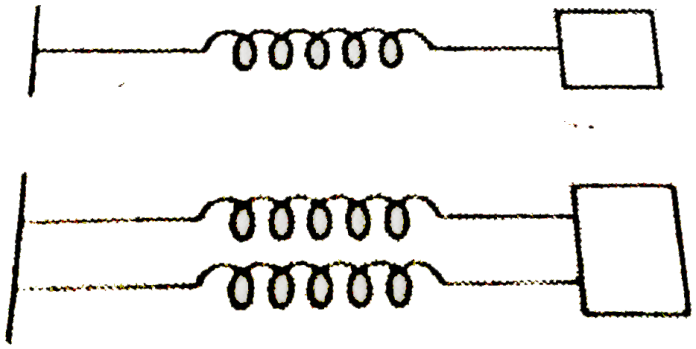
C. $\sqrt{\frac{10mg^2}{k}}$

D. None of these

Answer: B

Watch Video Solution

27. If k_s and k_p respectively are effective spring constant in series and parallel combination of springs as shown in figure, find $\frac{k_s}{k_p}$.



A. $\frac{9}{2}$

B. $\frac{3}{7}$

C. $\frac{2}{9}$

D. $\frac{7}{3}$

Answer: C

Watch Video Solution

28. A plane electromagnetic wave of wave intensity $6W/m^2$ strikes a small mirror of area $40cm(2)$, held perpendicular to the approaching wave. The momentum

transferred by the wave to the mirror each second will be

A. $6.4 \times 10^{-7} kgms^{-1}$

B. $4.8 \times 10^{-8} kgms^{-1}$

C. $3.2 \times 10^{-9} kgms^{-1}$

D. $1.6 \times 10^{-10} kgms^{-1}$

Answer: D

Watch Video Solution

29. If the kinetic energy of a free electron doubles , its de - Broglie wavelength changes by the factor

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

B. 2

C. $\frac{1}{\sqrt{2}}$

D. $\sqrt{2}$

Answer: C

Watch Video Solution

30. A frame made of metalic wire enclosing a surface area A is covered with a soap film. If the area of the frame of metallic wire is reduced by $50\,\%$ the energy of the soap film will be changed by:

A. $100\,\%$

B. $75\,\%$

C. $50\,\%$

D. $25\,\%$

Answer: C

Watch Video Solution

31. In turbulent flow the velocity of the liquid molecules in contact with the walls of the tube.

A. zero

B. maximum

C. in between zero and maximum

D. equal to critical velocity

Answer: D

Watch Video Solution

32. A person can see objects clearly only when they lie between $50cm$ and $400cm$ from his eyes. In order to increase the maximum distance of distinct vision to infinity, the type and power of the correcting lens, the person has to use, will be

A. Convex ,$+2.25D$

B. Concave , $-0.25D$

C. Concave , $-0.2D$

D. Convex ,$+0.15D$

Answer: B

Watch Video Solution

33. A concave mirror of focal length f produces a real image n times the size of the object. What is the distance of the object from the mirror?

A. $(P-1)f$

B. $(P+1)f$

C. $\left(\frac{P-1}{P}\right)f$

D. $\left(\frac{P+1}{P}\right)f$

Answer: D

Watch Video Solution

34. A circular disc of radius R and thickness $\frac{R}{6}$ has moment of inertia about an axis passing through its centre and perpendicular to its plane. It is melted and recasted into a

solid sphere. The moment of inertia of the sphere about its diameter as axis of rotation is

A. $\frac{I}{5}$

B. $\frac{I}{6}$

C. $\frac{I}{32}$

D. $\frac{I}{64}$

Answer: A

Watch Video Solution

35. A sphere and a hollow cylinder roll without slipping down two separate inclined planes and travel the same direction in the same time. If the angle of the plane dowm which the sphere rolls is 30° , the angle of the other pane is

A. 60°

B. 53°

C. 37°

D. 45°

Answer: D

Watch Video Solution

36. In a common base transistor circuit, I_C is the Output current and I_E is the input current. The current gain α is

A. Greater than one

B. Less than one

C. Equal to one

D. None of these

Answer: B

Watch Video Solution

37. In a reverse biased diode, when the applied voltage changes by $1V$, the current is found to change by $0.5\mu A$. The reversebiase resistance of the diode is

A. $2 \times 10^5 \Omega$

B. $2 \times 10^6 \Omega$

C. 200Ω

D. 2Ω

Answer: B

 Watch Video Solution

38. Two moles of oxygen are mixed with eight moles of helium. The effective specific heat of the mixture at constant volume is

A. 1.3R

B. 1.4 R

C. 1.7 R

D. 1.9 R

Answer: C

Watch Video Solution

39. A unit of area, often used in measuring land areas, is the hectare defined as $10^4 m^2$ An open-pit coal mine consumes 75 hectares of land, down to a depth of 26 m, each year. What

volume of earth, in a cubic kilometre, is removed in this time?

A. 0.01

B. 0.02

C. 0.03

D. 0.04

Answer: B

 Watch Video Solution

40. In Young's double slit experiment

A. The frings width will decrease

B. The fringe width will increase

C. The fringe width will increase

D. There will be no fringe

Answer: A

 Watch Video Solution

41. How does the angular width of principal maximum in the diffraction pattern vary with the width of slit ?

A. Principal maximum increases on increasing the width of slit

B. Principal maximum decreases on decreasing the width of slit

C. Principal maximum increases on decreasing the width of slit

D. None of these

Answer: C

Watch Video Solution

42. When the observer moves towards the stationary source with velocity, v_1, the apparent frequency of emitted note is f_1. When the observer moves away from the source with velocity v_1, the apparent frequency is f_2. If v is the velocity of sound in air and $\frac{f_1}{f_2} = 2$,then $\frac{v}{v_1} = ?$

A. 2

B. 3

C. 4

D. 5

Answer: B

Watch Video Solution

43. A whistle producing sound waves of frequencies $9500Hz$ and above is approaching a stationary person with speed vms^{-1}. The

velocity of sound in air is $300ms^{-1}$. If the person can hear frequencies upto a maximum of $10,000Hz$.The maximum value of v upto which he can hear whistle is

A. $15\sqrt{2}ms^{-1}$

B. $15ms^{-1}$

C. $30ms^{-1}$

D. none of these

Answer: B

Watch Video Solution

44. A body moves from a position $\overrightarrow{r_1} = \left(2\hat{i} - 3\hat{j} - 4\hat{k}\right)$ m to a position $\overrightarrow{r_2} = \left(3\hat{i} - 4\hat{j} + 5\hat{k}\right)m$ under the influence of a constant force $\overrightarrow{F} = \left(4\hat{i} + \hat{j} + 6\hat{k}\right)N$. The work done by the force is :

A. 57 J

B. 58 J

C. 59 J

D. 60 J

Answer: A

 Watch Video Solution

45. In each heart beat, a heart pumps 80 ml blood at an average pressure of 100 ml of Hg. What will be the power output of the herat? (Assume 60 heart beat per minute

A. 1.0 W

B. 1.06 W

C. 1.12 W

D. 2.16 W

Answer: B

 Watch Video Solution