PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 37

Physics

1. Mark out the correct statement with respect to thermal radiations emitted by a black body

A. At a given temperature, , energy is distributed non - uniformly among different wavelengths

B. As temperature of body is increased , energy content of all wavelengths decreases

C. The product of E_λ (spectral energy) with D_λ (spectral width) , for all equal $\Delta\lambda'$ is the same

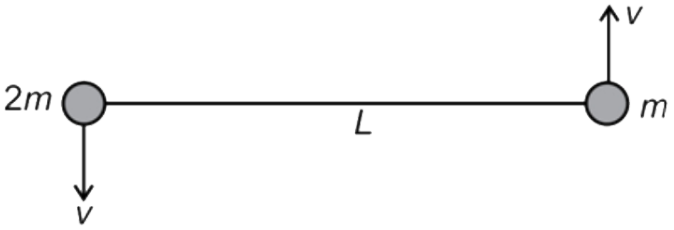
D. The thermal radiation emitted by a hot body is a discrete spectra

Answer: A

Watch Video Solution

2. Two particles of mass m and 2m are connected by a string of length L and placed at rest over a smooth horizontal surface. The particles are then given velocities as indicated in the figure shown. The tension developed in

the string will be



A. $\frac{mv^2}{2L}$

B. $\frac{3mv^2}{4L}$

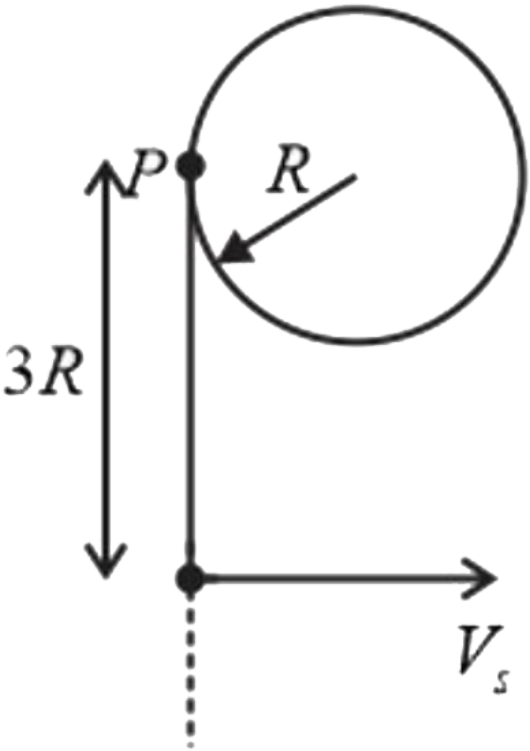
C. $\frac{4mv^2}{3L}$

D. $\frac{8mv^2}{3L}$

Answer: D

Watch Video Solution

3. A uniform circular ring of mass m and radius R is placed freely on a horizontal smooth surface as shown in figure. A particle of mass m is connected to the circumference of the ring with massless string . The particle is imparted velocity v_0 perpendicular to length of string as shown. If T is tension in the string just after the particle imparted velocity , then



Acceleration of point P at this instant , is

A. $\frac{4T}{3m}$

B. $\frac{T}{m}$

C. $\frac{2T}{m}$

D. $\frac{3T}{2m}$

Answer: C

Watch Video Solution

4. A particle of mass m describes a circle of radius r . The centripetal acceleration of the particle is $\frac{4}{r^2}$. What will be the momentum of the particle ?

A. $\frac{4m}{r}$

B. $\frac{2m}{r}$

C. $\frac{4m}{\sqrt{r}}$

D. $\frac{2m}{\sqrt{r}}$

Answer: D

Watch Video Solution

5. The north pole of a very strong electromagnet is brought near the meniscus of a liquid contained in a narrow. U - tube . The

liquid is seen to rise towards the north pole. This indicates that the liquid is

A. ferromagnetic

B. paramagnetic

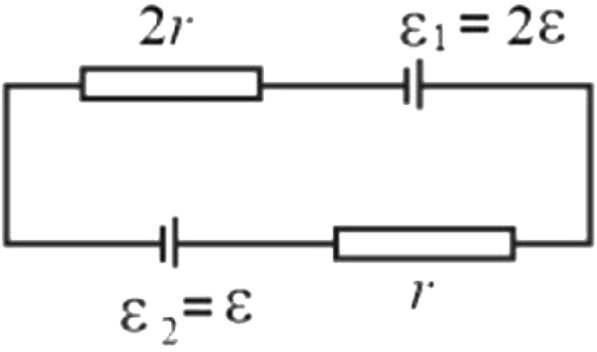
C. diamagnetic

D. non - magnetic

Answer: B

 Watch Video Solution

6. In the circuit shown if the internal resistance of each cell is r, then the rate at which the chemical energy of ε_1 is being consumed is



A. $\frac{\varepsilon^2}{5r}$

B. $\frac{4\varepsilon^2}{5r}$

C. $\frac{2\varepsilon^2}{5r}$

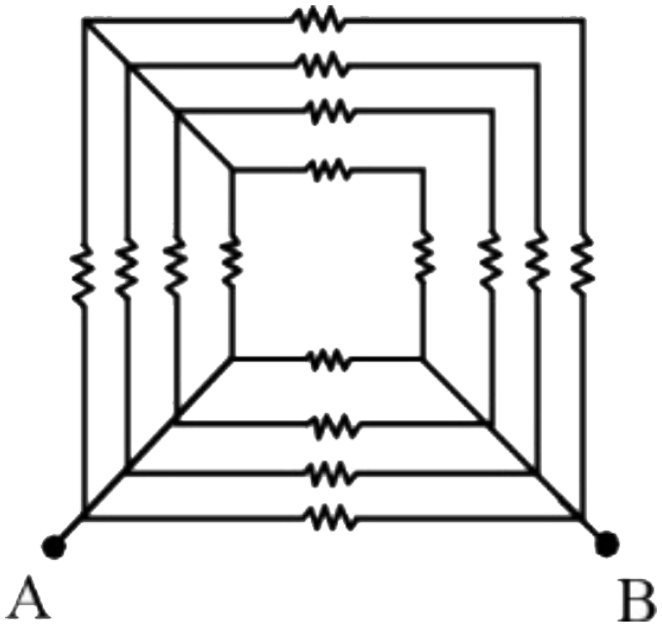
D. $\frac{7\varepsilon^2}{5r}$

Answer: C

Watch Video Solution

7. In the adjacent circuit diagram , each resister is of 16Ω . The equivalent resistance

between A and B is



A. 1Ω

B. 2Ω

C. 3Ω

D. 4Ω

Answer: C

 Watch Video Solution

8. A step - up transformer is used on 120 V line to provide a potential difference of 2400 V . If the number of turns in the primary is 75, then the number of turns in the secondary shall be

A. 25

B. 150

C. 1500

D. 500

Answer: C

Watch Video Solution

9. An electron accelerated through 500 V , enters a transverse uniform magnetic field of magnitude 100 mT . The radius of the circular path described by the electron is nearly

A. $7.54 \times 10^{-1} m$

B. $7.54 \times 10^{-2} m$

C. $7.54 \times 10^{-3} m$

D. $7.54 \times 10^{-4} m$

Answer: D

Watch Video Solution

10. The separation between the plates of a parallel plate capacitor , connected to a battery (zero resistance) of constant EMF is

increased with constant (very slow) speed by external forces . During the process, w is the work done dy external forces. ΔU is the change in potential energy of the capacitor , w_b is work done by the battery and H is the heat loss in the circuit . Then

A. $w + w_b = \Delta U$

B. $H \neq 0$

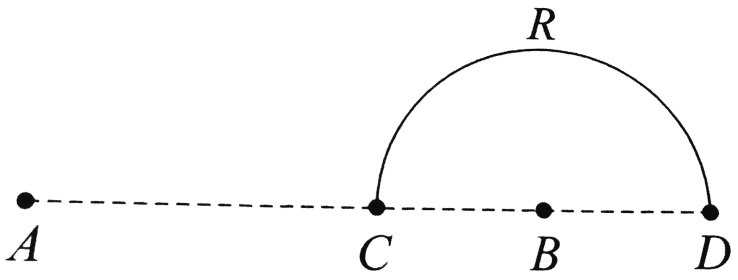
C. $H = \Delta U$

D. $w = 0$

Answer: A

Watch Video Solution

11. Charges $+q$ and $-q$ are placed at points A and B respectively which are a distance $2L$ apart, C is the midpoint between A and B. The work done in moving a charge $+Q$ along the semicircle CRD is



A. $\frac{qQ}{2\pi\varepsilon_0 L}$ and infinity

B. $\frac{qQ}{6\pi\varepsilon_0 L}$ and zero

C. zero, zero

D. $\frac{-qQ}{6\pi\varepsilon_0 L}$ and zero

Answer: D

Watch Video Solution

12. A particle is projected from the mid-point of the line joining two fixed particles each of mass m. If the separation between the fixed particles is l, the minimum velocity of

projection of the particle so as to escape is equal to

A. $\sqrt{\frac{G}{l}}$

B. $\sqrt{\frac{G}{2l}}$

C. $\sqrt{\frac{2Gm}{l}}$

D. $2\sqrt{\frac{2Gm}{l}}$

Answer: D

Watch Video Solution

13. The time period of a satellite of earth is 5 hours. If the separation between the centre of earth and the satellite is increased to 4 times the previous value, the new time period will become-

A. 10 h

B. 18 h

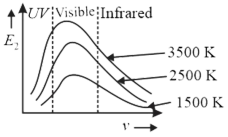
C. 40 h

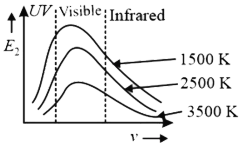
D. 20 h

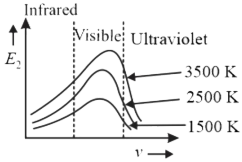
Answer: C

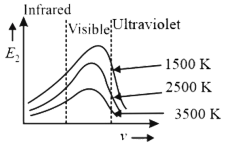
Watch Video Solution

14. Following graph shows the correct variation in intensity of heat radiations by black body and frequency at a fixed temperature

A. 

B. 

C. 

D. 

Answer: C

Watch Video Solution

15. $\Delta Q = nCdT$ represents

A. Change in amount of heat contained in a body as a result of temperature change

B. Amount of heat energy which transists from one body to other due to temperature difference

C. Both (Change in amount of heat contained in a body as a result of temperature change) and (Amount of heat energy which transits from one dody to other due to temperature difference) are correct

D. None of these

Answer: B

Watch Video Solution

16. An ideal gas A and a real gas B have their volumes increases from $V \to 2V$ under isothermal condtitions. The increase in internal energy

A. of A will be more than B

B. of A will be less than B

C. will be the same in both cases

D. will be zero in both cases

Answer: D

Watch Video Solution

17. The force between two parallel current carrying wires is independent of

A. their distance of separation

B. the length of the wires

C. the magnitude of currents

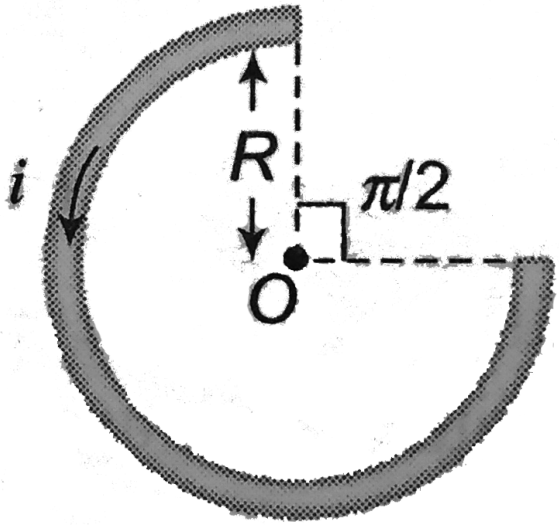
D. the radii of the wires

Answer: D

Watch Video Solution

18. A current i ampere flows in a circular arc of wire whose radius is R, which subtend an angle $3\pi/2$ radian at its centre. The magnetic

induction B at the centre is



A. $\frac{\mu_0 i}{R}$

B. $\frac{\mu_0 i}{2R}$

C. $\frac{2\mu_0 i}{R}$

D. $\frac{3\mu_0 i}{8R}$

Answer: D

Watch Video Solution

19. At time t, the position of a body moving along the x - axis is $x = t^3 - 6t^2 + 9tm$ The deceleration of the body at 1 s is

A. $6ms^{-2}$

B. $4ms^{-2}$

C. $8ms^{-2}$

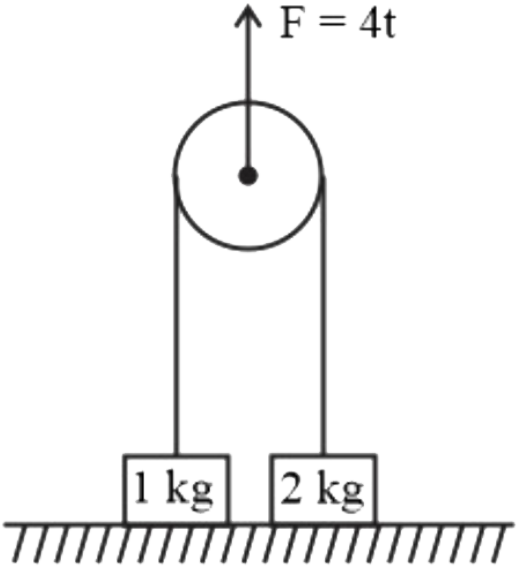
D. None

Answer: A

Watch Video Solution

20. Two blocks of mass 1 kg & 2 kg are hanged from a light pulley and resting on a horizontal surface. A time varying force F = 4t N is acting on pulley in the direction shown . Time after

which block will break off the surface will be -



A. 5

B. 10

C. 15

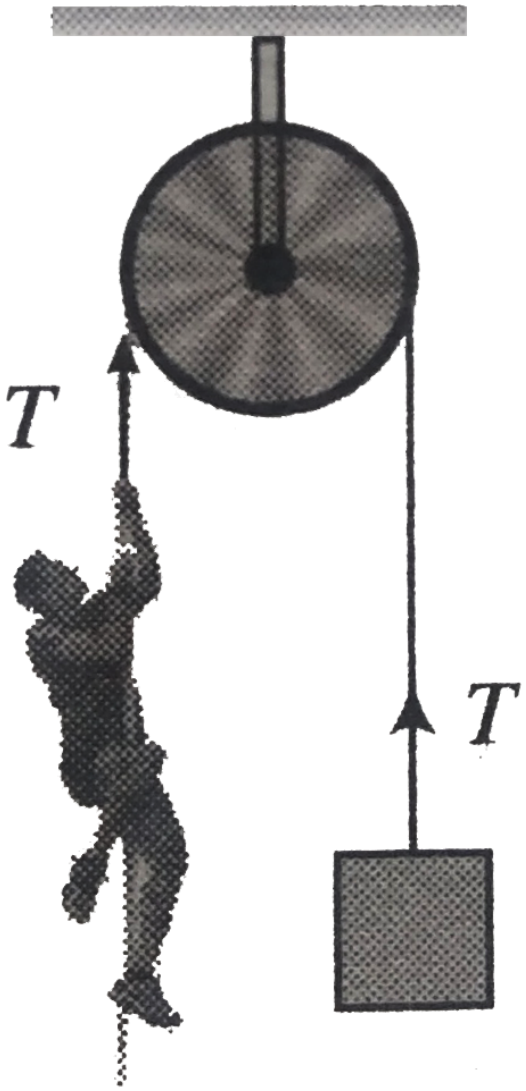
D. 20

Answer: A

Watch Video Solution

21. In order to raise a mass of 100 kg, a man of mass 60 kg fastens a rope to it and passes the rope over a smooth pulley. He climbs the rope with acceleration $5g/4$ relative to the rope.

The tension in the rope is (take $g = 10ms^{-2}$)



A. 1432 N

B. 928 N

C. 1218 N

D. 624 N

Answer: C

Watch Video Solution

22. A man is running on the ground .It is known that the coefficient of friction between the man and the ground is μ . Then which of the following statements is correct

A. Normal reaction between man and ground is equal to weight of man

B. The direction of friction on man is in the direction of normal reaction on the man

C. Direction of friction on man is opposite to the direction of motion of man

D. Maximum acceleration of man can be $2\mu g$

Answer: A

Watch Video Solution

23. The radioactive decay of uranium into thorium is represented by the equation:

$$_{92}^{238}U \rightarrow {}_{90}^{234}Th + x$$

What is x ?

A. an electron

B. a proton

C. an alpha particle

D. a neutron

Answer: C

Watch Video Solution

24. A nucleus with mass number 220 initially at rest emits an α-particle. If the Q-value of the reaction is $5.5MeV$, calculate the kinetic energy of the α-particle.

(a) 4.4 MeV (b) 5.4 MeV (c) 5.6 MeV (d) 6.5 MeV

A. 4.4 MeV

B. 5.4 MeV

C. 5.6 MeV

D. 6.5 MeV

Answer: B

Watch Video Solution

25. A pendulum with time period of $1s$ is losing energy due to damping. At time its energy is $45J$. If after completing 15 oscillations, its energy has become $15J$. Its damping constant (in s^{-1}) is :-

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

B. $\frac{1}{15}$ In3

C. $\frac{1}{30}$ In3

D. 2

Answer: C

Watch Video Solution

26. A uniform spring whose unstretched length is l has a force constant k. the spring is cut into two pieces of unstretched lengths l_1 and l_2, where $l_1 = nl_2$ and n is an integer.

What are the corresponding force constant k_1 and k_2 in terms of n and k? what is the ratio k_1 / k_2

A. force has to be kept same to find k_1 and k_2

B. $k_1 = \frac{k(\eta + 1)}{\eta}$ and $k_2 = k(\eta - 1)$

C. $k_1 = \frac{k(\eta - 1)}{\eta}$ and $k_2 = k(\eta + 1)$

D. $k_1 = \frac{k(\eta + 1)}{\eta}$ and $k_2 = k(\eta + 1)$

Answer: D

Watch Video Solution

27. When the voltage applied to an X-ray tube increased from $V_1 = 15.5kV$ to $V_2 = 31kV$ the wavelength interval between the K_α line and the cut-off wavelength of te continuous X-ray spectrum increases by a factor of 1.3. If te atomic number of the element of the target is z. Then the value of $\frac{z}{13}$ will be: (take $hc = 1240eVnm$ and $R = 1 \times \frac{10^7}{m}$)

A. Iron

B. Maganese

C. Nickel

D. Tin

Answer: A

 Watch Video Solution

28. What is de-Broglie wavelength of the electron accelerated through a potential difference of 100V?

A. 12.27Å

B. 1.227Å

C. 0.1227Å

D. 0.001227Å

Answer: B

Watch Video Solution

29. A metal wire of length L, area of cross-section A and young's modulus Y is stretched by a variable force F such that F is always slightly greater than the elastic forces of

resistance in the wire. When the elongation of the wire is l

A. the work done by F is $\frac{YAl^2}{2L}$

B. the work done by F is $\frac{YAl^2}{L}$

C. the elastic potential energy stored in the wire is $\frac{Yal^2}{2L}$

D. no heat is produced during the elongation

Answer: B

 Watch Video Solution

30. Two wires of the same material and length but diameters in the ratio $1:2$ are stretched by the same force. The potential energy per unit volume for the two wires when stretched will be of the ratio.

A. $16:1$

B. $2:1$

C. $4:1$

D. $1:1$

Answer: A

Watch Video Solution

31. Two plane mirrors are inclined at an angle θ to one another.

A ray of light incident on the first mirror and parallel to the

second mirror is reflected from the second mirror parallel to

the first mirror. What is the value of θ?

A. 90°

B. 60°

C. 120°

D. 30°

Answer: B

Watch Video Solution

32. A biconvex lens of focal length 40 cm is placed in front of an object at a distance of 20 cm . Now a slab of refractive index $\frac{4}{3}$ is placed

somewhere in between the lens and the object. The shift in the image formed after the introduction of slab equals (thickness of the slab is 2 mm)

A. 1 mm

B. 2 mm

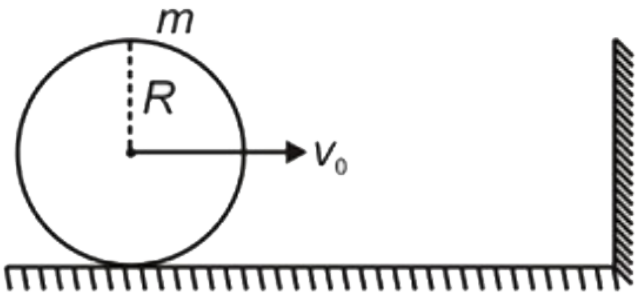
C. 3 mm

D. 4 mm

Answer: B

Watch Video Solution

33. A uniform solid sphere of mass m, radius R moving with velocity v_0 is rolling without slipping on a frictionless surface vertical wall. Ratio of magnitude of angular momentum of the sphere and after the collision about its bottommost point is



A. $\frac{3}{5}$

B. $\frac{5}{3}$

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

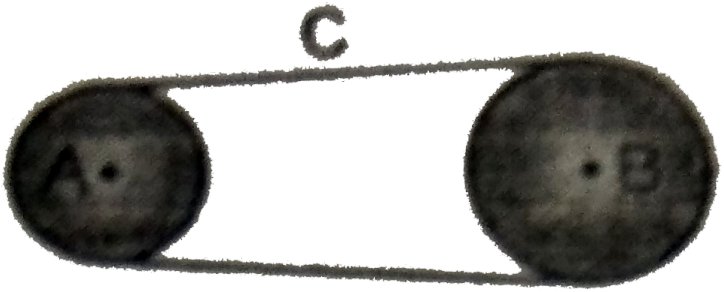
D. $\frac{7}{3}$

Answer: D

Watch Video Solution

34. Wheel A of radius $r_A = 10cm$ is coupled by a belt C to another wheel of radius $r_B = 25cm$ as in the figure. The wheels are free to rotate and the belt does not slip . At

time $t = 0$ wheel A increases it's angular speed from rest at a uniform rate $\pi / 2 rad / \sec^2$ Find the time in which wheel B attains a speed of $100r \pm$ [Hint : $v_A = v_B$]



A. 4 s

B. 8 s

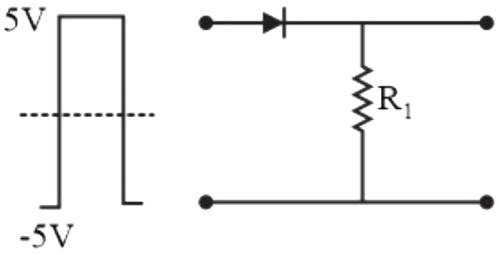
C. 12 s

D. 16 s

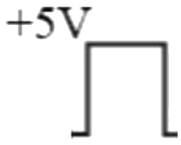
Answer: D

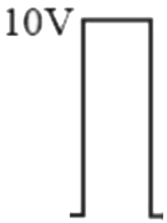
Watch Video Solution

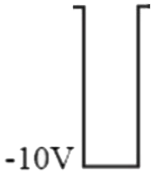
35. If in a p - n junction diode , a square input signal of 10 V is applied as shown



Then the output signal across R_L will be

A. 

B. 

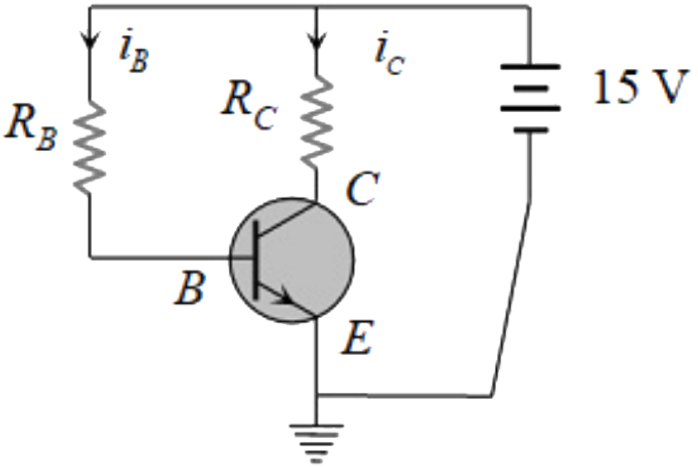
C. 

D. 

Answer: A

Watch Video Solution

36. In the following common emitter circuit , if $\beta = 100, V_{CE} = 7V, R(C) = 2k\Omega$ and V_{BE} negligible , then I_B is



A. 0.01 mA

B. 0.04 mA

C. 0.02 mA

D. 0.03 mA

Answer: B

Watch Video Solution

37. Two idential container joined by a small pipe initially contain the same gas at pressure p_0 and absolute temperature T_0. One container is now maintained at the same temperature while the other is heated to $2T_0$. The common pressure of the gas

A. $\frac{2P_0}{3}$

B. $\frac{4P_0}{3}$

C. $\frac{P_0}{3}$

D. $2P_0$

Answer: B

Watch Video Solution

38. For an ideal gas, the specific heat capacity during an isentropic process is always

A. zero

B. infinite

C. positive

D. negative

Answer: A

Watch Video Solution

39. In a system of units if force (F), acceleration (A) and time (T) are taken as fundamental

units, then the dimensional formula of energy is

A. $\left[FAT^2\right]$

B. $\left[FA^2T\right]$

C. $\left[FA^2T^2\right]$

D. [FAT]

Answer: A

 Watch Video Solution

40. If a planet was suddenly stopped in its orbit supposed to be circular, show that it would fall onto the sun in a time $\frac{\sqrt{2}}{8}$ times the period of the plant's revolution.

A. $\left(\frac{\sqrt{2}}{8}\right)$ times the period of the planet's revolution

B. $4\sqrt{2}$ times the period of the planet's revolution

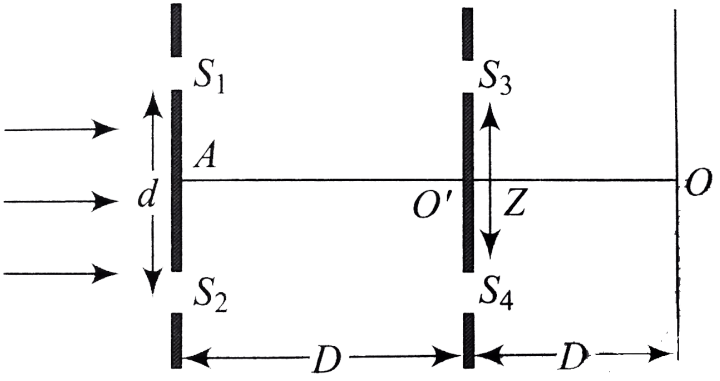
C. $3\sqrt{2}$ times the period of the planet's revolution

D. 9 times the period of the planet's revolution

Answer: A

Watch Video Solution

41. In the arrangement shown in Fig., slits S_1 and S_4 are having a variable separation Z. Point O on the screen is at the common perpendicular bisector of S_1S_2 and S_3S_4.



The minimum value of Z for which the intensity at O is zero is

A. $\frac{3\lambda D}{2d}$

B. $\frac{\lambda D}{2d}$

C. $\frac{\lambda D}{3d}$

D. $\frac{\lambda D}{d}$

Answer: D

Watch Video Solution

42. Light from sodium lamp is made to pass through two polaroids placed one after the other in the path of light. Taking the intensity of the incident light as 100%, the intensity of the out coming light that can be varied in the range

A. 0% to 100%

B. 0% to 50%

C. 0% to 25%

D. $0\,\%$ to $75\,\%$

Answer: B

Watch Video Solution

43. A string is clamped at both the ends and it is vibrating in its 4^{th} harmonic. The equation of the stationary wave is $Y = 0.3\sin(0.157x)\cos(200\pi t)$. The length of the string is: (All quantities are in SI units.)

A. 20 m

B. 60 m

C. 40 m

D. 80 m

Answer: D

Watch Video Solution

44. A point source emits sound equally in all directions in a non-absorbing medium. Two point P and Q are at distance of $2m$ and $3m$

respectively from the source. The ratio of the intensities of the wave at P and Q is :

A. $9:4$

B. $2:3$

C. $3:2$

D. $4:9$

Answer: A

Watch Video Solution

45. A particle is projected vertically upwards with a speed of $16ms^{-1}$. After some time, when it again passes through the point of projection, its speed is found to be $8ms^{-1}$. It is known that the work done by air resistance is same during upward and downward motion. Then the maximum height attained by the particle is (take $g = 10ms^{-2}$)

A. 8 m

B. 4.8 m

C. 17.6 m

D. 12.8 m

Answer: A

Watch Video Solution