PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 90

Physics

1. The electron in a hydrogen atom makes a transition from $n = n_1$ to $n = n_2$ state. The time period of the electron in the initial state

(n_1) is eigh times that in the final state (n_2).

The possible values of n_1 and n_2 are

A. $n_1 = 8, n_2 = 1$

B. $n_1 = 4, n_2 = 2$

C. $n_1 = 2, n_2 = 4$

D. $n_1 = 1, n_2 = 8$

Answer: B

Watch Video Solution

2. The wavelength of K_α X-rays of two metals A and B are $4/1875R$ and $1/675R$, respectively , where R is rydberg 's constant. The number of electron lying between A and B according to this lineis

A. 3

B. 6

C. 5

D. 4

Answer: D

Watch Video Solution

3. Two blocks of masses 10 kg and 4 kg are connected by a spring of negligible mass and placed on a frictionless horizontal surface. An impulse gives a velocity of $14m/s$ to the heavier block in the direction of the lighter block. The velocity of the centre of mass is

A. $30ms^{-1}$

B. $20ms^{-1}$

C. $10ms^{-1}$

D. $5ms^{-1}$

Answer: C

Watch Video Solution

4. A bomb traveling in a parabolic path under the effect of gravity, explodes in mid air. The center of mass of fragments will :

A. vertically upwards and then downwards

B. vertically downwards

C. in an irregular path

D. in the parabolic as the unexploded bomb would have travelled.

Answer: D

Watch Video Solution

5. The maximum and minimum tension in the string whirling in a circle of radius 2.5 m with constant velocity are in the ratio $5:3$ then its velocity is

A. $\sqrt{98}ms^{-1}$

B. $7ms^{-1}$

C. $\sqrt{490}ms^{-1}$

D. $\sqrt{4.9}ms^{-1}$

Answer: A

Watch Video Solution

6. Two bar magnets of the same length and breadth but having magnetic moments M and $2M$ are joined with like poles together and

suspended by a string. The time of oscillation of this assembly in a magnetic field of strength B is 3 sec. What will be the period of oscillation, if the polarity of one of the magnets is changed and the combination is again made to oscillate in the same field ?

A. 3s

B. $3\sqrt{3}s$

C. $3/\sqrt{3}s$

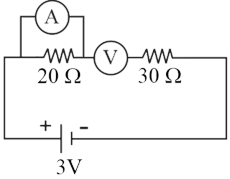
D. $3\sqrt{2}s$

Answer: D

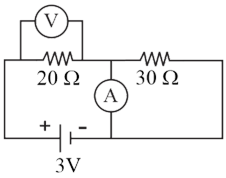
Watch Video Solution

7. Resistor of resistance 20Ω and 30Ω are joined in series a battery of emf 3V . It is desired to measure current and voltage across the 20Ω resistor with the help of an ammeter and a voltmeter. Identify the correct arrangement of ammeter (A) and voltmeter (V) out of four possible arrangement shown in the figure given below.

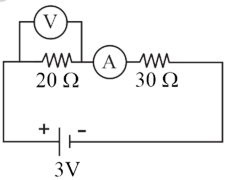
A.



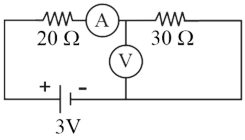
B.



C.



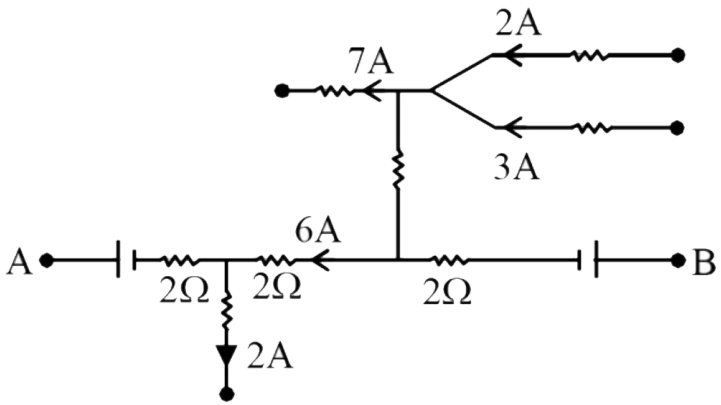
D.



Answer: C

Watch Video Solution

8.



In the above circuit diagram emf of two batteries are equal , then the potential difference $V_A - V_B$ between terminals A and B will be

A. $-36V$

B. $+36V$

C. $+24V$

D. $-24V$

Answer: A

Watch Video Solution

9. In a region of space, the electric field is given by $\vec{E} = 8\hat{i} + 4\hat{j} + 3\hat{k}$. The electric flux through a surface of area 100 units in the xy plane is

A. 800 units

B. 300 units

C. 400 units

D. 1500 units

Answer: B

Watch Video Solution

10. Two identical parallel plate capacitors are placed in series and connected to a constant voltage source of V_0 volt. If one of the capacitors is completely immersed in a liquid

with dielectric constant K, the potential difference between the plates of the other capacitor will change to -

A. $\frac{K}{K+1}V$

B. $\frac{K+1}{K}$

C. $\frac{2K}{K+1}V$

D. $\frac{K+1}{2K}V$

Answer: A

Watch Video Solution

11. What is the value of inductance L for which the current is a maximum in series LCR circuit with $C = 10\mu F$ and $\omega = 1000\frac{rad}{s}$?

A. 10 mH

B. 50 mH

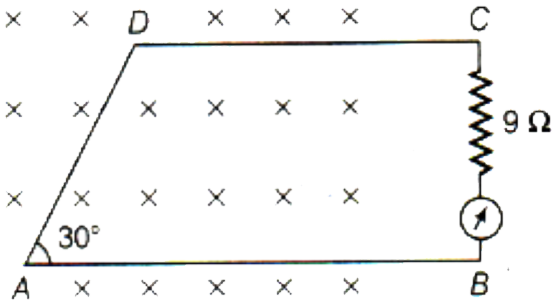
C. 200 mH

D. 100 mH

Answer: D

Watch Video Solution

12. A loop ABCD is moving with velocity v towards the right . The magnetic field is 2 T . Loop is connected to a resistance of 9Ω If the steady current of 2 A flows in the loop, then the value of v , if loop has resistance of 4Ω is (Given AD = 30 cm)



A. $86.7ms^{-1}$

B. $30ms^{-1}$

C. $33.33ms^{-1}$

D. $20ms^{-1}$

Answer: A

Watch Video Solution

13. Suppose the gravitational force varies inversely as the n^{th} power of distance. Then the time period of a planet in circular orbit of radius R around the sun will be proportional to-

A. $r^{\frac{1}{2}(n+1)}$

B. $r^{\frac{1}{2}(n-1)}$

C. r^n

D. $r^{\frac{1}{2}(n-2)}$

Answer: A

Watch Video Solution

14. The ratio of binding energy of a satellite at rest on earth's surface to the binding energy of a satellite of same mass revolving around of

the earth at a height h above the earth's surface is (R = radius of the earth).

A. $\frac{2(R+h)}{R}$

B. $\frac{R+h}{2R}$

C. $\frac{R+h}{R}$

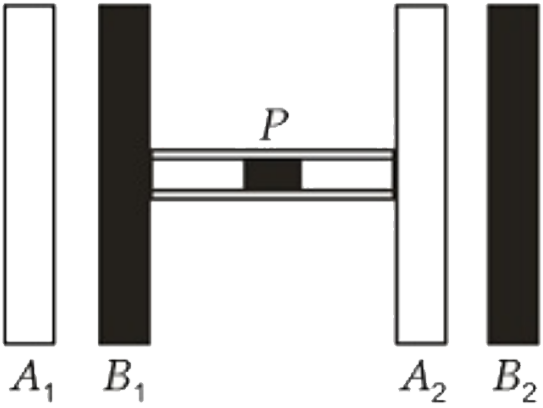
D. $\frac{R}{R+h}$

Answer: C

Watch Video Solution

15. Two plates identical in size, one of black and rough surface (B_1) and the other smooth and polished (A_2) are interconnected by a thin horizontal pipe with a mercury pellet at the centre. Two more plates A_1 (identical to A_2) and B_2 (identical to B_1) are heated to the same temperature and placed closed to the plates $B_1, \text{ and } A_2$ as shown in the

diagram. The Mercury pellet



A. Moves to the right

B. Moves to the left

C. Remains stationary

D. Starts oscillating left and right

Answer: C

Watch Video Solution

16. A Carnot engine, having an efficiency of $\eta = 1/10$ as heat engine, is used as a refrigerator. If the work done on the system is 10J, the amount of energy absorbed from the reservoir at lower temperature is

A. 99 J

B. 90 J

C. 1 J

D. 100 J

Answer: B

Watch Video Solution

17. Two containers of equal volume contain the same gas at pressure P_1 and P_2 and absolute temperature T_1 and T_2, respectively. On joining the vessels, the gas reaches a common pressure P and common temperature T. The ratio P/T is equal to

A. $\frac{P_1}{T_1} + \frac{P_2}{T_2}$

B. $\frac{P_1T_1 + P_2T_2}{(T_1 + T_2)}$

C. $\frac{P_1T_2 + P_2T_1}{(T_1 + T_2)}$

D. $\frac{P_1}{2T_1} + \frac{P_2}{2T_2}$

Answer: D

Watch Video Solution

18. A long rigid wire liens along the X - axis and carries a current of 10 A in the positive X - direction . Round the wire , the external

magnetic field is $\overrightarrow{B} = \hat{i} + 2x^2\hat{j}$ with x in metres and B in Tesla. The magnetic force (in Sl units) on the segment of the wire between x = 1m and x = 4 m is

A. 1260

B. $\frac{1280}{3}$

C. 1310

D. 420

Answer: D

Watch Video Solution

19. Magnetic induction at the center of a circular loop carrying a current is $'B'$. If $'A'$ is the area of the coil, the magnetic dipole moment of the loop is

A. $\frac{BA^2}{\mu_0\pi}$

B. $\frac{BA\sqrt{A}}{\mu_0}$

C. $\frac{BA\sqrt{A}}{\mu_0\pi}$

D. $\frac{2BA}{\mu_0}\sqrt{\frac{A}{\pi}}$

Answer: D

Watch Video Solution

20. A bullet loses $1/20th$ of its velocity is passing through a plank. What is the least number of planks required to stop the bullet ?

A. 5

B. 10

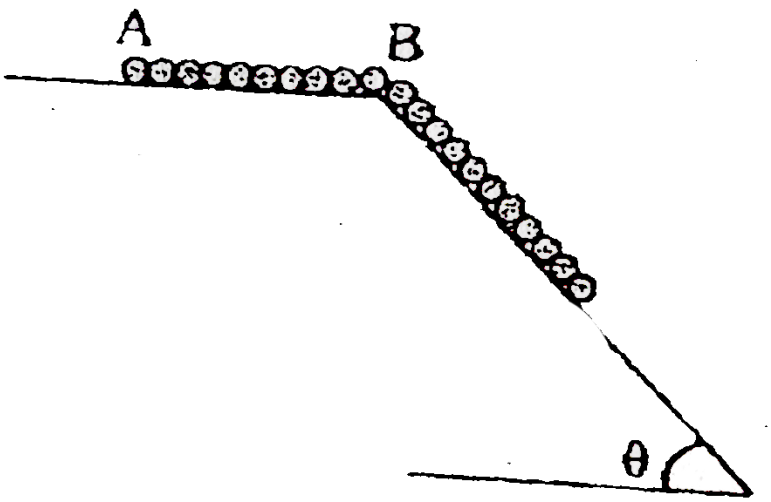
C. 11

D. 20

Answer: C

Watch Video Solution

21. A chain of length L and mass m is placed upon a smooth surface. The length of BA is $(L-b)$. Calculate the velocity of the chain when its and reaches B



A. $\sqrt{\frac{g\sin\theta(L^2-b^2)}{L}}$

B. $\sqrt{\frac{2g\sin\theta(L-b)}{L}}$

C. $\sqrt{2g\sin\theta(L-b)}$

D. $\sqrt{g\sin\theta(L-b)}$

Answer: C

Watch Video Solution

22. Two weights w_1 and w_2 are suspended from the ends of a light string passing over a

smooth fixed pulley. If the pulley is pulled up at an acceleration g , the tension in the string will be

A. $\frac{4w_1w_2}{w_1+w_2}$

B. $\frac{2w_1w_2}{w_1+w_2}$

C. $\frac{w_1-w_2}{w_1+w_2}$

D. $\frac{w_1w_2}{2(w_1-w_2)}$

Answer: A

Watch Video Solution

23. An object is kept on a smooth inclined plane of height 1 unit and length l units. The horizontal acceleration to be imparted to the inclined plane so that the object is stationary relative to the incline is

A. $g\sqrt{l^2-1}$

B. $g\left(l^2-1\right)$

C. $\frac{g}{\sqrt{l^2-1}}$

D. $g\sqrt{l^2+1}$

Answer: C

Watch Video Solution

24. There are two radioactive substance A and B. Decay consant of B is two times that of A. Initially, both have equal number of nuclei. After n half-lives of A, rates of disintegration of both are equal. The value of n is .

A. 4

B. 2

C. 1

D. 5

Answer: C

Watch Video Solution

25. If ${}_{92}U^{238}$ undergoes successively $8\alpha -$ decays and $6\beta -$ decays, then resulting nucleus is.

A. $Z = 84, A = 206$

B. $Z = 84, A = 224$

C. $Z = 82, A = 206$

D. $Z = 82, A = 200$

Answer: C

Watch Video Solution

26. If A is amplitude of a particle in SHM, its displacement from the mean position when its kinetic energy is thrice that to its potential energy

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

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

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

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

Answer: C

 Watch Video Solution

27. A pendulum consisting of a small sphere of mass m, suspended by a inextensible and massless string of length 1 , is made to swing in a verticle plane. If the breaking strength of the string is 2 mg, then the maximum angular

amplitude of the displacement from the verticle can be

A. 0°

B. 30°

C. 60°

D. 90°

Answer: C

Watch Video Solution

28. The number of photons falling per second on a completely darkened plate to produce a force of $6.62 \times 10^{-5} N$ is 'n'. If the wavelength of the light falling is 5×10^{-7}m, then n= _____ $\times 10^{22}$.

$\left(h = 6.62 \times 10^{-34} J - s\right)$

A. 1

B. 5

C. 0.2

D. 3.3

Answer: B

Watch Video Solution

29. The energy flux of the sunlight reaching the surface of the earth is $1.388 \times 10^3 Wm^{-2}$. How many photons (nearly) per square meter are incident on the earth per second? Assume that the photonsin the sunlight have an average wavelength of 550 nm.

A. $3.838 \times 10^{21} \text{photon } m^{-2} s^{-1}$

B. $3.838 \times 10^{23} \text{photon } m^{-2} s^{-1}$

C. $5.838 \times 10^{21} \text{photon } m^{-2} s^{-1}$

D. $5.838 \times 10^{23} \text{photon } m^{-2} s^{-1}$

Answer: A

Watch Video Solution

30. The pressure inside two soap bubbles is 1.01 and 1.02 atmosphere. The ration of their respective volumes is

A. $8:1$

B. $2:1$

C. $102:101$

D. $(102)^3:(101)^3$

Answer: A

Watch Video Solution

31. A capillary tube of the radius r is immersed in water and water rise in it to a height H. Mass of water in the capillary tube is m. If the

capillary of radius 2r is taken and dipped in water, the mass of water that will rise in the capillary tube will be

A. m

B. 2 m

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

D. 4 m

Answer: B

Watch Video Solution

32. A thin lens focal length f_1 and its aperture has diameter d. It forms an image of intensity I. Now the central part of the aperture up to diameter $\frac{d}{2}$ is blocked by an opaque paper. The focal length and image intensity will change to

A. $\frac{f}{2}$ and $\frac{I}{2}$

B. f and $\frac{I}{4}$

C. $\frac{3f}{4}$ and $\frac{I}{2}$

D. f and $\frac{3I}{4}$

Answer: D

Watch Video Solution

33. A plano-concave lens is made of glass of refractive index 1.5 and the radius of curvature of its curved face is 100 cm. What is the power of the lens?

A. $+0.5D$

B. $-0.5D$

C. $-2D$

D. $+2D$

Answer: B

Watch Video Solution

34. The moment of inertia of a rod about an axis through its centre and perpendicular to it is $\frac{1}{12}ML^2$ (Where M is the mass and L, the length of the rod). The rod is bent in the middle so that the two halves make an angle

of 60° The moment of inertia of the bent rod about the same axis would be ;

A. $\frac{ML^2}{48}$

B. $\frac{ML^2}{12}$

C. $\frac{ML^2}{24}$

D. $\frac{ML^2}{8\sqrt{3}}$

Answer: B

Watch Video Solution

35. A solid sphere of mass 2 kg is rolling on a frictionless horizontal surface with velocity $6m/s$. It collides on the free and of an ideal spring whose other end is fixed. The maximum compression produced in the spring will be (Force constant of the spring = 36 N/m)

A. $\sqrt{14}m$

B. $\sqrt{2.8}m$

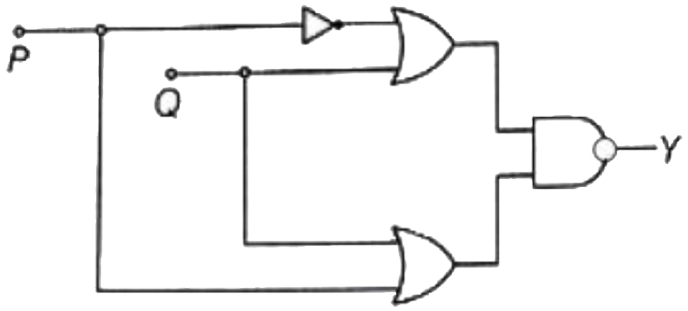
C. $\sqrt{1.4}m$

D. $\sqrt{0.7}m$

Answer: B

Watch Video Solution

36. In the given circuit P and Q from the inputs. The output Y is



A. $Y = \overline{P}$

B. $Y = P\overline{Q}$

C. $Y = P + Q$

D. $Y = \overline{Q}$

Answer: D

Watch Video Solution

37. In a n-p-n transister circuit the collector current is $9mA$. If $90\,\%$ of the electrons emitted reach the collector, find emitter current and base current

A. $I_E = -1mA, I_B = 9mA$

B. $I_E = 9mA, I_B = -1mA$

C. $I_E = 1mA, I_B = 11mA$

D. $I_E = 11mA, I_B = 1mA$

Answer: D

Watch Video Solution

38. A metallic rod l cm long, A square cm in cross-section is heated through $t^\circ C$. If Young's modulus of elasticity of the metal is E

and the mean coefficient of linear expansion is α per degree celsius, then the compressional force required to prevent the rod from expanding along its length is

A. $YA\alpha t$

B. $\frac{Ya\alpha t}{1-\alpha t}$

C. $\frac{Ya\alpha t}{1+\alpha t}$

D. $\frac{YA(1+\alpha t)}{\alpha}$

Answer: A

Watch Video Solution

39. Let $x = \left[\frac{a^2b^2}{c}\right]$ be the physical quantity. If the percentage error in the measurement of physical quantities a,b, and c is 2,3 and 4 per cent respectively, then percentage error in the measurement of x is

A. 0.07

B. 0.14

C. 0.21

D. 0.28

Answer: B

Watch Video Solution

40. In Young's experiment the wavelenght of red light is $7.8 \times 10^{-5} cm$ and that of blue light is 5.2×10^{-5} cm. The value of n for which $(n+1)^{th}$ blue bright band coincides with n^{th} red band is

A. 1

B. 2

C. 3

D. 4

Answer: B

 Watch Video Solution

41. According to Huygens' principle, during rafraction of light from air to a denser medium

A. Wavelength decreases but speed increases

B. Wavelength increases but speed decreases

C. Wavelength and speed both increases

D. Wavelength and speed both decreases

Answer: D

Watch Video Solution

42. A car is moving with $90kmh^{-1}$ blows a horn of 150 Hz, towards a cliff. The frequency of the reflected sound heard by the driver will be (speed of sound in air is $340ms^{-1}$)

A. 150 Hz

B. 140 Hz

C. 180 Hz

D. 174 Hz

Answer: D

Watch Video Solution

Watch Video Solution

43. A standing wave propagating with velocity $300ms^{-1}$ in an open pipe of length 4 m has four nodes. The frequency of the wave is

A. 75 Hz

B. 100 Hz

C. 150 Hz

D. 300 Hz

Answer: C

Watch Video Solution

44. An object of mass 10 kg falls from rest through a vertical distance of 10 m and acquires a velocity of $10ms^{-1}$. The work done by the push of air on the object is $(g = 10ms^{-2})$

A. 500 J

B. $-500J$

C. $250J$

D. $-250J$

Answer: B

Watch Video Solution

45. Power applied to a particle varices with time as $P = \left(3t^2 - 2t + 1\right)$ watt, where t is in second. Find the change in its kinetic energy between time $t = 2s$ and $t = 4s$.

A. 32 J

B. 46 J

C. 61 J

D. 100 J

Answer: B

Watch Video Solution