



PHYSICS

BOOKS - NTA MOCK TESTS

NEET MOCK TEST 21

Physics

1. The angular velocity of a body is

$\vec{\omega} = 2\hat{i} + 3\hat{j} + 4\hat{k}$ and a torque

$\vec{\tau} = \hat{i} + 2\hat{j} + 3\hat{k}$ acts on it. The rotational power will be

A. 20 W

B. 15 W

C. $\sqrt{17}W$

D. $\sqrt{14}W$

Answer: A



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2. The potential energy of a particle of mass 5 kg moving in the $x - y$ plane is given by $U = (-7x + 24y) J$, where x and y are given in metre. If the particle starts from rest, from the origin, then the speed of the particle at $t = 2s$ is

A. 5 m/s

B. 10 m/s

C. 14 m/s

D. 17.5 m/s

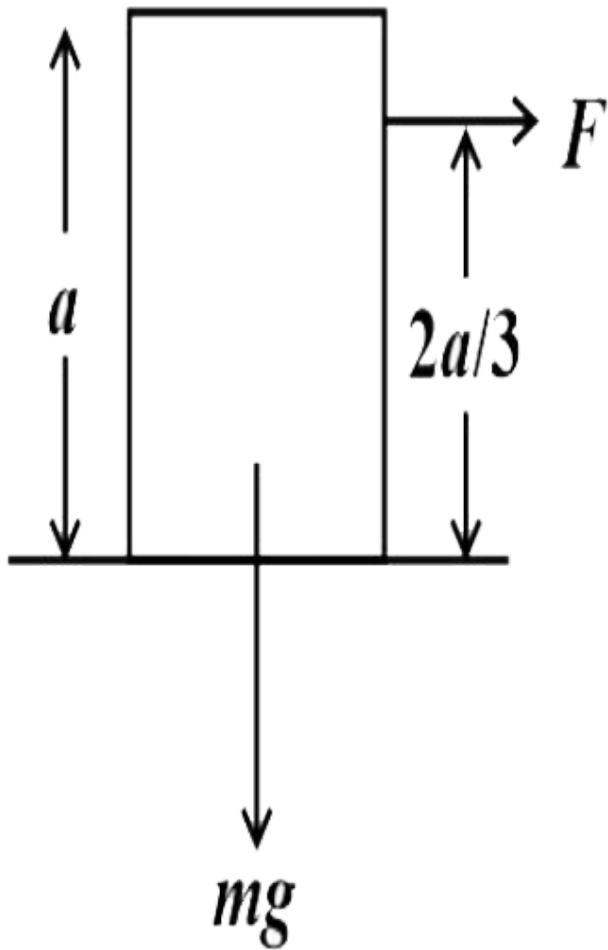
Answer: B



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3. If the friction is sufficient to prevent the block from sliding, then the minimum value of F for which the cube begins to topple about

an edge is



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

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

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

D. mg

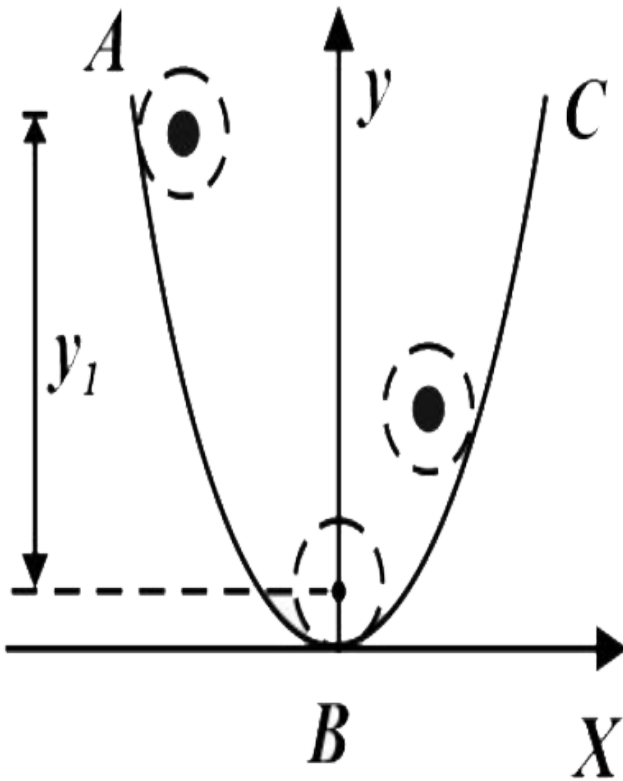
Answer: B



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4. A uniform cylinder rolls down from rest, on a track whose vertical cross - section is a parabola given by the equation $y = kx^2$. If the surface is rough from A to B due to which the

cylinder doesn't slip but it is frictionless from B to C, then the height of ascent of cylinder towards C is



A. $\frac{y_1}{3}$

B. $\frac{2y_1}{3}$

C. $\frac{3y_1}{2}$

D. y_1

Answer: B



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5. A magnetic dipole is situated in the direction of a magnetic field. What is its potential energy? If it is rotated by 180° , then what amount of work will be done?

A. MB

B. 2 MB

C. -2 MB

D. zero

Answer: D



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6. A projectile is thrown with a velocity of 20 m/s , at an angle of 60° with the horizontal. After how much time the velocity vector will

make an angle of 45° with the horizontal (in upward direction) is (take $g=10m/s^2$) –

A. $\sqrt{3}s$

B. $\frac{1}{\sqrt{3}}s$

C. $(\sqrt{3} + 1)s$

D. $(\sqrt{3} - 1)s$

Answer: D



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7. A sample contains large number of nuclei.
The probability that a nucleus in sample will
decay after four half lives is

A. $\frac{1}{4}$

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

C. $\frac{15}{16}$

D. $\frac{7}{16}$

Answer: C



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8. Photoelectric emission is observed from a metallic surface for frequencies ν_1 and ν_2 of the incident light rays ($\nu_1 > \nu_2$). If the maximum values of kinetic energy of the photoelectrons emitted in the two cases are in the ratio of $1:k$, then the threshold frequency of the metallic surface is

A. $\frac{n_1 - n_2}{k - 1}$

B. $\frac{kn_1 - n_2}{k - 1}$

C. $\frac{kn_2 - n_1}{k - 1}$

D. $\frac{n_2 - n_1}{k}$

Answer: B



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9. In a compound microscope, the focal lengths of two lenses are 1.5cm and 6.25cm an object is placed at 2cm from objective and the final image is formed at 25cm from eye lens. The distance between the two lenses is

A. 6.00 cm

B. 7.75 cm

C. 9.25 cm

D. 11.00 cm

Answer: D



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10. When a ray is refracted from one medium into another, the wavelegths changes from 6000\AA to 4000\AA . The critical angle for a ray from the second medium will be

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

B. $\sin^{-1}\left(\frac{2}{3}\right)$

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

D. $\sin^{-1}\left(\frac{2}{\sqrt{13}}\right)$

Answer: B



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11. A $100V$ a.c. source of frequency $500Hz$ is connected to a LCR circuit with $L = 8.1$

millihenry, $C = 12.5\mu F$ and $R = 10$ ohm, all connected in series. What is the potential difference across the resistance?

- A. 100 V
- B. 200 V
- C. 300 V
- D. 400 V

Answer: A



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12. A rod of length l rotates with a small but uniform angular velocity ω about its perpendicular bisector. A uniform magnetic field B exists parallel to the axis of rotation. The potential difference between the centre of the rod and an end is

A. zero

B. $\frac{1}{2}\omega Bl^2$

C. ωBl^2

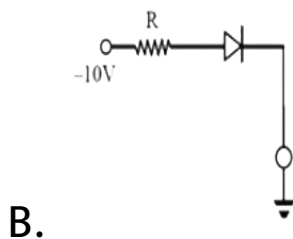
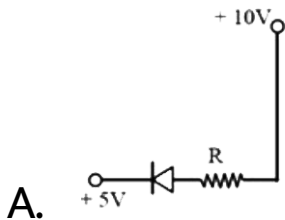
D. $2\omega Bl^2$

Answer: A

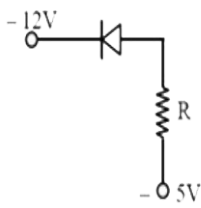


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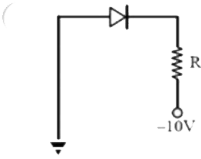
13. In the figure, which of the diode is in reverse bias



C.



D.

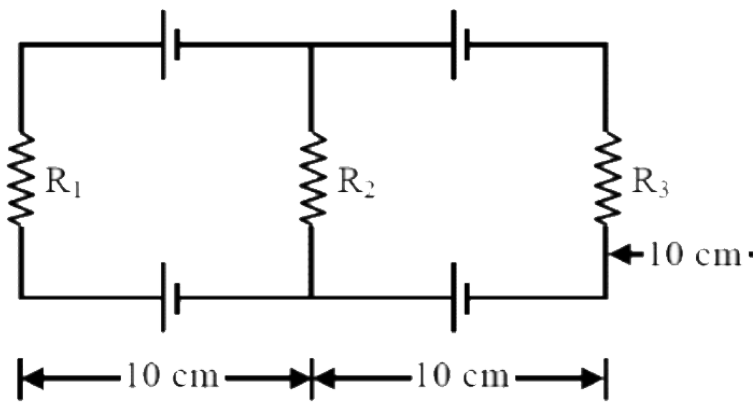


Answer: B



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14. In the figure shown below each battery has $\text{emf} = 5 \text{ V}$. Then the magnetic field at P is



A. zero

B. $\frac{10\mu_0}{R_1(4\pi)(.2)}$

C. $\frac{20\mu_0}{R_1 + R_2(.8\pi)}$

D. none of these

Answer: A

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15. Two long parallel wires are 30 cm apart carrying currents 10 A and 15 A respectively in the same direction. The force acting over a length of 5 m of the wires is

A. $5 \times 10^{-4} N$, (attraction)

B. $1 \times 10^{-4} N$, (attraction)

C. $5 \times 10^{-4} N$, (repulsion)

D. $1 \times 10^{-4} N$, (repulsion)

Answer: A



16. The resistance of a moving coil galvanometer is 20Ω . It requires 0.01 A current for full - scale deflection. The value of resistance to convert it into a voltmeter of the range 20 V will be

A. 198Ω

B. 1980Ω

C. 20Ω

D. 0Ω

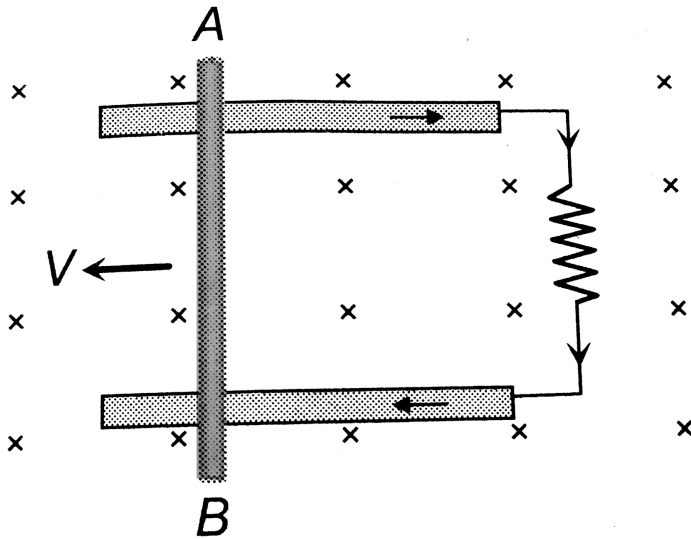
Answer: B



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17. Consider the situation shown in the figure. The wire AB is sliding on the fixed rails with a constant velocity. If the wire AB is replaced by semicircular wire, the magnitude of the

induced current will



A. increase

B. remain the same

C. decrease

D. increase of decrease depending on

whether the semicircle bulges towards

the resistance or away from it

Answer: B



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18. The coefficient of friction between two surface is 0.2. The maximum angle of friction is

A. $\sin^{-1}(0.2)$

B. $\cos^{-1}(0.2)$

C. $\tan^{-1}(0.1)$

$$D. \cot^{-1}(5)$$

Answer: D



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19. The ratio of thermal conductivity of two rods of different material is 5:4. The two rods of same area of cross-section and same thermal resistance will have the lengths in the ratio

A. 4:5

B. 9:1

C. 1:9

D. 5:4

Answer: D



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20. A dielectric slab is inserted between the plates of an isolated capacitor. The force between the plates will

A. increase

B. decrease

C. remain unchanged

D. become zero

Answer: C



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21. The effective capacitance of two capacitors of capacitances C_1 and C_2 ($C_2 > C_1$) connected in parallel is $\frac{25}{6}$ times the effective

capacitance when they are connected in series.

The ratio $\frac{C_2}{C_1}$ is

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

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

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

D. $\frac{25}{6}$

Answer: A



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22. A particale moves under the effect of a force $F = Cs$ from $x = 0$ to $x = x_1$. The work down in the process is

A. cx_1^2

B. $\frac{1}{2}cx_1^2$

C. cx_1^3

D. zero

Answer: B



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23. Root mean square speed of an ideal gas at 300 K is 500 m/s. Temperature is increased four times then root mean square speed will become

- A. 1000 m/s
- B. 560 m/s
- C. 2000 m/s
- D. none of these

Answer: A



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24. When a laser beam returns after reflection from an aeroplane, the observed change in frequency is 1%, then the speed of the aeroplane is (c is the velocity of light)

A. $\frac{c}{50}$

B. $\frac{c}{100}$

C. $\frac{c}{200}$

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

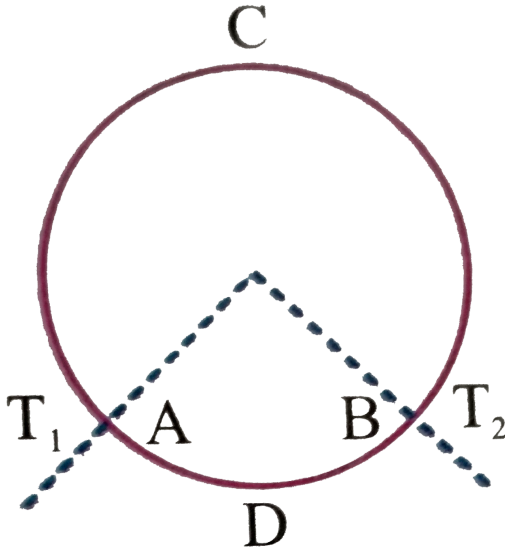
Answer: C



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25. A ring consisting of two parts ADB and ACB of same conductivity k carries an amount of heat H . The ADB part is now replaced with another metal keeping the temperature T_1 and T_2 constant. The heat carried increases to $2H$. What should be the conductivity of the new ADB . Given

$$\frac{ACB}{ADB} = 3$$



A. $\frac{7}{3}K$

B. $2K$

C. $\frac{5}{2}K$

D. $3K$

Answer: A



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26. The period of oscillation of a simple pendulum of length (L) suspended from the roof of a vehicle which moves without friction down an inclined plane of inclination (α), is given by.

A. $2\pi \sqrt{\frac{L}{g \cos \alpha}}$

B. $2\pi \sqrt{\frac{L}{g \sin \alpha}}$

C. $2\pi\sqrt{\frac{L}{g}}$

D. $2\pi\sqrt{\frac{L}{g \tan \alpha}}$

Answer: A



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27. Potential energy of a 3kg body at the surface of a planet is $-54J$, then escape velocity will be :

A. $18ms^{-1}$

B. $162ms^{-1}$

C. $36ms^{-1}$

D. $6ms^{-1}$

Answer: D



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28. A projectile is fired vertically upwards from the surface of the earth with a velocity Kv_e , where v_e is the escape velocity and $K < 1$. If R is the radius of the earth, the maximum height

to which it will rise measured from the centre of the earth will be (neglect air resistance)

A. $\frac{R}{k^2 + 1}$

B. $\frac{k^2 R}{1 - k^2}$

C. $\frac{R}{1 - k^2}$

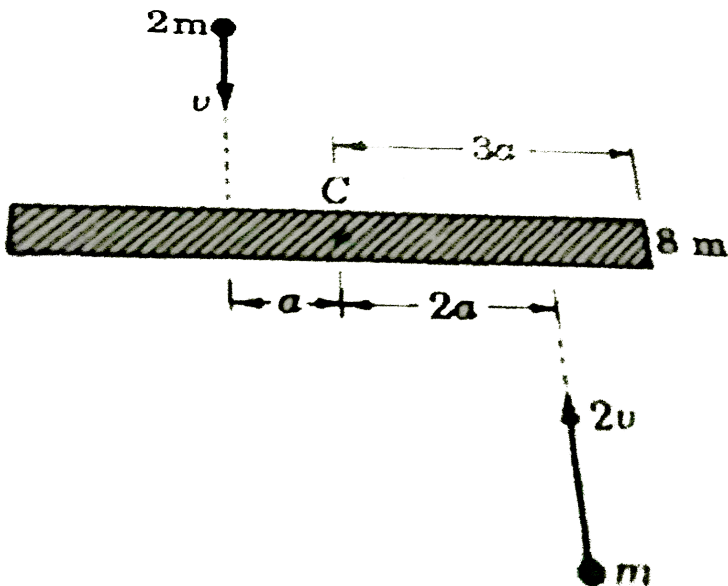
D. $\frac{k^2 R}{k^2 + 1}$

Answer: C



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29. A uniform bar of length $6a$ and mass $8m$ lies on a smooth horizontal table. Two point-masses m and $2m$ moving in the same horizontal plane with speeds $2v$ and v respectively strike the bar as shown in Fig, and stick to the bar after collision.



A. zero

B. $\frac{2v}{3a}$

C. $\frac{v}{5a}$

D. $\frac{3v}{5a}$

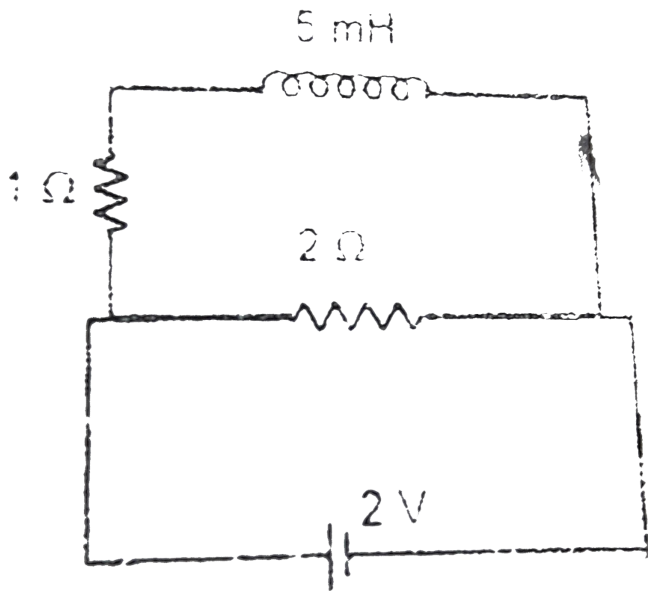
Answer: C



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30. When induced emf in inductor coil is 50 % of its maximum value then stored energy in inductor coil in the given circuit at

that instant will be:-



A. 2.5 mJ

B. 5 mJ

C. 15 mJ

D. 20 mJ

Answer: A



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31. The magnetic flux through a coil varies with time as $\phi = 5t - 6t^2 + 9$. The ratio of E.M.F. at $t = 0s$ to $t = 0.5s$ will be

A. 9:1

B. 1:6

C. 6:1

D. 1:9

Answer: C



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32. Specific resistance of a wire depends on its

- A. length of the wire
- B. area of cross - section of the wire
- C. resistance of the wire
- D. material of the wire

Answer: D



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33. What is the ratio of the electrostatic potential at the corner and the centre point of a charged conducting cube? (The potential is considered 0 at infinity)

A. 2:1

B. 4:1

C. 1:2

D. 1:1

Answer: D



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34. The work done by all the forces (external and internal) on a system equals the change in

- A. total energy
- B. kinetic energy
- C. potential energy
- D. none of these

Answer: B



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35. The potential energy of a body mass m is

$U = ax + by$ the magnitude of acceleration

of the body will be-

A. $\frac{ab}{m}$

B. $\left(\frac{a + b}{m}\right)$

C. $\frac{\sqrt{a^2 + b^2}}{m}$

D. $\frac{a^2 + b^2}{m}$

Answer: C



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36. A ball of mass 1 kg moving with a velocity of 0.4 ms^{-1} collides with another stationary ball. After the collision, the first ball moves with a velocity of 0.3 ms^{-1} in a direction making an angle of 90° with its initial direction. The momentum of the second ball after the collision will be (in kg ms^{-1})

A. 0.1

B. 0.3

C. 0.5

D. 0.7

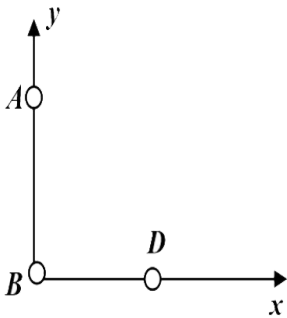
Answer: C



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37. An interference is observed due to two coherent sources A and B separated by a distance 4λ along Y-axis, where λ is the

wavelength of light. A detector 'D' is moved along the positive X-axis. Find the total number of maxima observed on the X-axis excluding the points $x = 0$ and $x = \infty$?



- A. three
- B. four
- C. two
- D. infinite

Answer: A



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38. A convex lens A of focal length 20cm and a concave lens G of focal length 5cm are kept along the same axis with the distance d between them. If a parallel beam of light falling on A leaves B as a parallel beam, then distance d in cm will be

A. 20

B. 15

C. 30

D. 50

Answer: B



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39. A variable force F acts along the x - axis given by $F = (3x^2) - 2x + 1N$. The work done by the force when a particle of mass 100 g moves from $x = 50$ cm to $x = 100$ cm is

A. 0.625 J

B. 6.25 J

C. 0.0625 J

D. 62.5 J

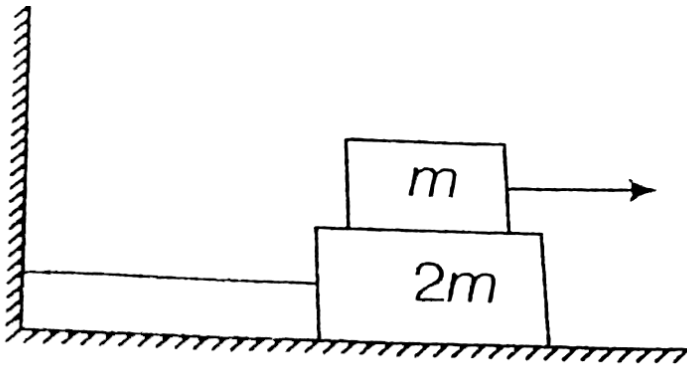
Answer: A



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40. Two blocks of masses m and $2m$ are placed one over the other as shown in figure. The coefficient of friction between m and $2m$ is μ

and between $2m$ and ground is $\frac{\mu}{3}$. If a horizontal force F is applied on upper block and T is tension developed in string, then choose the incorrect alternative.



A. If $F = \frac{\mu}{2}mg, T = 0$

B. If $F = \mu mg, T = 0$

C. If $F = 2\mu mg, T = \frac{\mu mg}{3}$

D. If $F = 3\mu mg, T = 0$

Answer: C



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41. According to Bohr's theory, the time averaged magnetic field at the centre (i.e. nucleus) of a hydrogen atom due to the motion of electrons in the n^{th} orbit is proportional to :

(n = principal quantum number)

A. $\frac{1}{n^3}$

B. $\frac{1}{n^5}$

C. n^5

D. n^3

Answer: B



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42. The half - life of a radioactive substance is 50 days. The substance will disintegrate completely in

A. 50 days

B. 500 days

C. 5000 days

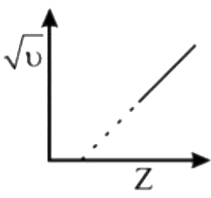
D. infinite time

Answer: D

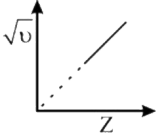


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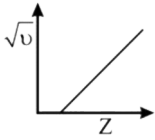
43. Which of the following curves is correct?



A.



B.



C.

D. None of these

Answer: A



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44. A simple telescope, consisting of an objective of focal length 60 cm and a single eye lens of focal length 5 cm is focussed on a distant object in such a way that parallel rays comes out from the eye lens. If the object subtends an angle 2° at the objective, the angular width of the image

A. 50°

B. $\left(\frac{1}{6}\right)^\circ$

C. 10°

D. 24°

Answer: D



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45. An equilateral prism produces a minimum deviation of 30° . The angle of incidence is

A. 120°

B. 60°

C. 90°

D. none of these

Answer: B



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