PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 53

Physics

1. The ratio of the maximum wavelength of the Lyman series in hydrogen spectrum to the maximum wavelength in the Paschen series is

A. $\dfrac{3}{105}$

B. $\dfrac{6}{15}$

C. $\dfrac{52}{7}$

D. $\dfrac{7}{108}$

Answer: D

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2. When an electron jumps from a level $n = 4$ to $n = 1$, the momentum of the recoiled hydrogen atom will be

A. $6.8 \times 10^{-27} kG - ms^{-1}$

B. $12.75 \times 10^{-19} kG - ms^{-1}$

C. $136 \times 10^{-19} kG - ms^{-1}$
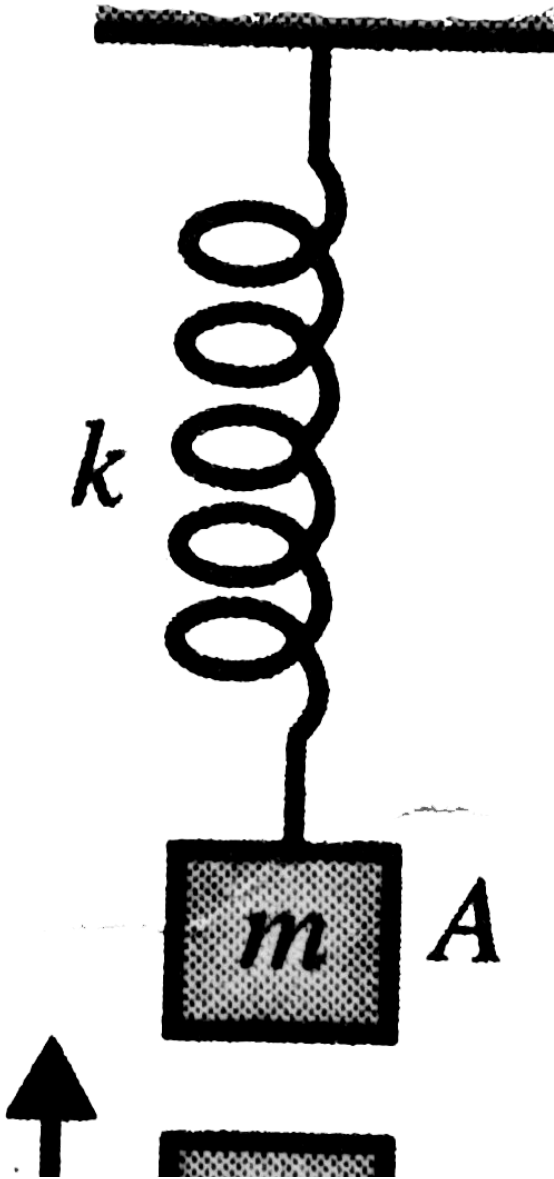
D. Zero

Answer: A

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3. 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. $\sqrt{\dfrac{60mg^2}{k}}$

B. $\sqrt{\dfrac{6mg^2}{k}}$
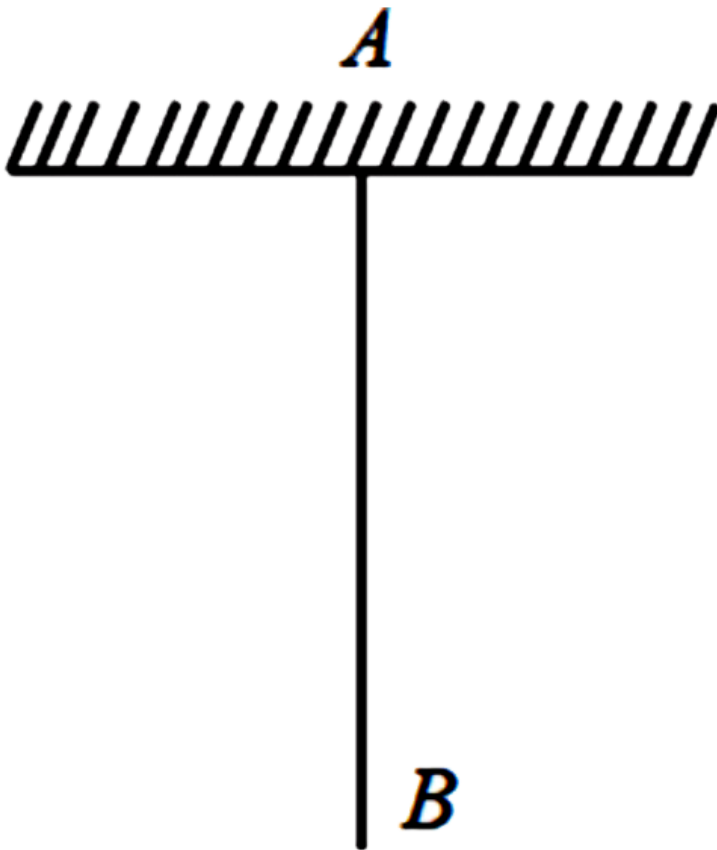
C. $\sqrt{\dfrac{10mg^2}{k}}$

D. None of these

Answer: B

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4. A bar of mass m and length l is hanging from point A as shown in the figure . If the Young's modulus of elasticity of the bar is Y and area of cross - section of the wire is A, then the increase in its length due to its own

weight will be

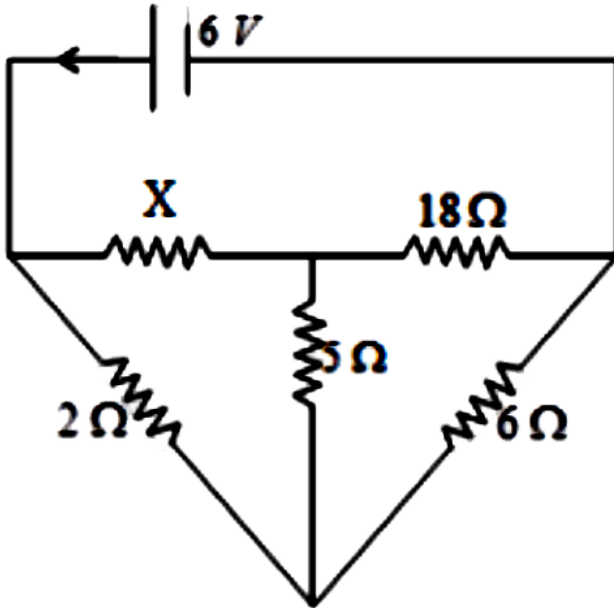A. $\dfrac{mgL}{2AY}$

B. $\dfrac{mgA}{2LY}$

C. $\dfrac{mg}{2LAY}$

D. $\dfrac{2LY}{mgA}$

Answer: A

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5.

The magnitude of resistance X in the circuit shown in the given figure , when no current flows through the 5Ω resistor is
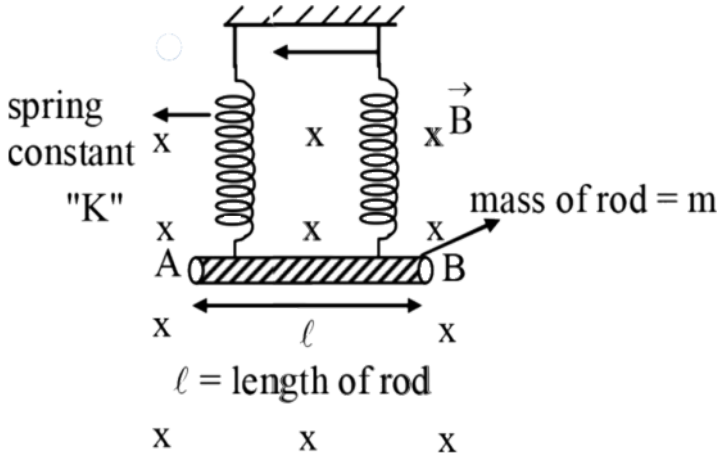
A. 3Ω

B. 6Ω

C. 9Ω

D. 12Ω

Answer: B

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6. If the extension in both the springs increases from x to x_0 on flowing current I in the rod from B to A then, the value of

magnetic field will be -

spring
constant "K"

ℓ = length of rod

mass of rod = m

A. $\dfrac{mg}{\Pi}$

B. $\dfrac{mgx}{\Pi}$

C. $\dfrac{mgI}{lx_0}$

D. $\dfrac{mg(x_0 - x)}{lix}$

Answer: D

7. In a region of uniform electric field ofn intencity E, an electron of mass m_e is released from rest. The distance travelled by the eloctron in a time t is

A. $\dfrac{2m_e t^2}{e}$

B. $\dfrac{eEt^2}{2m_e}$

C. $\dfrac{m_e \mathrm{g} t^2}{eE}$

D. $\dfrac{2Et^2}{em_e}$

Answer: B

8. A step-down transformer is used on a $1000V$ line to deliver $20A$ at $120V$ at the secondary coil. If the efficiency of the transformer is 80% the current drawn from the line is.

   A. $3A$

   B. $30A$

C. $0.3A$

D. $2.4A$

Answer: A

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9. What will be the ratio of temperatures of sun and moon if the wavelengths of their maximum emission radiations rates are $140A°$ and $4200A°$ respectively .

A. $1:30$

B. $30:1$

C. $42:14$

D. $14:12$

Answer: B

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10. The phase difference between voltage and current in an AC circuit containing a resistor and an inductor in series is ϕ_1. When the

inductor is replaced by a capacitor , the phase difference is changed to ϕ_2 . The phase difference when all the three elements are connected in series with the same AC source will be

A. $\tan^{-1}(\tan\phi_1 + \tan\phi_2)$

B. $\tan^{-1}(\tan\phi_2 - \tan\phi_1)$
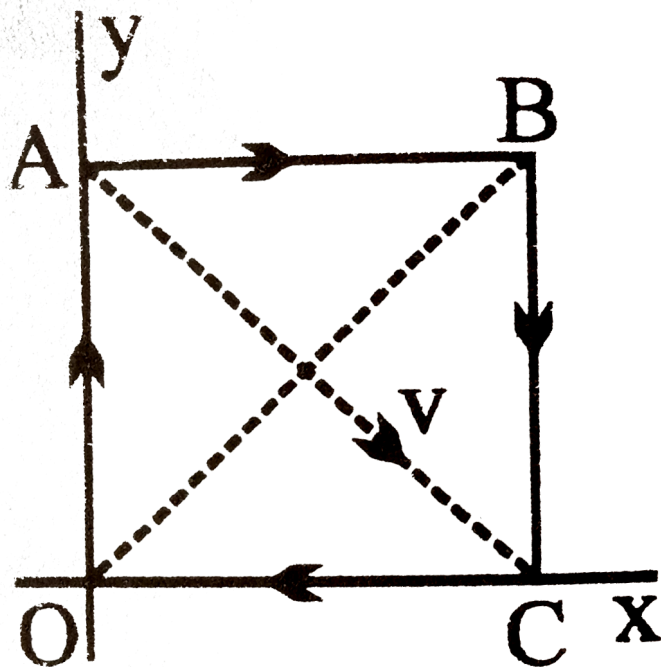
C. $\cos^{1}(\cos\phi_1 - \cos\phi_2)$

D. $\cos^{1}(\cos\phi_2 - \cos\phi_1)$

Answer: A

11. $OABC$ is a current carrying square loop an electron is projected from the center of loop along its diagonal AC as shown. Unit vector in

the direction of initial acceleration will be

A. $\hat{k}$

B. $-\left(\dfrac{\hat{i} + \hat{j}}{\sqrt{2}}\right)$

C. $-\hat{k}$

D. $\dfrac{\hat{i} + \hat{j}}{\sqrt{2}}$

Answer: B

12. Two projectiles thrown from the same point at angles $60°$ and $30°$ with the horizontal attain the same height. The ratio of their initial velocities is

A. 1

B. 2

C. $\sqrt{3}$

D. $\dfrac{1}{\sqrt{3}}$

Answer: D

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13. The acceleration due to gravity at a height

$(1/20)^{th}$ the radius of the earth above earth s

surface is $9m/s^2$ Find out its approximate

value at a point at an equal distance below the

surface of the earth .

A. 8.5

B. 9.5

C. 9.8

D. 11.5

Answer: B

14. A radioactive sample at any instant has its disintegration rate 5000 disintegrations per minute After 5 minutes , the rate is 1250 disintegration per minute. Then , the decay constant (per minute)

A. 0.4 ln (2)

B. 0.2 ln (2)

C. 0.1 ln (2)

D. 0.8 ln (2)

Answer: A

15. The temperature of sun is 5500 K and it emits maximum intensity radiation in the yellow region $(5.5 \times 10^{-7}m)$. The maximum radiation from a furnace occurs at wavelength $11 \times 10^{-7}m$ The temperature of furnace is
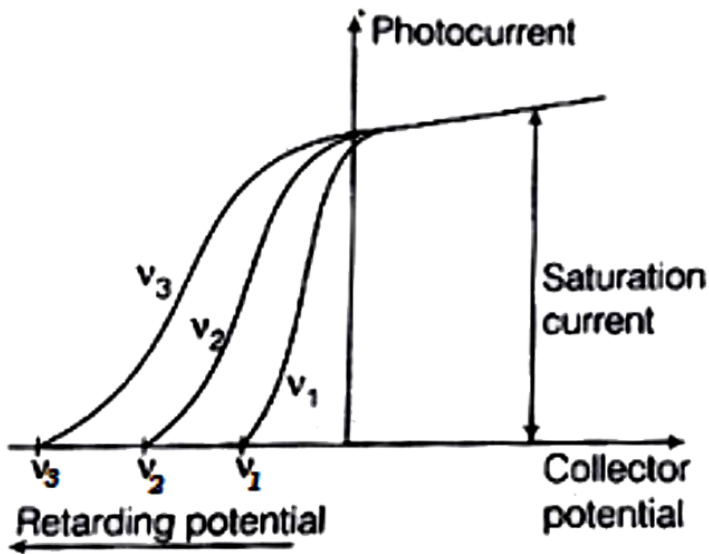
A. 500 K

B. 1750 K

C. 3750 K

D. 2750 K

Answer: D

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16. The variation of photocurrent with collector potential for different frequencies of incident radiation v_1, v_2, v_3 is as shown in the

the graph , then

Photocurrent

V_3 V_2 V_1

Saturation current

Collector potential

V_3 V_2 V_1

Retarding potential

A. $v_1 = v_2 = v_3$

B. $v_1 > v_2 > v_3$
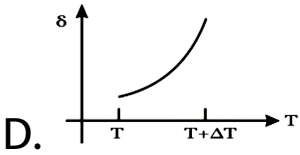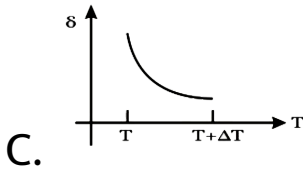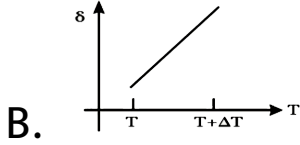
C. $v_1 < v_2 < v_3$

D. $v_3 = \dfrac{v_1 + v_2}{2}$

Answer: C

17. An ideal gas is initially at temperature T and volume V . Its volume is increased by ΔV due to an increase in temperature Δ , pressure remaining constant . The quantity $\delta = \Delta V / V \Delta T$ varies with temperature as
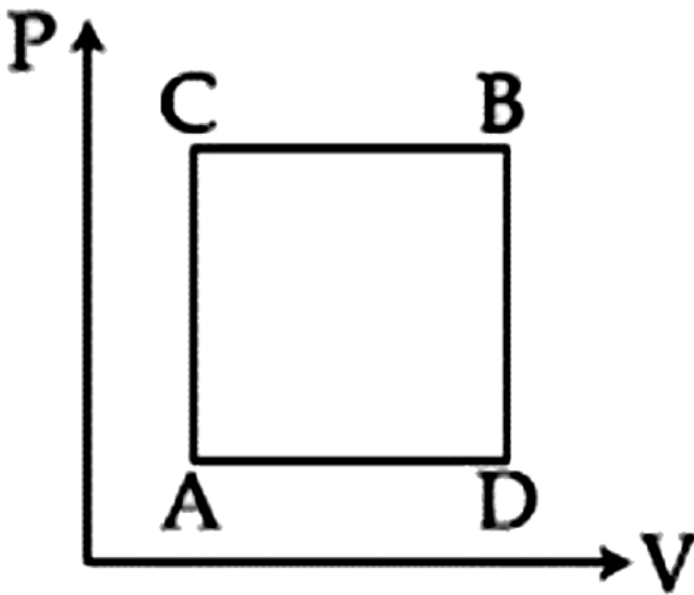
A.

B.

C.

D.
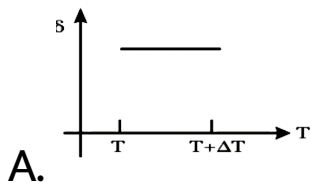
Answer: C

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18. A gas can be taken from A to B via two different processes ACB and DB.

When path ACB is used 60 J of heat flows into the system and 30J of work done by the system is 10 J , the heat flows into the system in the path ADB is :

A. 100 J

B. 20 J

C. 40 J

D. 80 J

Answer: C

19. 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. $0.1ms^{-1}$

C. $0.5ms^{-1}$

D. $0.3ms^{-1}$

Answer: A

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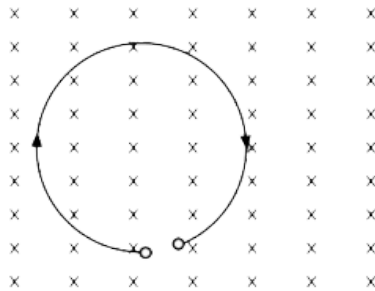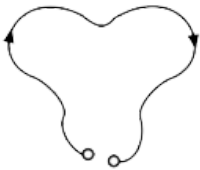**20.** A thin flexible wire of length L is connected

to two adjacent fixed points and carries a

current I in the clockwise direction, as shown

in the figure. When the system is put in a uniform magnetic field of strength B going into the plane of the paper, the wire takes the shape of a circle. The tension in the wire is :

A. IBL

B. $\dfrac{IBL}{\pi}$

C. $\dfrac{IBL}{2\pi}$

D. $\dfrac{IBL}{4\pi}$

Answer: C

21. A one mole of an ideal gas expands adiabatically at constant pressure such that its temperature $T \propto \dfrac{1}{\sqrt{V}}$ .The value of the adiabatic constant gas is

A. 1.30

B. 1.50

C. 1.67

D. 2.00

Answer: B

22. A cylindrical conductor of diameter 0.1 mm

carries a current of 90 ma. The current density

(in A m^{-2}) is $(\pi \approx 3)$

A. 1.2×10^{7}

B. 3×10^{6}

C. 6×10^6

D. 2.4×10^7

Answer: A

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23. 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

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24. The upper half of an inclined plane with inclination ϕ is perfectly smooth while the lower half is rough. A body starting from rest at the top will again come to rest at the

bottom if the coefficient of friction for the lower half is given by

A. $\mu = \sin \theta$

B. $\mu = \cot \theta$

C. $\mu = 2\cos \theta$

D. $\mu = 2\tan \theta$

Answer: D

25. The potential energy for a conservative force system is given by $U = ax^2 - bx.$ Where a and b are constants find out (a) The expression of force (b) Potential energy at equilibrium.

   A. F = constant

   B. F = bx - 2a

   C. F = b - 2ax

   D. F = 2 ax

Answer: C

26. Starting with a sample of pure $.^{66}Cu$, $7/8$ of it decays into Zn in 15 minute. The corresponding half-life is:

    A. 10 min

    B. 15 min

    C. 5 min
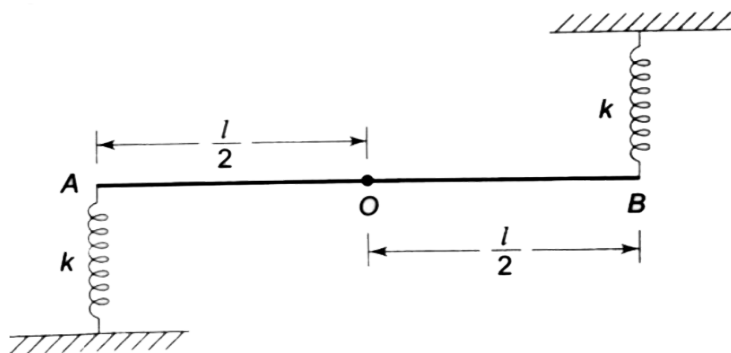
    D. $7\dfrac{1}{2}$

Answer: C

27. The ends of a rod of length l and mass m are attached to two identical springs as shown in the figure. The rod is free to rotate about its centre O . The rod is depressed slightly at end A and released . The time period of the oscillation is

A. $2\pi\sqrt{\dfrac{m}{2k}}$

B. $2\pi\sqrt{2\dfrac{m}{k}}$

C. $\pi\sqrt{2\dfrac{m}{3k}}$

D. $\pi\sqrt{3\dfrac{m}{2k}}$

Answer: C

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28. A pendulum is executing simple harmonic motion and its maximum kinetic energy is K_1. If the length of the pendulum is doubled and

it perfoms simple harmonuc motion with the same amplitude as in the first case, its maximum kinetic energy is K_2 Then:

A. $K_2 = 2K_1$

B. $K_1 = 2K_2$

C. $K_2 = K_1$

D. $K_1 = 4K_2$

Answer: A

29. A photocell is illuminated by a small bright source places 1 m away when the same source of light is placed $\dfrac{1}{2}$ m away. The number of electron emitted by photocathode would be

    A. decrease by a factor of 2

    B. increase by a factor of 2

    C. decrease by a factor of 4

    D. increase by a factor of 4

Answer: D

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30. The magnitude of x and y components of $\overrightarrow{A}$ are 7 and 6 respectively . Also , the magnitudes of x and y components of $\overrightarrow{A} + \overrightarrow{B}$ are 11 and 9 respectively . Calculate the magnitude of vector $\overrightarrow{B}$

A. 10

B. 5

C. 6

D. 3

Answer: B

31. The work done in blowing a bubble of volume V is W, then what is the work done in blowing a soap bubble of volume $2V$?

A. W

B. $\sqrt{2}W$

C. $\sqrt[2]{2}W$

D. $\sqrt[3]{4}W$

Answer: D

32. A body is projected at time $t = 0$ from a certain point on a planet's surface with a certain velocity at a certain angle with the planet's surface (assumed horizontal). The horizontal and vertical displacement x and y (in metre) respectively vary with time t in second as, $x = (10\sqrt{3})t$ and $y = 10t - t^2$. The maximum height attained by the body is
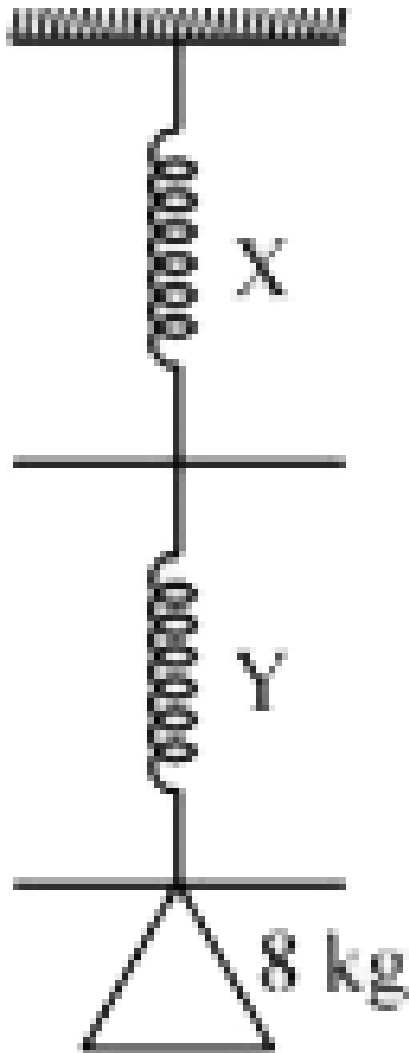
A. 100 m

B. 75 m

C. 50 m

D. 25 m

Answer: D

33. A body of mass 8 kg is suspended through two light springs X and Y connected in series as shown in figure. The readings is X and Y

respectively are :

A. 8 kg , zero

B. Zero , 8 kg

C. 6 kg , 2 kg

D. 8 kg, 8 kg

Answer: D

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34. The two surfaces of a biconvex lens has same radii of curvatures . This lens is made of glass of refractive index 1.5 and has a focal length of 10 cm in air. The lens is cut into two

equal halves along a plane perpendicular to its

principal axis to yield two plane - convex

lenses. The two pieces are glued such that the

convex surfaces touch each other. If this

combination lens is immersed in water

(refractive index $= \dfrac{4}{3}$), its focal length (in cm)

is

A. 5 cm

B. 10 cm

C. 20 cm

D. 40 cm

35. The displacement of an object attached to a spring and executing simple harmonic motion is given by $x = 2 \times 100^{-2} \cos \pi t$ metre. The time at which the maximum speed first occurs is.

A. 0.25 s

B. 0.75 s

C. 0.125 s

D. 0.5 s

Answer: D

36. A sphere of mass M rolls without slipping on the inclined plane of inclination θ. What should be the minimum coefficient of friction, so that the sphere rolls down without slipping ?

A. $\mu = \tan\theta$

B. $\mu = \dfrac{2}{3}\tan\theta$

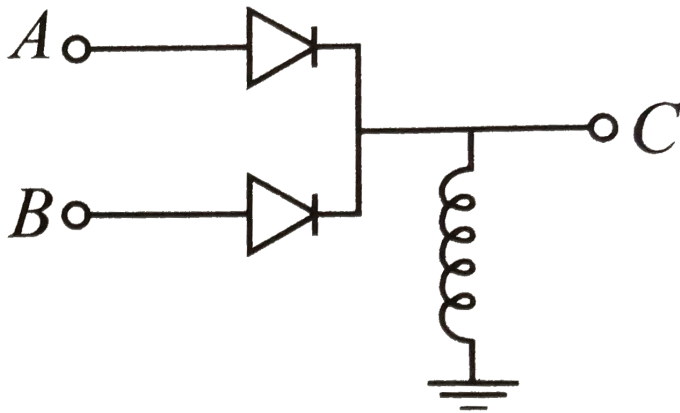C. $\mu = \dfrac{2}{5}\tan\theta$

D. $\mu = \dfrac{2}{7}\tan\theta$

Answer: D

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37. In the circuit below, A and B represents two

inputs and C represents the output . The

circuit represents

A. OR gate

B. NOR gate

C. AND gate

D. NAND gate

Answer: A

38. A ray of light travelling in the direction $\frac{1}{2}\left(\hat{i} + \sqrt{3}\hat{j}\right)$ is incident on a plane mirror. After reflectiion, it travels along the direction $\frac{1}{2}\left(\hat{i} - \sqrt{3}\hat{j}\right)$. The angle of incidence is

A. $45°$

B. $75°$

C. $30°$

D. $60°$

Answer: D

39. A force $\vec{F} = \alpha\hat{i} + 3\hat{j} + 6\hat{k}$ is acting at a point $\vec{r} = 2\hat{i} - 6\hat{j} - 12\hat{k}$. The value of α for which angular momentum about origin is conserved is:

A. 2

B. Zero

C. 1

D. -1

Answer: D

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40. Which of the two have the same dimensions ?

A. Force and strain

B. Force and stress

C. Angular velocity and frequency

D. Energy and strain

Answer: C

41. Pressure of an ideal gas is increased by keeping temperature constant.What is its effect on kinetic energy of molecules?

A. Increase

B. Decrease

C. No change

D. Can't be determined

Answer: C

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42. A resistor of $10k\Omega$ has a tolerance of 10%
and another resistor of $20k\Omega$ has a tolerance
of 20%. The tolerance of the series
combination is rearly

A. 10 %

B. 13 %

C. 17 %

D. 20 %

Answer: C

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43. Fundamental frequency of a sonometer

wire is n. If

the length and diameter of the wire are

doubled

keeping the tension same, then the new

fundamental

frequency is

A. $\dfrac{2n}{\sqrt{2}}$

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

C. $\sqrt{2}n$

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

Answer: D

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44. A tuning fork of frequency 200 Hz is in unison with a sonometer wire . Tension is the wire of sonometer is increased by 1% without any change in its length . Find the number of beats heard in 9 s.

A. 9

B. 3

C. 6

D. 12

Answer: A

45. Work down by static friction on an object :

A. may be positive

B. must be negative

C. must be zero

D. None of these

Answer: A

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