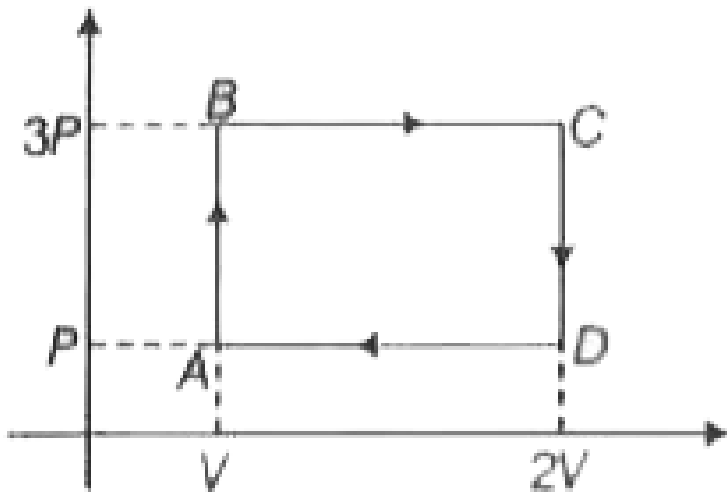# PHYSICS

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

AP EAMCET ENGINEERING ENTRANCE EXAM QUESTION PAPER 2017 (SOLVED)

Physics

1. A monoatomic ideal gas through a cyclic process as shown in the figure . The efficiency of this process is
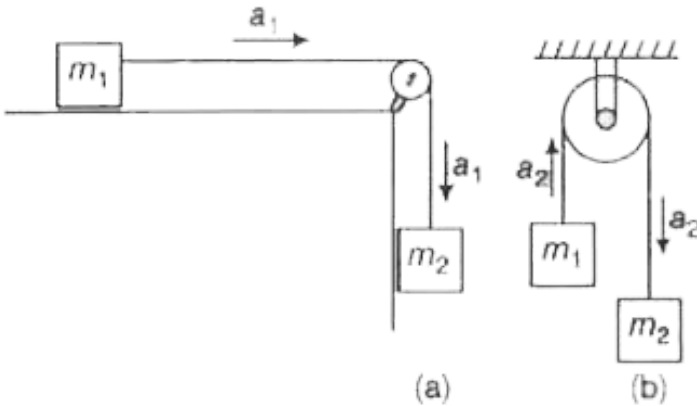
A. 19. 04 %

B. 40. 04 %

C. 50.00 %

D. 10.00 %

Answer:

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2. Two situations are shown in fig. (a) and (b)

In each case $m_1 = 3kg$ and $m_2 = 4kg$. If a_1, a_2 are the respective accelerations of the blocks in these situations, then the values of a_1 and a_2 are respectively $\left[g = 10ms^{-2}\right]$

(a)   (b)

A. $\dfrac{20}{7}ms^{-2}$, $\dfrac{10}{7}ms^{-2}$

B. $\dfrac{10}{7}ms^{-2}$, $\dfrac{25}{7}ms^{-2}$

C. $\dfrac{40}{7}ms^{-2}$, $\dfrac{10}{7}ms^{-2}$

D. $\dfrac{30}{7}ms^{-2}$, $\dfrac{5}{7}ms^{-2}$

Answer: C

**3.** Three uniform thin aluminum rods each of length 2 m form an equilateral triangle PQR as shown in the figure. The mid point of the rod PQ is at the origin of the coordinate system . If the temperature of the system of rods increases by $50°C$ the increase in y-coordinate of the ceentre of mass of hte system of the rods is .... mm.

(Coefficient of volume expansion of aluminium =

$12\sqrt{3} \times 10^{-6} K^{-1}$)
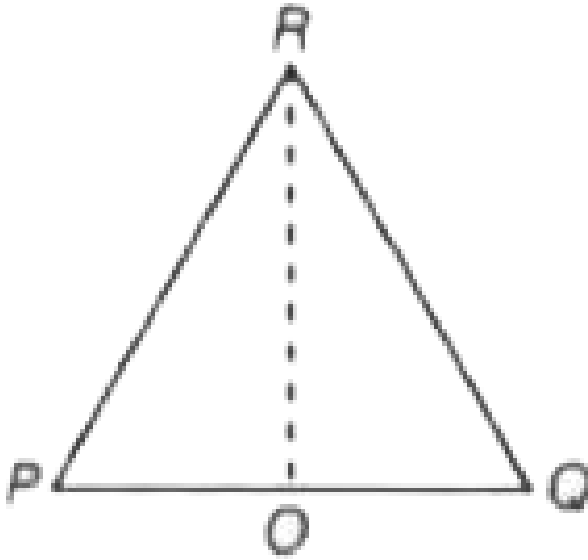
A. 0. 05

B. 0. 8

C. 0. 1

D. 0. 2

Answer: D

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4. An infinitely long thin straight wire has uniform linear charge density of $\frac{1}{3} Cm^{-1}$. Then the magnitude of the force acting on a charge $3\mu C$ situated at a point of 18 cm away from the wire is

$$\left(\frac{1}{4\pi\varepsilon_0} = 9 \times 10^9 Nm^2 C^{-2} \right)$$

A. $2 \times 10^5 N$

B. $10^5 N$

C. $\frac{1}{3} \times 10^6 N$

D. $3 \times 10^{11} N$

Answer: B

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5. An electrostatic paint sprayer has a metal sphere of diameter 18 cm and at a potential of 25 kV. The charge on the metal sphere

is

A. 0. 25μC

B. 2. 5μC

C. 0. 5μC

D. 25μC

Answer: A

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6. A body is projected from the top of a tower with a velocity $\bar{u} = 3\hat{i} + 4\hat{j} + 5\hat{k} ms^{-1}$, where $\hat{i}, \hat{j}$ and $\hat{k}$ are unit vectors along east, north and vertically upwards respectively. If the height of the tower is 0 m , horizontal range of the body on the ground is $\left(g = 10 ms^{-2}\right)$

A. 15 m

B. 25 m

C. 9 m

D. 12 m

Answer: A

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7. Two long parallel conducting wires carrying currents are seperated by a distance 'x' . Work done per unit length in changing the distance between the wires is proportional to

A. $\dfrac{1}{\log_e x}$

B. $\dfrac{1}{x}$

C. $\log_e x$

D. x

Answer: C

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8. A Zener diode voltage regulator operated in the range 120 V -
180 V produces a constant supply of 110 v and 250 aM to the load
. If the maximum current is equally shared between the load and
the Zener diode, then the values of load resistance (R_L) and
series resistance (R_S) are respectively

A. $R_L = 280\Omega$, $R_S = 70\Omega$

B. $R_L = 440\Omega$, $R_S = 140\Omega$

C. $R_L = 70\Omega$, $R_S = 280\Omega$

D. $R_L = 440\Omega$, $R_S = 1400\Omega$

Answer: B

9. Equation of a projectile is given by $y = Px - Qx^2$, where P and Q are constants. The ratio of maximum height to the range of the projectile is

A. $\dfrac{Q^2}{2P}$

B. $\dfrac{P^2}{Q}$

C. 4P

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

Answer: D

10. The transverse displacement of a string of a linear dinsity $0.01 kgm^{-1}$, clamped at its ends is given by $Y_{x,t} = 0.03 \sin\left(\dfrac{2\pi x}{3}\right)\cos(60\pi t)$, where x and y arein metres and time t is in seconds . Tension in the string is

A. 9 N

B. 36 N

C. 162 N

D. 81 N

Answer: D

11. A girl of mass 50 kg swinging on a cardle. If she moves with a velocity of $2ms^{-1}$ upwards in a direction making an angle $60°$

with the vertical, then the power generated is $\left(g = 9.\,8ms^{-2}\right)$

A. 245 W

B. $490\sqrt{2}W$

C. $490\sqrt{3}W$

D. 980 W

Answer: C

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12. Two point surces S_1 and S_2 are 24 cm apart. Where should a convex lens of focal length 9 cm be placed them , so that the images of both sources are formed at the same place ?

A. 8 cm

B. 12 cm

C. 6 cm

D. 10cm

Answer: B

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13. Assertion (A) It is more difficult to push a magnet into a coil with more number of turns.

Reasong (R) The emfincuced in a coil opposes the motion of a magnet when it is moved towards the coil .

A. A is false , R is ture

B. Both A and R are true. R is correct explanation of A

C. A is ture, R is false

D. Both A and R are true. R is not correct explanation of A

Answer: B

14. A wall is made of equally thick layers P and Q of different materials. Thermal conductivity of Q is half of that of the P . In the steady state , If the temperature difference across the wall is $24°C$, then the temperature difference across the layer 'P' is ....

    A. $12°C$

    B. $16°C$

    C. $4°C$

    D. $8°C$

Answer: D

15. In the determination of the internal resistance of a cell with a potentiometer, the error in the measurement of the balancing length is ± 1 m m . When the cell alone is connected in the circuit, the balancing length is obtained at 60 cm and when the cell is shunted with a resistance of $10\Omega \pm 2\%$, the balancing length is ovtained at 50 cm. The error int he determination of The internal resistance of the cell is ....

A. 2.4 %

B. 4.2%

C. 1.8%

D. 5.6%

Answer: B

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16. The half life of a stream of radioactive particles moving along as straight path with a constant kinetic energy of 4 eV is 1 minute. The percentage of particles which decay before travelling a distance of 3.6 km is (Mass of the radioactive particles $= 3.2 \times 10^{-21}$ kg and charge of the electron $= 1.6 \times 10^{-19} C$).

A. 87.5

B. 175

C. 37.5

D. 75

Answer: A

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17. The process of recovering the modulating signal from the modulated carrier wave is called

    A. amplification

    B. detection

    C. rectification

    D. noise

Answer: B

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18. Two bodies of masses 4m and 9m are seperated by distance 'r' . The gravitational potential at a point on this line joining them where the gravitational field becomes zero is

A. $\dfrac{-25Gm}{r}$

B. $\dfrac{-4Gm}{r}$
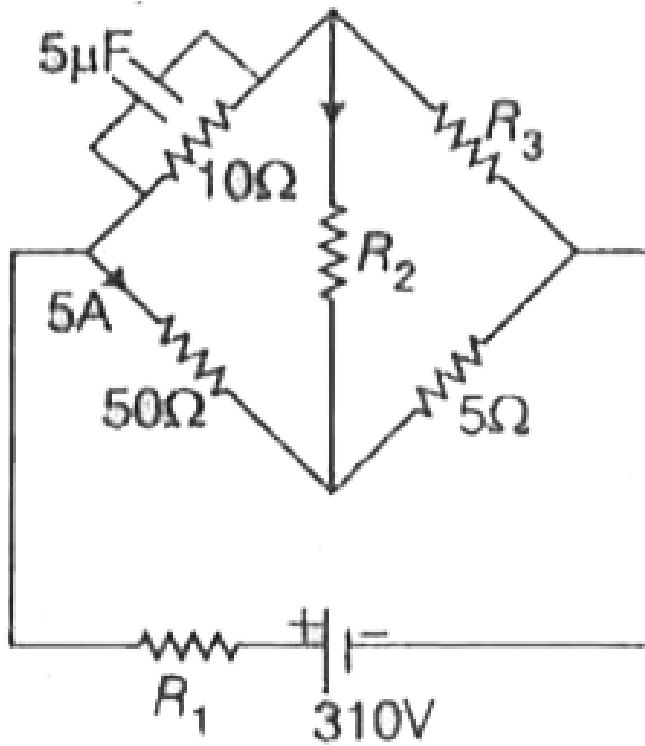
C. $\dfrac{-9Gm}{r}$

D. $\dfrac{-13Gm}{r}$

Answer: A

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19. If the charge on the capacitor is 1 mC in the given circuit, then $\dfrac{R_1 R_2}{R_3} = \ldots\ldots \Omega$.

A. 6

B. 0. 4

C. 0. 6

D. 10

Answer: C

20. The amplitude of electric field in an electromagnetic wave is

$60Vm^{-1}$. Then the amplitude of magnetic field is

A. $2 \times 10^{-7}T$

B. $2 \times 10^{7}T$

C. $6 \times 10^{7}T$

D. $6 \times 10^{-7}T$

Answer: A

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21. A bird is tossing (flying to and pro) between two cars moving

towards each other on a straight road. One car has speed of

$54 kmh^{-1}$ while the other has the speed of $36 kmh^{-1}$. The bird starts moving from first can towards the other and is moving with the speed of $36 kmh^{-1}$ where the two cars were separated by 36 km . The total distance covered by the bird before the cars meet each other is

A. 14400 m

B. 1440 m

C. 244 m

D. 24400 m

Answer: A

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22. If the average translational kinetic energy of molecule in a gas is equal to the kinetic energy of an electron acceleration

from rest through 10 V , then the temperature of the gas molecule is

(Boltzmann constant $= 1.38 \times 10^{-23} JK^{-1}$)

A. $7.73 \times 10^{23} K$

B. $730K$

C. 737 K

D. $77.3 \times 10^3 K$

Answer: D

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23. A closed organ pipe of length 'L' and an open organ pipe contain gases of densities $\rho(1)$ and ρ_2 respectively . The compressibility of gases are equal in both the pipes . If the

frequencies of their first overtones are same then, the length of the open organ pipe is

A. $\dfrac{4L}{3}\sqrt{\dfrac{\rho_2}{\rho_1}}$

B. $\dfrac{4L}{3}\sqrt{\dfrac{\rho_1}{\rho_2}}$

C. $\dfrac{4L}{3}$

D. $\dfrac{L}{3}$

Answer: B

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24. One mole of a gas expands such that its volume 'v' changes with absolute temperature 'T' in accordance with the ralation $V = HT^2$ where 'K' is a constant . If the temperature of the gas changes by $60°C$, then work done by the gas is (R is universal gas constant) .

A. KRln 60

B. Rin 60

C. 40 KR

D. 120 R

Answer: D

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25. When a coil is connected to AC supply of frequency 50 Hz , current of 4 A flows in it and it consumes 240 w power . If the potential difference across the coil is 100v . Then the inductance value of the coil is

A. $L = (5\pi)H$

B. $L = \dfrac{\pi}{5}H$

C. $L = \dfrac{1}{5\pi}H$

D. $L = \dfrac{1}{25\pi}H$

Answer: C

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26. The uniform electric field intensity between the two plates of a parallel plate capacitor is $1 \times 10^3 Vm^{-1}$ acting vertically upwards as shown in the figure.

The plates are sufficiently long and have separation 2 cm. A particle of negative charge $1\mu C$ and mass 2 g is projected at an angle $45°$ with the electric field from the lower plate with a velocity 'u' . The maximum velocity acquired by the particle , if it

is not hit the upper plate is
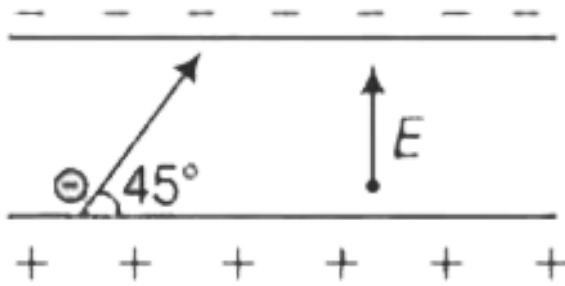
A. $2ms^{-1}$

B. $1ms^{-1}$

C. $0.1ms^{-1}$

D. $0.2ms^{-1}$

Answer: D

27. Both an electron and a photon have same de-Broglie wavelength of $1.2\,\text{Å}$. The ratio of their energies is nearly

A. $1:100$

B. $1:10$

C. $1:1000$

D. $1:1$

Answer: A

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28. When the terminals of a cells are connected by a wire of resistance 4Ω, the potential difference across the cell is 1.6 V. If a wire of the same resistance is connected in parallel with the

first, the potential difference becomes 1.33 v . The emf and internal resistance of the cell are respectively

A. $1V$, 1Ω

B. $2V$, 1Ω

C. $1V$, 2Ω

D. $2V$, 2Ω

Answer: B

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29. Two concentric coils of 20 turns each are placed in same plane. Their radii are 30 cm and 60 cma nd carry 0.4 A and 0.6 currents respectively in opposite directions. The magnetic induction at the centre in tesla is .....

A. $\dfrac{8}{3}\mu_0$

B. $\dfrac{2}{3}\mu_0$

C. $\dfrac{5}{3}\mu_0$

D. $\dfrac{10}{3}\mu_0$

Answer: D

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30. Time period of a simple pendulum of length 'L' is T_1 . Time period of a uniform rod of same length 'L' suspended from one end and oscillating in a vertical plane is T_2 . Amplitude of oscillation is small in both the cases . Them $\dfrac{T_1}{T_2}$ is

A. $\sqrt{\dfrac{2}{3}}$

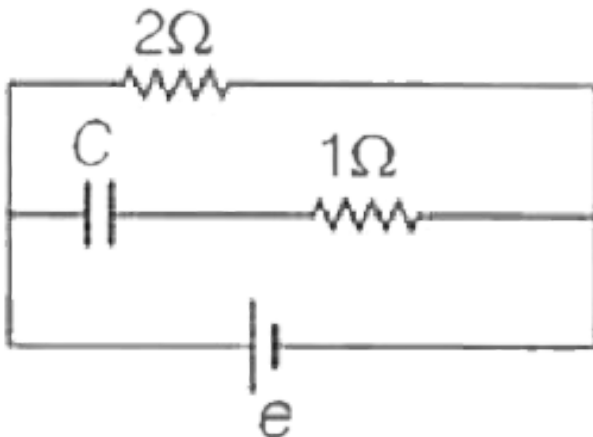B. $\sqrt{\dfrac{3}{2}}$

C. $\sqrt{\dfrac{4}{3}}$

D. 1

Answer: B

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31. In steady state,a capacitor of capacitance $2\mu F$ is charged to $4\mu C$, as shown in figure. If the internal resistance of the cell is 0.5Ω , then the emf of the cell is
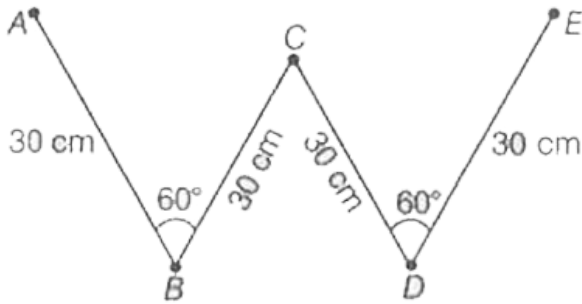
A. 4V

B. 5 V

C. 2 . 5 V

D. 2 V

Answer: C

32. A uniform thin rod of 120 cm length and 1600 g mass is bent as shown in the figure. The moment of inertia of the bent rod about and axis passing through the point 'O' and perpendicular
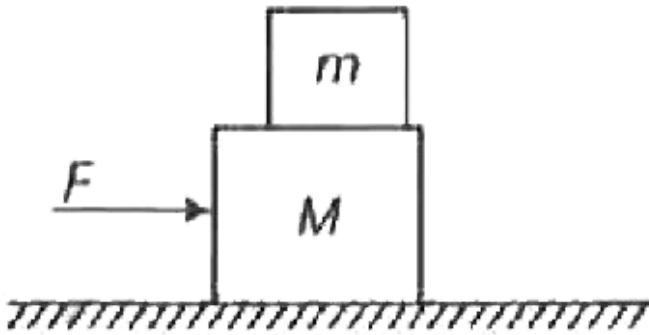
to the plane of the paper is ...... $kg - m^2$.

A. 0 . 084

B. 0 . 360

C. 0 . 018

D. 0 . 120

Answer: A

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33. Two block of masses 'M' and 'm' are placed on one another on a smoothe horizontal surface as shown in the figure.

The force 'F' is acting on the mass 'M' horizontally during time intervel 't' Assuming no relative sliding between the blocks, the work done by friction on the blocks is . . . . .

A. $\dfrac{Ft}{2(M+m)}$

B. $\dfrac{M+m}{mt^2}$

C. $\dfrac{mF^2t^2}{2(M+m)^2}$

D. $\dfrac{F^2t^2}{(M+m)}$

Answer: C

34. A solid sphere is projected up along an inclined plane of inclination $30°$ with the horizontal with a speed of $4ms^{-1}$. If it rolls without slipping , the maximum distance traversed by it is . .. .. . $\left(g = 10ms^{-2}\right)$

A. $2.24m$

B. 112 m

C. 1 . 12 m

D. 22.4 m

Answer: A

35. Fully filled open water tank has two holes on either sides of its walls. One is a square hole of side x cm at a depth of 2 m from the top, and the other hole is equilateral triangle of side 4 cm at a depth of 6 m from the top. If the rate of flow of water is same from both the holes, then 'x' is

    A. 1 . 73 cm

    B. 12 cm

    C. 6 . 92 cm

    D. 3 . 46 cm

Answer: A

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36. The radius of orbit of an electron and the speed of electron in the ground state of hydrogen atom are $5.5 \times 10^{-11}m$ and $4 \times 10^6 ms^{-1}$ respectivley . Then , the orbital period of this electron in the first excited state will be . . . . . .

    A. $6.908 \times 10^{-6}s$

    B. $9.608 \times 10^{-16}s$

    C. $7.806 \times 10^{-16}s$

    D. $8.9068 \times 10^{-16}s$

Answer: A

37. Two slits separated by 0 . 5 mm are illuminated by light of wavelength 500 nm . The screen is at a distance of 120 cm from the slits . The phase difference between the interfering waves at a point 3 mm on the screen from the central bright fringe is . . . . .
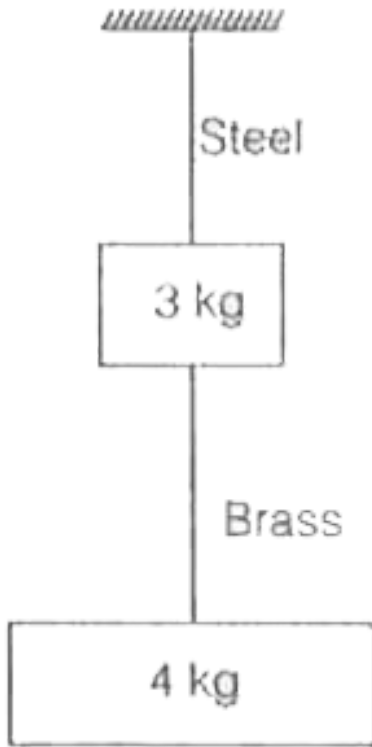
A. 5π

B. π

C. 3π

D. 7π

Answer: A

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38. The ratios of length areas of cross-section and Young's modulii of steel of that of brass wires shown in the figure are a,b

and c respectively . The ratio of increase in the lengths of brass

of that of steel wires is [Assume that the masses of steel and

brass wires are negligible]

Steel

3 kg

Brass

4 kg

A. $\dfrac{4a}{7bc}$

B. $\dfrac{7bc}{4a}$

C. $\dfrac{4bc}{7a}$

D. $\dfrac{7a}{4bc}$

Answer: C

39. A person of 60 kg mass is in a lift which is coming down such that the man exerts a force of 150 N on the floor of the lift. Then the accelaration of the lift is $\left(g = 10ms^{-2} \right)$

    A. $7.\,7ms^{-2}$

    B. $40.\,0ms^{-2}$

    C. $22.5ms^{-2}$

    D. $15.\,0ms^{-2}$

Answer: A

40. Match the following

List - I	List-II
(a) High retentivity	(i) Telephone diaphram
(b) High resistivity	(ii) Diamagnet
(c) Low coercivity	(iii) To decrease eddy current losses
(d) Negative susceptibility	(iv) Permanent magnet

A. a - (i), b- (iv), c- (iii), d-(ii)

B. a- (iv), b-(iii), c-(i), d-(ii)

C. a-(i), b-(ii), c-(iii), d-(iv)

D. a-(iv, b-(ii), c-(i), d-(iii)

Answer: B

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