PHYSICS

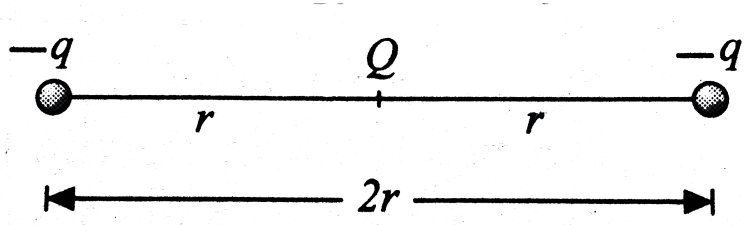
BOOKS - NTA MOCK TESTS

NEET MOCK TEST 18

Physics

1. Charges $-q, Q,$ and $-q$ are placed at an equal distance on a straight line. If the total potential energy of the system of three

charges is zero, then find the ratio Q/q.



A. $1:1$

B. $1:2$

C. $1:3$

D. $1:4$

Answer: D

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2. If an alpha particle and a proton are accelerated from rest by a potential difference of 1MeV, then the ratio of their kinetic energies will be

A. 3

B. 1

C. 2

D. 4

Answer: C

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3. A thin spherical conducting shell of radius R has a charge q. Another charge Q is placed at the centre of the shell. The electrostatic potential at a point P a distance $\frac{R}{2}$ from the centre of the shell is

A. $\frac{2Q}{4\pi\varepsilon_0 R} - \frac{2q}{4\pi\varepsilon_0 R}$

B. $\frac{2Q}{4\pi\varepsilon_0 R} - \frac{q}{4\pi\varepsilon_0 R}$

C. $\frac{(q+Q)}{4\pi\varepsilon_0}\frac{2}{R}$

D. $\frac{2Q}{4\pi\varepsilon_0 R}$

Answer: B

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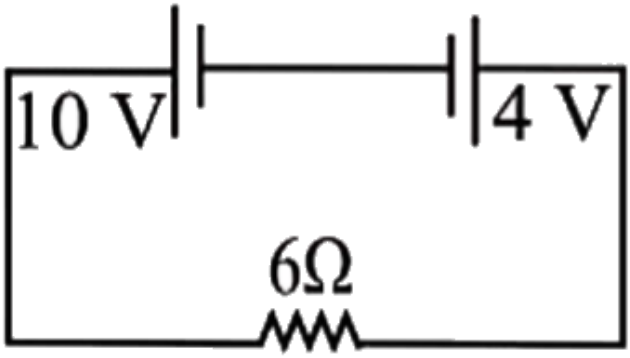
4. The power consumed by the 4 V battery is



A. 4 W

B. 8 W

C. 7 W

D. Cannot be calculated

Answer: A

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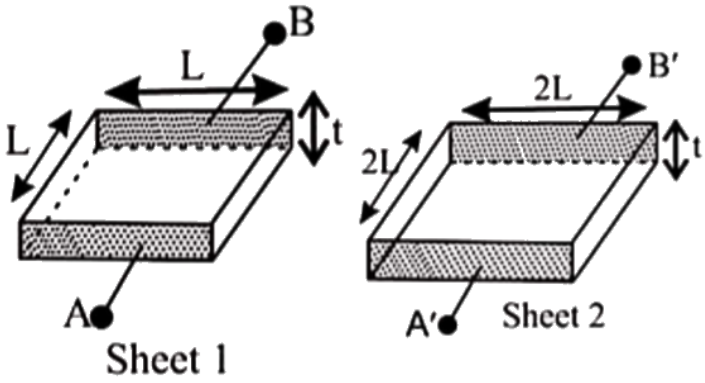
5. The resistance of metal sheet 1 between A and B is R_1 and the resistance of sheet 2 between A' and B' is R_2. The value of the ratio

$\frac{R_1}{R_2}$ is



A. 1

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

C. 2

D. 4

Answer: A

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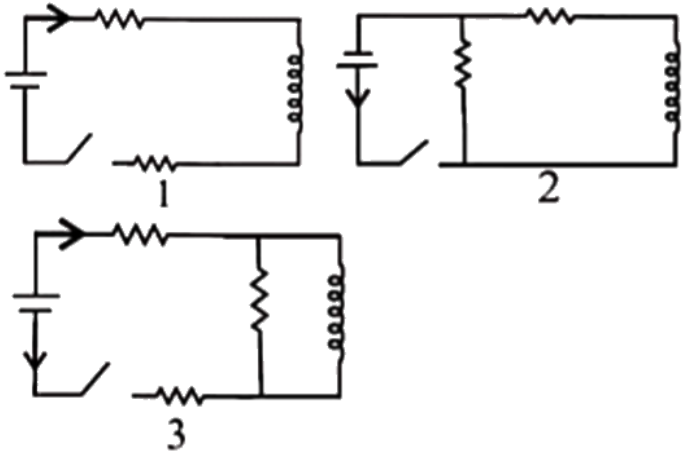
6. The figure shows three circuits with identical batteries, inductors and resistance . Rank the circuits in decreasing order, according to the current through the battery just after the switch is closed



A. $i_2 > i_3 > i_1$

B. $i_2 > i_1 > i_3$

C. $i_1 > i_2 > i_3$

D. $i_1 > i_3 > i_2$

Answer: A

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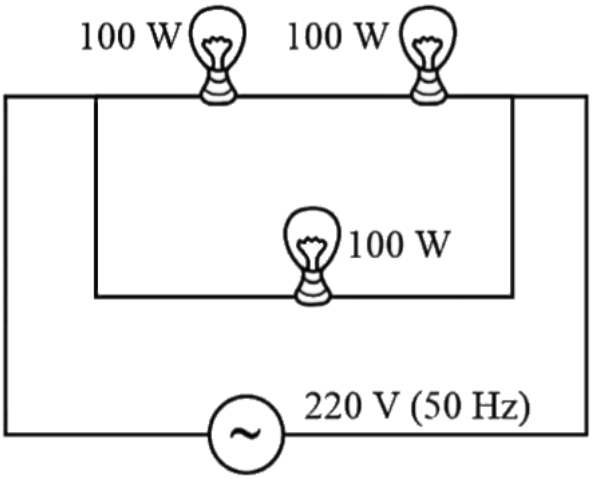
7. In the arrangement of 3 bulbs of 100 W each as shown in the figure, total power

consumption will be



A. 300 W

B. 50 W

C. 150 W

D. 25 W

Answer: C

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8. A flux of $10^{-3}Wb$ passes through a strip having an area $A = 0.02m^2$. The plane of the strip is at an angle of 60° to be direction of a uniform field B. The value of B is

A. 0.1 T

B. 0.058 T

C. 4.0 mT

D. None of the above

Answer: B

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9. A dip needle vibrates in the vertical plane perpendicular to the magnetic meridian. The time period of vibration is found to be 2 sec. The same needle is then allowed to vibrate in the horizontal plane and the time period is again found to be 2 seconds. Then the angle of dip is

A. 0°

B. 30°

C. 45°

D. 90°

Answer: C

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10. A square conducting loop of side length L carries a current I.The magnetic field at the centre of the loop is (dependence on L)

A. independent of L

B. proportional to L^2

C. inversely proportional to L

D. linearly proportional to L

Answer: C

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11. If the de-Broglie wavelength is λ_0 for protons accelerated through 100 V, then the

de-Broglie wavelength for alpha particles accelerated through the same voltage will be

A. λ_0

B. $\frac{\lambda_0}{2}$

C. (lambda_0)/(2sqrt2)`

D. none of these

Answer: C

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12. Two photons having

A. equal wavelengths have equal linear momenta

B. equal energies have equal linear momenta

C. equal frequencies have equal linear momenta

D. equal linear momenta have equal wavelengths

Answer: D

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13. Heavy water is used as moderator in a nuclear reactor. The function of the moderator is

A. to control the energy released in the rector

B. to absorb neutrons and stop chain reaction

C. to cool the factor reactor

D. to slow down the neutrons to thermal energies

Answer: D

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14. The half life period of a radioactive substance is 140 days. After how much time, 15 g will decay from a 16 g sample of the substance?

A. 140 days

B. 560 days

C. 420 days

D. 280 days

Answer: B

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15. 300 grams of water at $25^{\circ}C$ is added to 100 grams of ice at $0^{\circ}C$. The final temperature of the mixture is _____ $\hat{}$ $\circ C$

A. $-\frac{5}{3}.^{\circ} C$

B. $-\frac{5}{4}.^{\circ} C$

C. $-5.^{\circ} C$

D. $-0.^{\circ} C$

Answer: D

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16. A polished metal plate with a rough black spot on it is heated to about $1400K$ and quickly taken into dark room Then .

A. in comparison with the plate, the spot will shine more

B. in comparison with the plate, the spot will appear more black

C. the spot and the plate will be equally bright

D. the plate and the black spot cannot be seen in the dark room

Answer: A

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17. The temperature gradient in a rod of $0.5m$ length is $80^\circ C/m$. It the temperature of hotter end of the rod is $30^\circ C$, then the temperature of the cooler end is

A. $40^\circ C$

B. $-10^\circ C$

C. $10^\circ C$

D. $0^\circ C$

Answer: B

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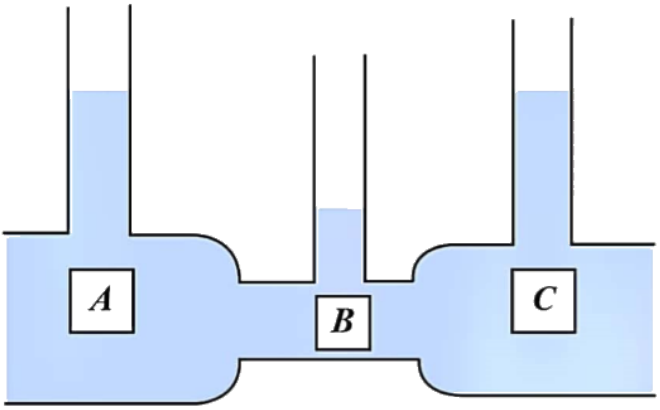
18. A non-viscous liquid is flowing through a horizontal pipe as shown in the figure. Three tube A,B and C are connected to the pipe. The radii of the tubes A, B and C at the junction are 2 cm, 1 cm and 2 cm respectively. It can be

said that the



A. height of the liquid in the tube A is maximum

B. height of the liquid in the tubes A and B is the same

C. height of the liquid in all the three tubes is the same

D. height of the liquid in the tubes A and C is the same

Answer: D

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19. An object will continue moving uniformly until

A. the resultant force acting on it begins to decrease

B. the resultant force on it is zero

C. the resultant force is at right angle to its rotation

D. the resultant force on it is increased continuously

Answer: B

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20. A gas in an airtight container is heated from $25^\circ C$ to $90^\circ C$. The density of gas will

A. increase slightly

B. increase considerably

C. remain the same

D. decrease slightly

Answer: C

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21. If two tuning fork A and B are sounded together they produce 4 beats per second. A is then slightly loaded with wax, they produce 2 beats when sounded again. The frequency of A is 256. The frequency of B will be

A. 250

B. 252

C. 260

D. 262

Answer: B

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22. The superposition takes place between two waves of frequency f and amplitude a . The total intensity is directly proportional to

A. a

B. 2a

C. $2a^2$

D. $4a^2$

Answer: D

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23. Which one of the following is a simple harmonic motion

A. wave moving through a string fixed at both ends

B. earth spinning about its own axis

C. ball bouncing between two rigid vertical walls

D. particle moving in a circle with uniform speed

Answer: A

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24. Two rectangular blocks A and B of different metals have same length and same area of cross-section. They are kept in such a way that their cross-sectional area touch each other. The temperature at one end of A is $100^{\circ}C$ and

B at the other end is $0^\circ C$. If the ratio of their thermal conductivity is $1:3$, then under steady state, the temperature of the junction in contact will be

A. $25^\circ C$

B. $50^\circ C$

C. $75^\circ C$

D. $100^\circ C$

Answer: A

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25. Equal molecules of two gases are in thermal equilibrium. If P_a, P_b and V_a, V_b are their respective pressures and volumes, then which of the following relation is true?

A. $P_a \neq P_b, V_a = V_b$

B. $P_a = P_b, V_a \neq V_b$

C. $\frac{P_a}{V_a} = \frac{P_b}{V_b}$

D. $P_a V_a = P_b V_b$

Answer: D

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26. A uniform metal rod is used as a bar pendulum. If the room temperature rises by $10^{\circ}C$, and the coefficient of linear expansion of the metal of the rod is $2 \times 10^{-6} per^{\circ} C$, the period of the pendulum will have percentage increase of

A. -2×10^{-3}

B. -1×10^{-3}

C. 2×10^{-3}

D. 1×10^{-3}

Answer: D

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27. Equal masses of water and a liquid of density 2g/cm3 are mixed together. The density of mixture is:

A. $\frac{2}{3} g/cc$

B. $\frac{4}{3} g/cc$

C. $\frac{3}{2} g / cc$

D. $3 g / cc$

Answer: B

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28. Force necessary to pull a circular plate of 5 cm radius from water surface for which surface tension is 75 dynes/cm, is

A. 30 dynes

B. 60 dynes

C. 750 dynes

D. 750π dynes

Answer: D

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29. When a certain weight is suspended from a long uniform wire, its length increases by $1cm$. If the same weight is suspended from another wire of the same material and length but

having a diameter half of the first one, the increases in length will be

A. 0.5 cm

B. 2 cm

C. 4 cm

D. 8 cm

Answer: C

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30. The mass and diameter of a planet have twice the value of the corresponding parameters of earth. Acceleration due to gravity on the surface of the planet is

A. $9.8ms^{-2}$

B. $4.9ms^{-2}$

C. $980ms^{-2}$

D. $19.6ms^{-2}$

Answer: B

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31. A force acts on a 3.0 gm particle in such a way that the position of the particle as a function of time is given by $x = 3t - 4t^2 + t^3$, where xx is in metres and t is in seconds. The work done during the first 4 seconds is

A. 5.28 J

B. 450 mJ

C. 490 mJ

D. 530 mJ

Answer: A

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32. A pulley fixed to the ceiling carries a string with blocks of mass m and $3m$ attached to its ends. The masses of string and pulley are negligible .When the system is released, its center of mass moves with what acceleration

A. g

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

C. $\frac{g}{4}$

D. zero

Answer: C

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33. A body of mass m collides against a wall with the velocity v and rebounds with the same speed. Its magnitude of change of momentum is

A. 2 m v

B. m v

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

D. 0

Answer: A

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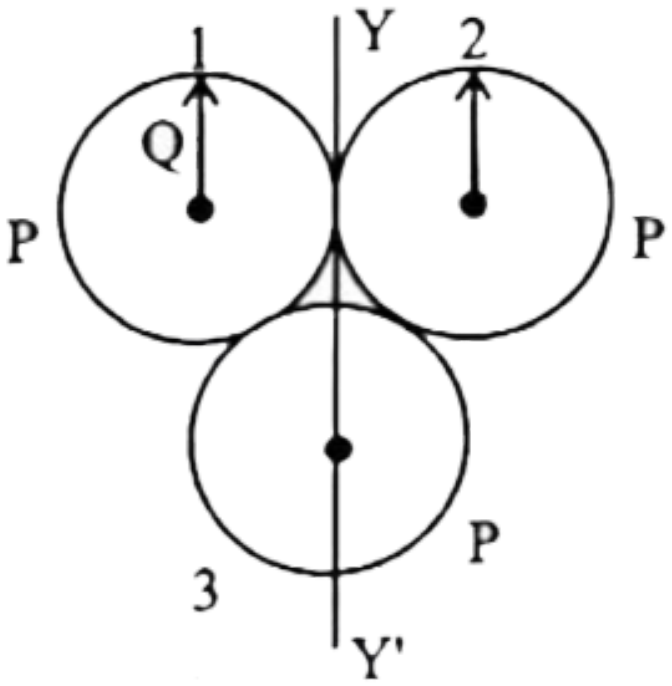
34. Three rings, each of mass P and radius Q are arranged as shown in the figure. The moment of inertia of the arrangement about

YY' axis will be



A. $\frac{7}{2}PQ^2$

B. $\frac{2}{7}PQ^2$

C. $\frac{2}{5}PQ^2$

D. $\frac{5}{2}PQ^2$

Answer: A

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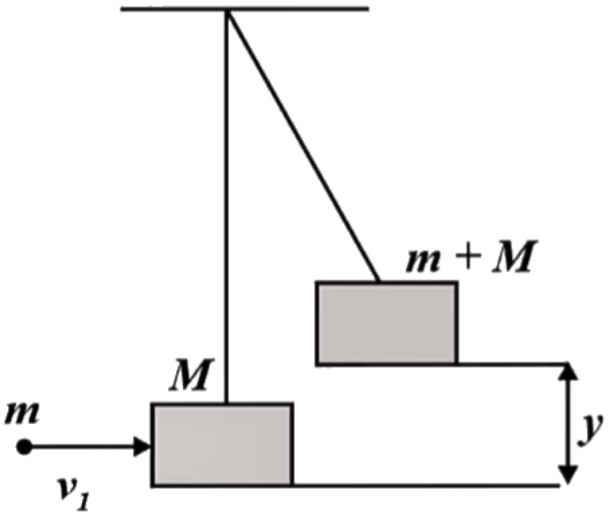
35. A bullet of mass m moving with velocity v_1 strikes a suspended wooden block of mass M as shown in the figure and sticks to it. If the block rises to a height y. the initial of the

bullet is



A. $v_1 = \dfrac{m+M}{m}\sqrt{2gy}$

B. $v_1 = \sqrt{2gy}$

C. $v_1 = \dfrac{M+m}{M}\sqrt{2gy}$

D. $v_1 = \dfrac{m}{m+M}\sqrt{2gy}$

Answer: A

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36. A particle is moving on a circular path with constant speed, then its acceleration will be

A. magnitude

B. direction

C. both magnitude and direction

D. neither magnitude nor direction

Answer: A

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37. Check up only the correct statement in the following.

A. a body has a constant velocity and still it can have a varying speed

B. a body has a constant speed but is can have a varying velocity

C. a body has a constant speed cannot have any acceleration

D. a body in motion under a force acting upon it must always have work done upon it

Answer: B

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38. The force required to row a boat over the sea is proportional to the speed of the boat. It is found that it takes 24 h.p. to row a certain boat at a speed of 8km/hr, the horse power required when speed is doubled -

A. 12 hp

B. 48 hp

C. 96 hp

D. 192 hp

Answer: D

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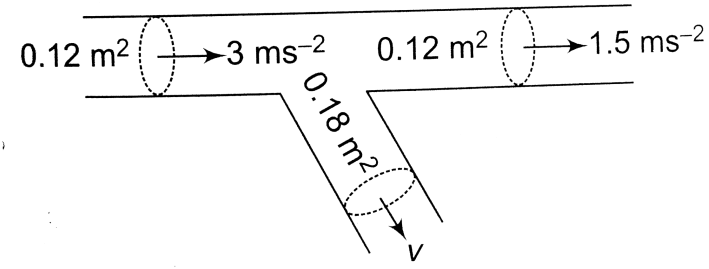
39. An incompressible liquid travels as shown in fig. The speed of the liquid branch will be



A. $1.0ms^{-1}$

B. $1.5ms^{-1}$

C. $2.5ms^{-1}$

D. $3.0ms^{-1}$

Answer: A

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40. A Newtonian fluid fills the clearance between a shaft and a sleeve. When a force of 800 N is applied to the shaft, parallel to the sleeve, the shaft attains a speed of $2cms^{-1}$. If a force of 2.4 kN is applied instead, the shaft would move with a speed of

A. $2cms^{-1}$

B. $15cms^{-1}$

C. $6cms^{-1}$

D. none of these

Answer: C

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41. The magnitude of electric field intensity at point $B(2, 0, 0)$ due to dipole of dipole moment, $\overrightarrow{p} = \hat{i} + \sqrt{3}\hat{j}$ kept at origin is

(assume that the point B is at large distance from the dipole and $k = \frac{1}{4\pi\varepsilon_0}$)

A. $\frac{\sqrt{13}K}{8}$

B. $\frac{\sqrt{13}K}{4}$

C. $\frac{\sqrt{7}K}{8}$

D. $\frac{\sqrt{7}K}{4}$

Answer: C

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42. A particle of mass m is moving in a potential well, for which the potential energy is given by $U(x) = U_0(1 - \cos ax)$ where U_0 and a are positive constants. Then (for the small value of x)

A. `2pisqrt((U_0)/(ma^2))

B. $2\pi\sqrt{\frac{mU_0}{a^2}}$

C. $2\pi\sqrt{\frac{a^2}{mU_0}}$

D. $2\pi\sqrt{\frac{m}{U_0a^2}}$

Answer: D

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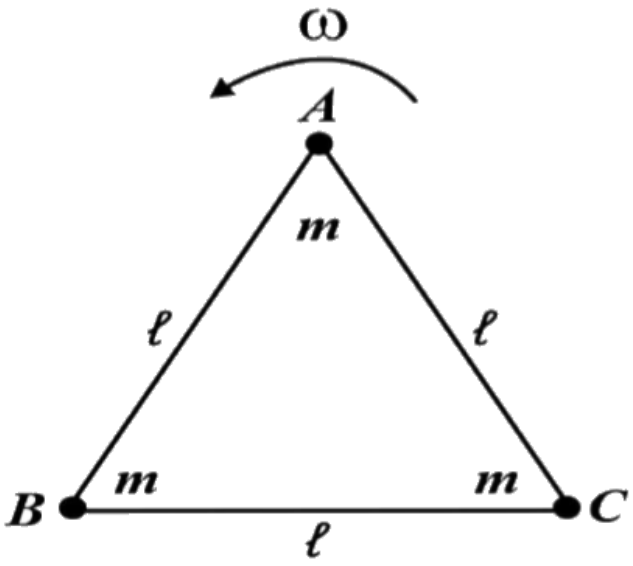
43. An equilateral triangular frame is made of three thin massless rods. Three point masses of mass m each are fixed at vertices of the frame as shown. The system is rotated with uniform angular speed ω about a fixed axis passing through A and normal to the plane of triangular frame. Neglect the effect of gravity.

The tension in rod connecting mass B and C is



A. $m\omega^2 l$

B. $\frac{m\omega^2 l}{2}$

C. $\frac{\sqrt{3}}{2} m\omega^2 l$

D. zero

Answer: D

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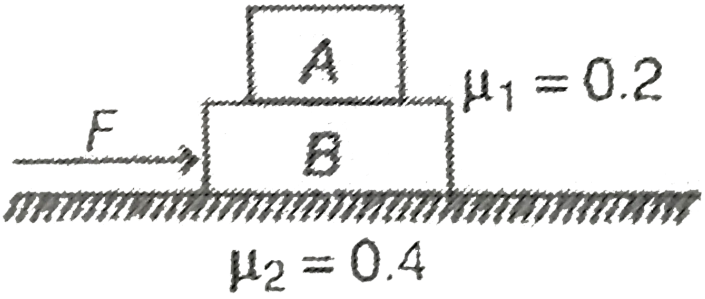
44. In the figure, $m_A = 2kg$ and $m_B = 4kg$. For what minimum value of F,A starts slipping over B? $\left(g = 10m/s^2\right)$



A. 24 N

B. 36 N

C. 12 N

D. 20 N

Answer: B

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45. In an α -decay, the kinetic energy of α-particles is $48MeV$ and Q value of the reaction is $50MeV$. The mass number of the

mother nucleus is (assume that daughter nucleus is in ground state)

A. 96

B. 100

C. 104

D. none of these

Answer: B

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