

Second Term Test - 2022

Grade 12

Physics I

Time : 2 Hrs

Answer all the questions.

(1) SI unit of luminous intensity,

- 1) Weber 2) Tesla 3) Candela 4) Bequerrel 5) Farad

* (2) A boat which is moving at speed V in stationary water is ridden across the river flowing at speed u . Banks of the river are parallel and ~~speed at the river~~ W . The minimum time taken to cross the river depends,

- (A) On V . ✓
(B) On u . ✓
(C) On W . ✓ True statement,
1) Only (A) 2) Only (A) and (B) 3) Only (A) and (C)
4) Only (B) and (C) 5) All (A) (B) and (C)

(3) Unit of the physical quantity given by dividing force by time,

- 1) J 2) W 3) Pa 4) N 5) kg

* (4) When a projectile reaches its maximum height under the gravity,

- (A) No acceleration on it. ✗
(B) Maximum force on it. ✗
(C) It has minimum Kinetic energy. ✓

True statement,

- 1) Only (A) 2) Only (B) 3) Only (C)
4) Only (B) and (C) 5) All (A), (B) and (C)

* (5) When an object is released at rest from the top of a smooth inclined plane, it comes to the bottom within 1s. When this object is projected up along the plane. It returns back to initial point within 1s distance travelled by the object in the second case,

- 1) 0.125 m 2) 0.25 m 3) 0.5 m 4) 0.75 m 5) 1.0 m

(6) Dimension of density and velocity are D and V . The dimension of pressure,

- 1) DV 2) DV^2 3) DV^{-1} 4) DV^{-2} 5) VD^{-1}

(7) Two children are moving towards each other at steady velocities.

- (A) Relative velocities both as how they observe are same.
(B) Magnitudes of momentum of both as how they observe are same.
(C) magnitude of kinetic energy of both as how they observe are same.

True statement,

- 1) Only (A) 2) Only (B) 3) Only (C)
4) Only (B) and (C) 5) (A), (B) and (C)

(8) Relationship among acceleration a , time t and displacement S is $S = ka^xt^y$, Values of x and y ,

- 1) 1, 2 2) 2, 1 3) 1, 1 4) 2, 2 5) 1, 1/2

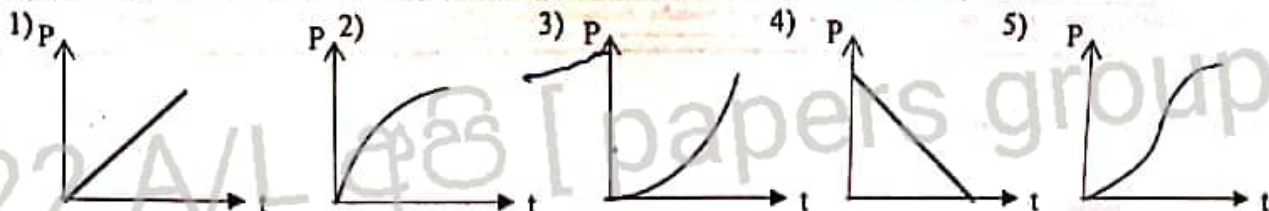
(9) Addition of two equal vectors is $2R$ and difference of two equal vectors is R . The angle between two vectors,

- 1) 30° 2) 60° 3) 120° 4) $2 \tan^{-1}(1/2)$ 5) $2 \tan^{-1}(2)$

(10) Object falling freely under the gravity covers distance h_1 in first second and distance h_2 in last second if $h_2 = 5h_1$, what is the total displacement of object?

- 1) 25 m 2) 30 m 3) 45 m 4) 55 m 5) 60 m

(11) What is the correct variation of momentum, with time t , for an object falling freely.



(12) When internal diameter and external diameter of a test tube are measured by same vernier caliper,

- A) Fractional errors can be difference. ✓
B) Maximum error can be difference. ✗
C) Zero error can be difference. ✗

True statement,

- 1) Only (A) 2) Only (B) 3) Only (C)
4) Only (B) and (C) 5) All (A), (B) and (C)

3) Only (C)

(13) A bicycle starts its motion at rest and moves at steady 1 ms^{-2} acceleration. After two seconds second bicycle starts at rest from same point follows 1^{st} bicycle at steady 4 ms^{-2} acceleration. What is the displacement of two bicycles, when second bicycle passes the 1^{st} .

- 1) 16 m 2) 12 m 3) 8 m 4) 4 m 5) 2 m

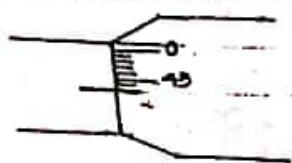
(14) There are three equal coplaner vectors, sum of those three vectors equals to one of a vector.

- A) Two vectors should be perpendicular. ✓
B) Two vectors should be parallel. ✗
C) Addition of two vectors should be greater than other vector. ✗

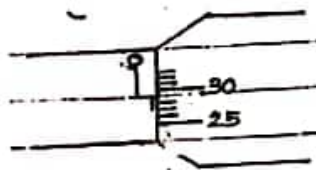
True statement,

- 1) Only (A) 2) Only (B) 3) Only (A) and (B)
4) Only (A) and (C) 5) All (A), (B) and (C)

(15) When anvil touches spindle and when a micrometer screw gauge is used to measure diameter of a cable scales are given in figure 1 and 2 respectively.



0.03



29×0.01

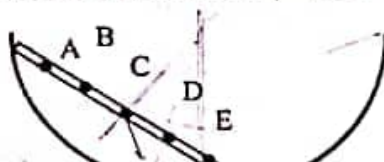
0.29

Diameter of the cable,

- 1) 0.72 mm 2) 0.76 mm 3) 0.85 mm 4) 0.86 mm 5) 1.22 mm

(16) As shown in figure, a non uniform rod is placed in a smooth hemispherical bowl. The center of gravity is,

- 1) A 2) B
3) C 4) D
5) E

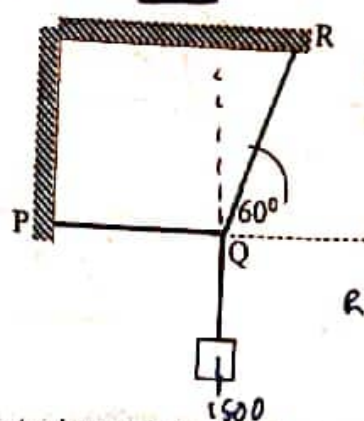


- (17) Single force which can be applied for two forces 5N, 15N.
 1) 2 N 2) 8 N 3) 12 N 4) 25 N 5) 30 N

- (18) Using two massless ropes PQ and QR an object of mass 150kg is hung. Tensions in PQ and QR respectively,

- 1) 865 N, 1700 N
 2) 800 N, 1700 N
 3) 865 N, 1730 N
 4) 800 N, 1730 N
 5) 900 N, 1730 N

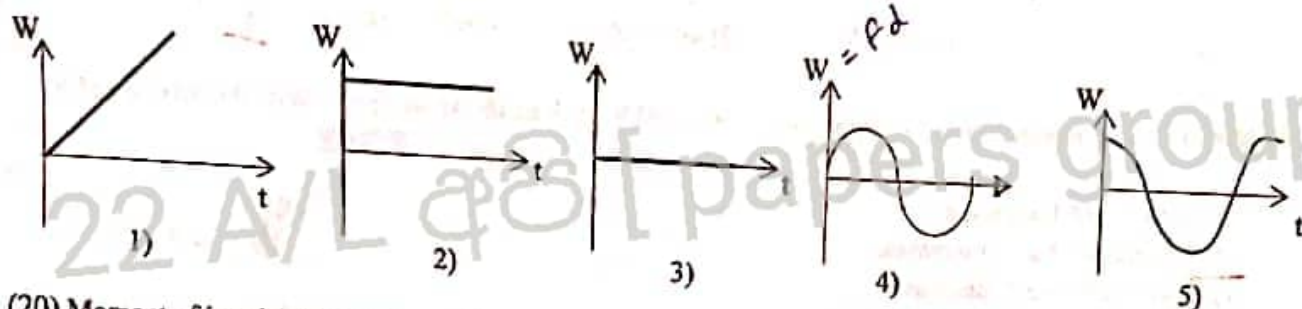
$$\begin{aligned} 865 &= 1700 \times \frac{1}{2} \\ 865 &= 850 \\ 1730 &= 1700 \times \frac{1}{2} \\ 1730 &= 850 \end{aligned}$$



$$\begin{aligned} R \sin 60 &= 1500 \\ R &= \frac{1500 \times 2}{\sqrt{3}} \\ &= 1730 \end{aligned}$$

$$R \cos 60 = P$$

- (19) A particle of mass m is moving along a circular track of radius r at steady speed. What is the correct variation of workdone with time?



- (20) Moment of inertia of a rotating body.

- (A) Depends on mass. ✓
 (B) Depends on distribution of mass. ✓
 (C) Depends on rotating axis.

$$I = mr^2$$

True statement,

- 1) Only (A) and (B)

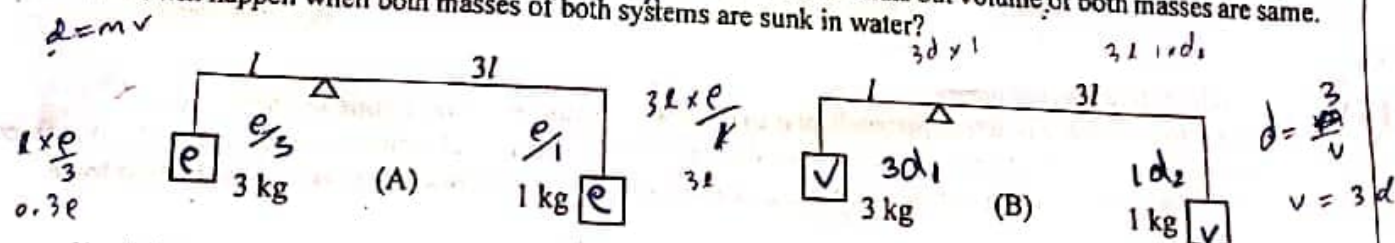
- 4) All (A), (B) and (C)

- 2) Only (B) and (C)

- 5) All are incorrect.

- 3) Only (A) and (C)

- (21) On system A and system B two masses 3kg and 1kg are hung by using a uniform rod, as shown in figure. On the system A both masses are made by using two different materials but volume of both masses are same. What will happen when both masses of both systems are sunk in water?



- 1) A is in equilibrium but left hand side of B goes up.
 2) A is in equilibrium but right hand side of B goes up.
 3) B is in equilibrium but left hand side of A goes up.
 4) B is in equilibrium but right hand side of A goes up.
 5) Both A and B are in equilibrium.

- (22) When an oscillator is subjected to oscillations under a harmonic force. Resonance occurs,
 (A) When frequency of periodic force equals to frequency of oscillator. ✓
 (B) When energy of the oscillator is maximum.
 (C) When amplitude of periodic force equal to the amplitude of oscillator. ✗

True statement,

- 1) Only (A)

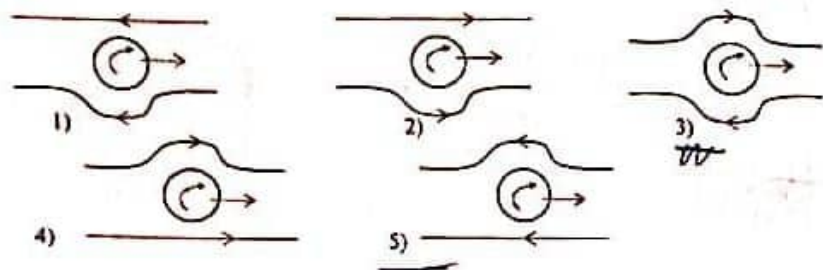
- 4) Only (A) and (B)

- 2) Only (B)

- 5) Only (A) and (C)

- 3) Only (C)

- (23) A cricket ball is moving horizontally spinning in stationary air. The correct stream line diagram around the ball is,

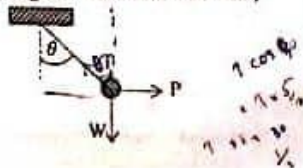


- (24) A disc of mass m and radius r is rotating at constant angular velocity ω . What should be the angular velocity ω^1 of the system, when the second disc of mass $m/2$ and radius r is placed on initial disc?

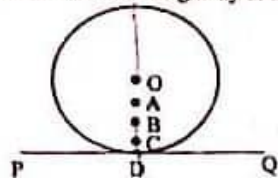
- 1) $\omega^1 = \omega$ 2) $\omega^1 = \frac{\omega}{2}$ 3) $\omega^1 = 2\omega$ 4) $\omega^1 = 3\omega$ 5) $\omega^1 = \frac{2\omega}{3}$

- (25) Weight W is held in equilibrium by applying a horizontal force P as shown in figure. With the increase of θ ,

- 1) Both P and T increase.
2) P decreases but T increases.
3) P increases but T decreases.
4) P remains unchange. T increases.
5) P remains unchange. T decreases.



- (26) A circular ring of diameter d and a straight conductor of length d are welded at point D and compound object has been made. The center of gravity of the compound object,



- 1) O
2) A
3) B
4) C
5) D

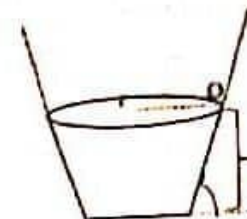
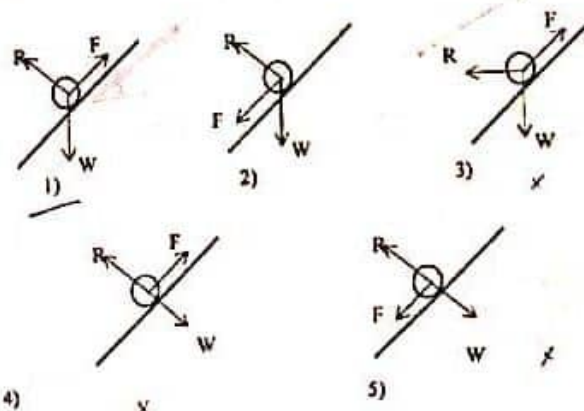
- (27) Consider following statements.

- (A) When the force is acting perpendicular to moving direction no work is done by that force. \times
(B) When the force acting on body is perpendicular to direction of acceleration, no work is done by that force.
(C) If the point of action of force is moving in a block of which is at rest, no work is done by that force.

True statement,

- 1) Only (A) 2) Only (B)
4) Only (A) and (B) 5) Only (A) and (C)

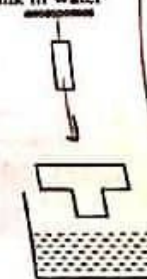
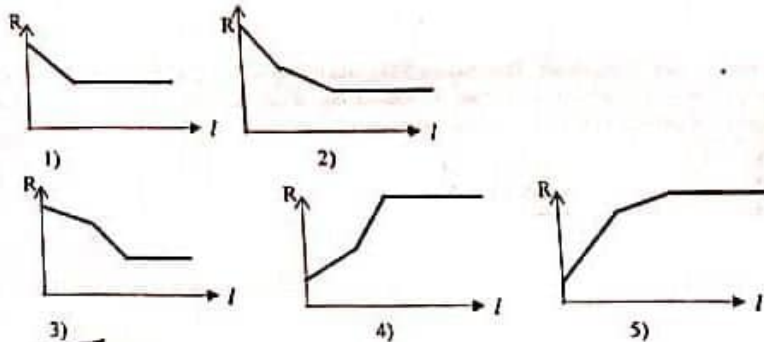
- (28) A cyclist of total weight W is moving along a horizontal circle in a well, as shown in figure. What is correct force diagram which shows weight W , normal reaction R and friction F , when he is riding his bicycle at minimum velocity?



- (29) Density of a liquid is 500 kg m^{-3} . When some amount of it is mixed with water of density 1000 kg m^{-3} , density of mixture is 600 kg m^{-3} . What is ratio of volume of liquid and water?

- 1) 1 : 2 2) 1 : 4 3) 2 : 1 4) 4 : 1 5) 1 : 3

- (30) Compound solid object made by using two metallic cylinders is hung by using a light inextensible string. What should be the correct variation of balance reading with submerged height l , when object is sunk in water gradually?

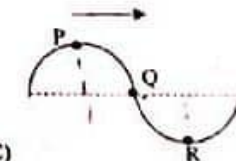


- (31) Instantaneous position of a transverse wave, moving right is given in the figure.

- (A) Phase difference between P and R is $\pi/2$. \times
(B) Speed at P and R are maximum but it is minimum at Q. \checkmark
(C) P and R are moving towards wave but Q is at rest. \checkmark

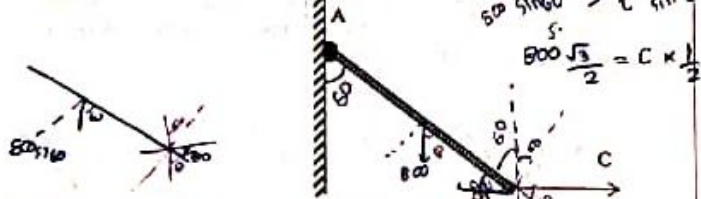
True statement,

- 1) Only (A) 2) Only (B) 3) Only (C)
4) All (A), (B) and (C) 5) All are incorrect



- 32) AB is a uniform rod of weight 800N and BC is a horizontal cord. AB rod is hinge at A as it can be rotated around A freely. Tension in the BC cord is,

- 1) $400\sqrt{3}$
- 2) $800\sqrt{3}$
- 3) $\frac{800}{\sqrt{3}}$
- 4) $1200\sqrt{3}$
- 5) $\frac{400}{\sqrt{3}}$



- 33) Speed of pendulum bob of simple pendulum at the center of oscillation is V_0 . What is the new speed of bob when the amplitude is doubled without changing the length of string?

- 1) $\frac{V_0}{2}$
- 2) $2V_0$
- 3) V_0
- 4) $\frac{2}{V_0}$
- 5) $4V_0$

- 34) As usual notation, characteristic equation of simple harmonic motion is given by $a = -\omega^2 x$, True statement/statements,

(A) Acceleration is maximum at amplitude. ✓

(B) Time period of oscillation T is given by $T = \frac{2\pi}{\omega}$. ✓

(C) When $x=0$, kinetic energy is maximum. ✓

1) Only (A)

2) Only (B)

3) Only (A) and (B)

4) Only (B) and (C)

5) All (A), (B), (C)

- 35) Force F is applied on a block of mass 2kg placed on rough surface as shown in figure. It is in limiting equilibrium and coefficient of static friction 0.5. The normal reaction force on the block,

- 1) $10\sqrt{2}$ N
- 2) $20\sqrt{2}$ N
- 3) 20 N
- 4) 10 N
- 5) 40 N

$$F \cos 45 = \mu_s R = 2$$

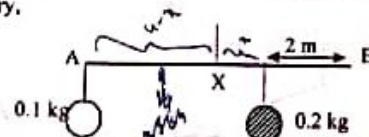


- 36) Propeller of a wind mill covers area A, wind flows perpendicular to above area at speed V in time interval t, kinetic energy of wind,

- 1) $AV^2 \rho t$
- 2) $AV^3 \rho t^2$
- 3) $\frac{1}{2} AV^3 \rho t$
- 4) $\frac{1}{2} AV^2 \rho t$
- 5) $\frac{1}{3} AV^3 \rho t$

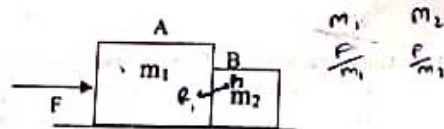
- 37) AB is a rod of mass 0.5kg and length 6m. Two masses 0.1kg and 0.2 kg are hung as shown in the figure. The rod has been hung from its mid point by a light inextensible string. What should be tension of string and gap between A and center of gravity if the system remains stationary,

- 1) 3 N, 3.0 N
- 2) 5 N, 3.0 N
- 3) 8 N, 3.0 N
- 4) 5 N, 3.2 N
- 5) 8 N, 3.2 N



- 38) A and B are two blocks placed on a smooth table. What should be the normal reaction between A and B when F force is applied on A?

- 1) $\frac{m_2 F}{m_1 + m_2}$
- 2) $\frac{m_1 F}{m_1 + m_2}$
- 3) $\frac{m_1}{m_2} F$
- 4) $\frac{m_2}{m_1} F$
- 5) $\frac{m_1 + m_2}{m_1} F$



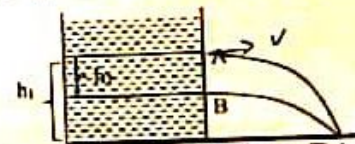
- 39) Sugar falls on to a conveyor belt moving horizontally at speed 5 ms^{-1} of rate 10 kg s^{-1} . The force should be applied by a motor to maintain its speed,

- 1) 40 N
- 2) 50 N
- 3) 60 N
- 4) 70 N
- 5) 80 N

$$F = \dot{m} v = 10 \times 5 = 50$$

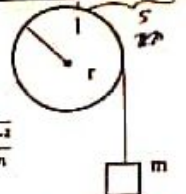
- 40) A and B are two holes on vertical wall of a vessel, which is filled by water. Horizontal displacements both flows ejected from A and B are same. Height of the water column in the vessel, (Cross sectional area of the vessel is high)

- 1) $h_1 + h_2$
- 2) $2h_1 + h_2$
- 3) $h_1 - 2h_2$
- 4) $h_1 - h_2$
- 5) $2h_1 + h_2$



- 41) An object of mass m is connect to free end of rope, which is wound around a pulley of moment of inertia I and radius r, and system is released at rest. What is the linear velocity of object after falling down height h.

- 1) $\sqrt{2gh}$
- 2) $\sqrt{\frac{2mgh}{1+r^2}}$
- 3) $\sqrt{\frac{2mgh}{1+mr^2}}$
- 4) $\sqrt{\frac{2mghr^2}{1+mr^2}}$
- 5) $\sqrt{\frac{2mghr^2}{1+r^2+m}}$



- 42) A uniform chain of length l is placed on a rough horizontal table as some portion of chain lies in the table, of friction is μ . The length of the chain hanging freely is,

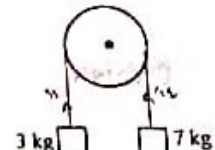
- 1) $\frac{l}{\mu}$
- 2) $\frac{\mu l}{\mu+1}$
- 3) $\frac{l}{\mu-1}$
- 4) $\frac{\mu l}{\mu-1}$
- 5) $\frac{l}{\mu+1}$

- 43) Two masses m_1 and m_2 are connected to a light inextensible string going over a rough pulley of mass m and radius r. ($m_1 > m_2$) What is the linear acceleration of m_1 and m_2 after releasing the system?

- 1) $\frac{2(m_1 - m_2)g}{(2(m_1 - m_2) + m)}$
- 2) $\frac{2(m_1 - m_2)g}{(m_1 + m_2 + m)}$
- 3) $\frac{2(m_2 - m_1)g}{m_1 + m_2 + m}$
- 4) $\frac{(m_1 - m_2)g}{(m_1 + 2m_2 + m)}$
- 5) $\frac{(m_1 - m_2)g}{\{2((m_1 - m_2) + m)\}}$

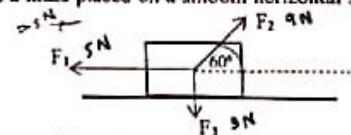
- 44) Two masses 3kg and 7kg are connected to free ends of a cable which is going over smooth pulley. The common acceleration and tension in the cable,

- 1) 3 ms^{-2} , 21 N
- 2) 3.5 ms^{-2} , 42 N
- 3) 4 ms^{-2} , 21 N
- 4) 3 ms^{-2} , 81 N
- 5) 4 ms^{-2} , 42 N



- 45) $F_1 = 5 \text{ N}$, $F_2 = 9 \text{ N}$, $F_3 = 3 \text{ N}$, three forces are applied on a mass placed on a smooth horizontal surface, if it travel 3m left, work done on the block by 3 forces?

- 1) 1.50 J
- 2) 2.40 J
- 3) 3.0 J
- 4) 6.00 J
- 5) 7.50 J

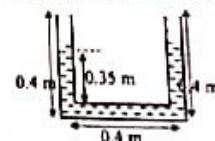


- 46) 360 bullets are fired in one minute at muzzle speed 360 km h^{-1} . What is the power of the gun if mass of each bullet is 20g?

- 1) 1 kW
- 2) 36 kW
- 3) 360 kW
- 4) 36 W
- 5) 360 W

- 47) A liquid is in a u tube as shown in figure. What should be maximum acceleration can be given the u tube without flowing out?

- 1) 1 ms^{-2}
- 2) 1.25 ms^{-2}
- 3) 2.5 ms^{-2}
- 4) 5 ms^{-2}
- 5) 10 ms^{-2}



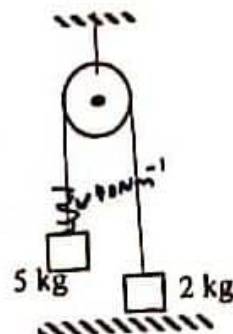
- 48) By an electric motor, water is lifted 4m up and ejected at speed 5 ms^{-1} , 6 m^3 per minute. Power of the pun

- 1) 5250 W
- 2) 4000 W
- 3) 1250 W
- 4) 1000 W
- 5) 500 W

- (49) From a water tap, water is ejected at initial velocity 1 ms^{-1} . Cross sectional area of outlet of water tap 10^{-4} m^2 . By assuming that pressure in the flow remains unchanged and flow is steady. What is the cross sectional area of flow, 0.15 m below the tap?
- 1) 10^{-4} m^2 2) 10^{-3} m^2 3) $0.5 \times 10^{-4} \text{ m}^2$ 4) $0.2 \times 10^{-4} \text{ m}^2$ 5) Zero

- (50) As shown in figure the system is released at rest when spring is not drawn, of the spring constant is 40 Nm^{-1} ; What should be the speed of 5 kg mass, when 2 kg mass starts to lift,

- 1) $\sqrt{2} \text{ ms}^{-1}$ 2) $2\sqrt{2} \text{ ms}^{-1}$ 3) 2 ms^{-1} 4) $4\sqrt{2} \text{ ms}^{-1}$ 5) 4 ms^{-1}



Answer

$$\frac{1}{2}mv^2 + mgh = \frac{1}{2}mv^2$$

$$\frac{1}{2} \times 10^{-4} \times 1^2 + 10 \times 10^{-4} \times 0.15 = \frac{1}{2} \times 10^{-4} \times v^2$$

$$1 \rightarrow \sqrt{2}$$



LOL.Lk
Learn Ordinary Level

විභාග ඉලක්ක පහසුවෙන් ජයගන්න පසුගිය විභාග ප්‍රශ්න පත්‍ර



- Past Papers
 - Model Papers
 - Resource Books
- for G.C.E O/L and A/L Exams



විභාග ඉලක්ක ජයගන්න
Knowledge Bank



Master Guide

WWW.LOL.LK



**CASH
ON**

DELIVERY



Whatsapp contact
+94 71 777 4440

Website
www.lol.lk



**Order via
WhatsApp**

071 777 4440