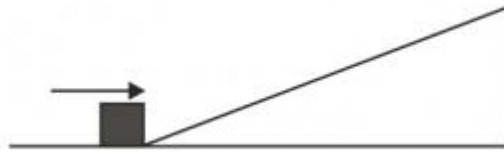


ENERGY, WORK, POWER.**Question 1**

A block of ice is sliding at a constant speed before moving up a smooth slope as shown. What are the changes in its kinetic energy and gravitational potential energy as it is sliding up the slope?



Kinetic Energy Gravitational Potential energy

- A Increase increase
- B Increase decrease
- C decrease increase
- D decrease decrease

Question 2

A car is accelerating up a slope. What are the changes in its kinetic energy and gravitational potential energy as it is moving up the slope?

Kinetic Energy Gravitational Potential energy

- A Increase increase
- B Increase decrease
- C decrease increase
- D decrease decrease

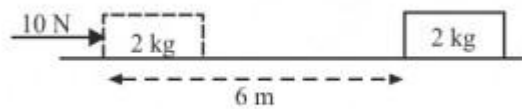
Question 3

A box is being pushed horizontally on a smooth surface by a 10 N force for 6 m. What is the work done on the box by the 10 N force?

- A 0.6 J
- B 1.7 J
- C 16 J
- D 60 J

Question 4

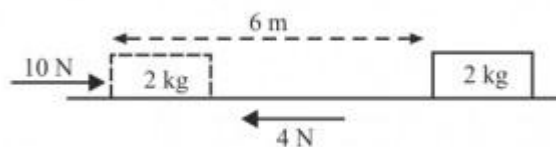
A box of mass 2 kg is being pushed horizontally on a smooth surface by a 10 N force for 6 m. What is the work done on the box by the 10 N force?



- A 12 J
- B 48 J
- C 60 J
- D 120 J

Question 5

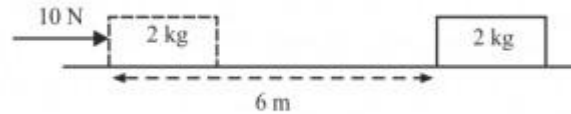
A box of mass 2 kg is being pushed horizontally on a rough surface by a 10 N force for 6 m. Given that the friction between the box and the surface is 4 N, what is the work done on the box by the 10 N force?



- A 24 J
- B 36 J
- C 60 J
- D 120 J

Question 6

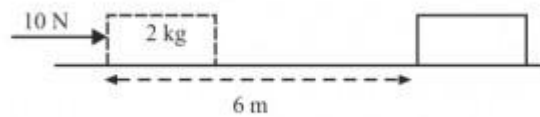
A box of mass 2 kg is being pushed horizontally on a smooth surface by a 10 N force for 6 m. What is the work done on the box by the weight of the box? ($g = 10 \text{ N/kg}$)



- A 0 J
- B 12 J
- C 60 J
- D 120 J

Question 7

A box of mass 2 kg is being pushed horizontally by a 10 N force for 60 cm along the floor. During the first 20 cm, the friction between the box and the floor is 4 N, and the friction for the rest of the distance is negligible. What is the work done on the box by the 10 N force?



- A 2 J
- B 3 J
- C 4 J
- D 6 J

Question 8

A box of mass 2 kg is moving at a constant speed of 3 m/s. What is the kinetic energy of the box?

- A 2 J
- B 3 J
- C 9 J
- D 18 J

Question 9

A box of mass 500 g is moving at a constant speed of 72 km/h. What is the kinetic energy of the box?

- A 5 J
- B 100 J
- C 1296 J
- D 1296000 J

Question 10

A box of mass 2 kg increases its speed from 3 m/s to 7 m/s. What is the increase in kinetic energy?

- A 4 J
- B 16 J
- C 40 J
- D 32 J

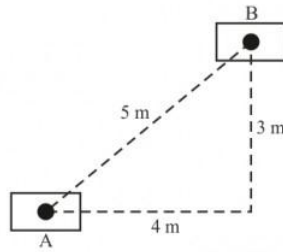
Question 11

A box of mass 2 kg is lifted vertically upwards by 3 m. Given that the acceleration due to gravity is 10 m/s^2 , what is the gravitational potential energy gained by the box?

- A 0.6 J
- B 6.7 J
- C 15 J
- D 60 J

Question 12

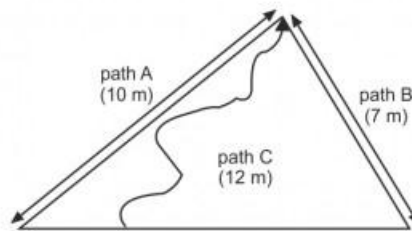
A box of mass 2 kg is lifted diagonally from point A to point B as shown. Given that the acceleration due to gravity is 10 m/s^2 , what is the gravitational potential energy gained by the box?



- A 20 J
- B 60 J
- C 80 J
- D 100 J

Question 13

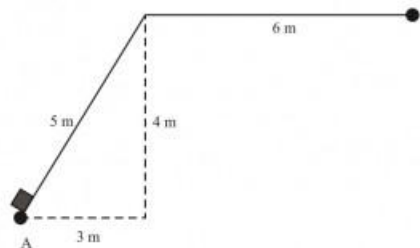
There are 3 paths leading to the top of the hill as shown. Assuming that the friction of the ground is negligible, which of the following statements is true?



- A Path C requires most energy to reach the top.
- B Path B requires the least energy to reach the top.
- C Path B requires the least energy to reach the top.
- D All three paths require same amount of energy to reach the top.

Question 14

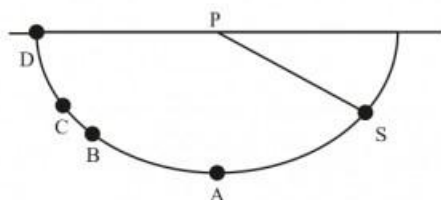
A box of mass 2 kg moves up a ramp from point A to point B at a constant speed. Given that the surfaces are smooth (frictionless), what is the gain in the potential energy by the box? ($g = 10 \text{ N/kg}$)



- A 80 J
- B 100 J
- C 200 J
- D 220 J

Question 15

A pendulum bob pivots at a point P, starts swinging from point S. Assuming that there is no loss of energy to the surrounding, at which position will the bob next come to a momentary rest?



- A A
- B B
- C C
- D D

Question 16

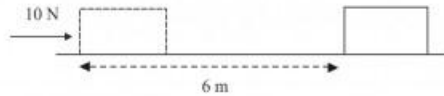
Three different stones are being lifted from the ground level to different heights on different planets as given below. Case 1: A 250 g stone lifted to 10 m on Earth. Case 2: A 6 kg stone lifted to 2 m on the moon Case 3: A 1 kg stone lifted to 1 m on Jupiter Given that the acceleration due to gravity on Earth, the Moon and Jupiter are 10 m/s^2 , 2 m/s^2 , 25 m/s^2 respectively, which of the following statements is true?

- A More energy is required for case 2 than case 1.

- B More energy is required for case 1 than case 3.
- C Case 1 and case 2 require the same amount of energy
- D Case 1 and case 3 require the same amount of energy

Question 17

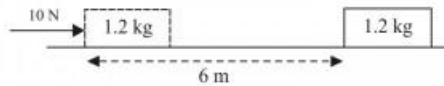
A box is pushed horizontally on a smooth surface by a 10 N force for 6 m. What is the increase in the kinetic energy of the box?



- A 0.6 J
- B 1.7 J
- C 16 J
- D 60 J

Question 18

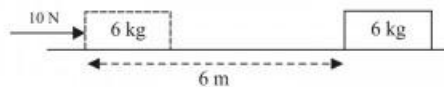
A 1.2 kg box is being pushed horizontally on a smooth surface by a 10 N force for 6 m. Given that the box is initially at rest, what is the speed of the box at the end of the 6 m?



- A 2.0 m/s
- B 10 m/s
- C 50 m/s
- D 100 m/s

Question 19

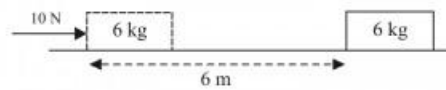
A 6 kg box is being pushed horizontally on a smooth surface by a 10 N force for 6 m. Given that the box has an initial speed of 4m/s, what is the speed of the box at the end of the 6 m?



- A 2.0 m/s
- B 4.5 m/s
- C 6.0 m/s
- D 10 m/s

Question 20

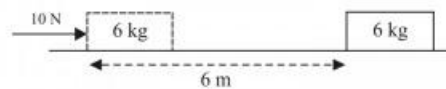
A 6 kg box is being pushed horizontally on a surface by a 10 N force for 6 m. Given that the box has an initial speed of 4m/s, what is the speed of the box at the end of the 6 m?



- A 2.0 m/s
- B 4.5 m/s
- C 5.7 m/s
- D 10 m/s

Question 21

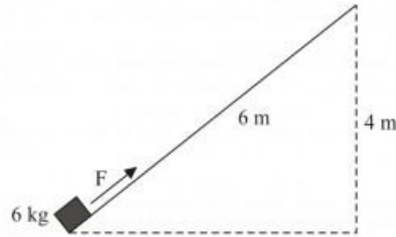
A 6 kg box is being pushed horizontally on a surface by a 10 N force for 6 m. Given that the box has an initial speed of 4 m/s and a final speed of 5 m/s at the end of the 6 m, what is the friction between the box and the surface?



- A 2.0 N
- B 3.5 N
- C 5.5 N
- D 6.0 N

Question 22

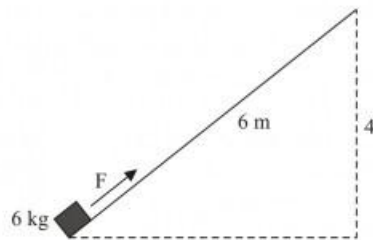
A 6 kg box is being pulled up a ramp by a force F at a constant speed as shown. Given that the friction along the surface is 4 N, what is the force F required to bring the box to the top of the ramp? ($g = 10 \text{ N/kg}$)



- A 4 N
- B 40 N
- C 44 N
- D 64 N

Question 23

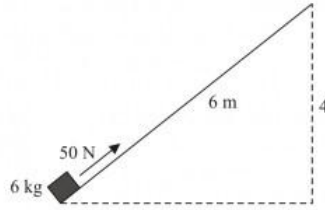
A box of 6 kg mass is being pulled up a ramp by a force F from rest as shown. Given that the friction along the surface is 4 N and the final speed of the box on top of the ramp is 2 m/s, what is the force F required to bring the box to the top of the ramp? ($g = 10 \text{ N/kg}$)



- A 4 N
- B 42 N
- C 46 N
- D 64 N

Question 24

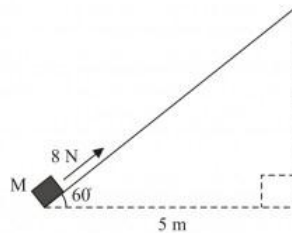
A box of 6 kg mass is being pulled by a 50-N force from an initial speed of 4 m/s at the foot of the ramp to a final speed of 6 m/s at the top of the ramp. What is the magnitude of friction along the ramp? ($g = 10 \text{ N/kg}$)



- A 0 N
- B 4 N
- C 12 N
- D 50 N

Question 25

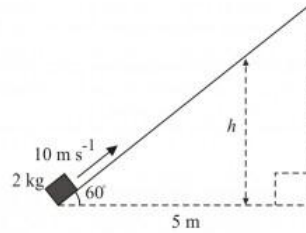
A box of 6 kg mass is being pulled by a 8-N force as shown, from an initial speed of 4 m/s at the foot of the ramp to a final speed of 6 m/s at the top of the ramp. Given that the friction along the ramp is 2 N, what is the mass of the box? ($g = 10 \text{ N/kg}$)



- A 0.2 kg
- B 0.6 kg
- C 1.2 kg
- D 2.4 kg

Question 26

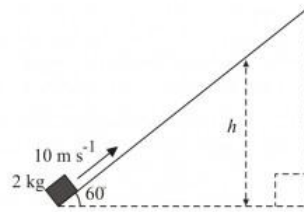
A box of 2 kg mass has an initial speed of 10 m/s at the foot of the ramp. Given that the friction along the ramp is 2 N, calculate the maximum height h that it can reach? ($g = 10 \text{ N/kg}$)



- A 2.8 m
- B 4.5 m
- C 5.0 m
- D 43.3 m

Question 27

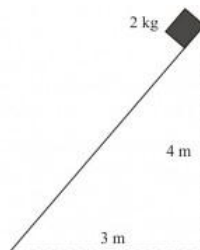
A box of mass 2 kg has an initial speed of 10 m/s at the foot of the ramp. Given that the friction along the ramp is 2 N, calculate the height h that it reaches when the speed of the box is 5 m/s. ($g = 10 \text{ N/kg}$)



- A 2.5 m
- B 3.4 m
- C 4.5 m
- D 6.0 m

Question 28

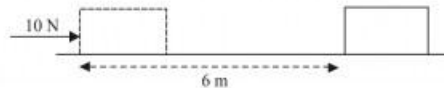
A box of mass 2 kg slides down from the top of the ramp with an initial speed of 0 m/s. Given that the friction along the ramp is 3.2 N, calculate the speed of the box when it reaches the foot of the ramp. ($g = 10 \text{ N/kg}$)



- A 2.8 m/s
- B 4.5 m/s
- C 8.0 m/s
- D 8.9 m/s

Question 29

A box is being pushed horizontally on a smooth surface by a 10 N force for 6 m in 3 s. What is the power acting on the box during this period?



- A 5 W
- B 18 W
- C 20 W
- D 600 W

Question 30

A man lifts a box of mass 2 kg vertically upwards by 3 m. Given that he takes 6 s to do the work, what is the power generated by the man? ($g = 10 \text{ m/s}^2$)

- A 1 W
- B 6 W
- C 10 W
- D 360 W

Question 31

A bullet hits a target board at a speed of 300 m/s. Given that the bullet is finally embedded 3.0 cm into the target board and the mass of the bullet is 15 g, what is the average resistive force acting on the bullet while it is penetrating into the target board?

- A 225 N
- B 2250 N
- C 22500 N

D 225000 N

Question 32

A 100 g mass drops from a 10 m building. What is the kinetic energy of the mass when it is 2 m away from the floor? ($g = 10 \text{ m/s}^2$)

A 0 J

B 2 J

C 8 J

D 10 J

Question 33

A 100 g mass drops from a 10 m building. What is the speed of the mass when it is 4 m away from the floor? ($g = 10 \text{ m/s}^2$)

A 4 m/s

B 6 m/s

C 8 m/s

D 11 m/s

Question 34

A 1000 kg motorcar travels at a constant speed of 30 m/s along a road with frictional force of 100 N. What is the power generated by the motorcar? ($g = 10 \text{ m/s}^2$)

A 3000 W

B 4500 W

C 300000 W

D 450000 W

Question 35

A motor car of mass 500 kg generates a power of 10000 W. How much time does the motorcar need to accelerate from a speed of 10 m/s to 20 m/s?

A 2.5 s

B 5.0 s

C 7.5 s

D 10 s

Question 36

A motor car of mass 500 kg generates a power of 10000 W. Given that the total resistance on the motorcar need to accelerate from a speed of 10 m/s to 20 m/s?

A 6.3 s

B 8.3 s

C 9.2 s

D 10.7 s

Question 37

A 100 w spot light has an efficiency of 40%. How much light energy can the spotlight produce in an hour?

A 144 kJ

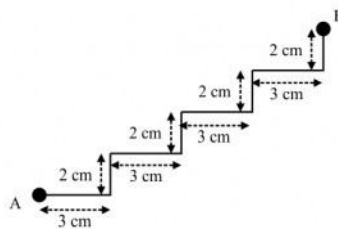
B 216 kJ

C 360 kJ

D 720 kJ

Question 38

A worm of mass 2 g crawls up a flight of steps from point A to point B as shown. What is the work done by the worm? ($g = 10 \text{ N/Kg}$)



A 1.2 mJ

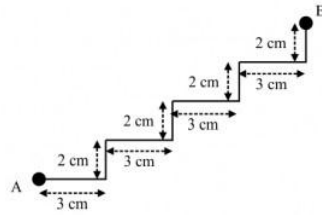
B 3.6 mJ

C 0.12 J

D 120 J

Question 39

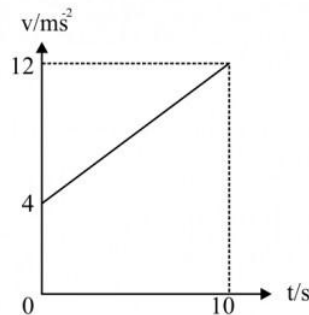
A worm of mass 2 g crawls up a flight of steps from point A to point B as shown. Given that the friction of the floor on the worm is 0.001 N, what is the work done by the worm? ($g = 10 \text{ N/Kg}$).



- A 0.12 mJ
- B 0.18 mJ
- C 1.20 mJ
- D 1.38 mJ

Question 40

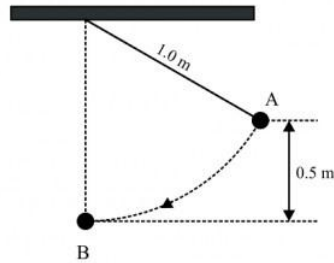
The speed time graph below shows the motion of a motorcar on a level road within a 10 s duration. Given that the mass of the motorcar is 500 kg and the frictional force along the road is 120 N, what is the power of the motorcar?



- A 3200 W
- B 4160 W
- C 32000 W
- D 41600 W

Question 41

A mass of 2 kg is suspended by a 1.0 m string and is set free at point A as shown. Neglecting air resistance, what is the speed of the mass as it passes through point B? ($g = 10 \text{ m/s}$)



- A 1.5 m/s
- B 2.3 m/s
- C 3.2 m/s
- D 4.1 m/s

Question 42

A mass of mass 3 kg is being pulled along horizontal bench at a constant speed of 5 m by a 10N horizontal force. What is the work done against friction in 4 s?

- A 0 J
- B 200 J
- C 600 J
- D 1000 J

Question 43

A block of mass m slides from the rest down smooth incline of length L . As a result, it moves through a vertical height y and a horizontal distance x . When it reaches the bottom of the incline, what is its kinetic energy? (Take acceleration due to gravity as g)

- A mgL
- B $mg y$
- C $(0.5)(m)(x^2)$
- D $(0.5)(m)(y^2)$

Question 44

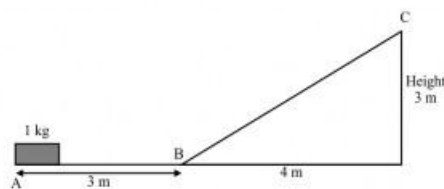
A car of mass m has an engine which can deliver power P . What is the minimum time in which the car can be accelerated from rest to a speed v ?

- A mv / P

- B P / mv
- C $(m \times v \times v) / 2P$
- D $2P / (m \times v \times v)$

Question 45

A block of mass 1 kg has a speed of 20 m/s at point A. It is moving towards point C. Given that the frictional force along AB is 10 N and the frictional force along BC is 5 N, what is the speed of the block when it reaches point C and what is the time taken for the process? (Take acceleration due to gravity to be 10 m/s)



- A Speed Time taken 15.2 m/s 0.45 s
- B 15.2 m/s 0.55 s
- C 17.0 m/s 0.65 s
- D 17.0 m/s 0.75 s

Question 46

A bullet leaves the vertical barrel of a rifle and reaches a height of 720 m. What is the speed of the bullet when it leaves the barrel of the rifle to achieve this height? (Given that the acceleration due to gravity is 10 m/s)

- A 120 m/s
- B 170 m/s
- C 240 m/s
- D 14400 m/s

Question 47

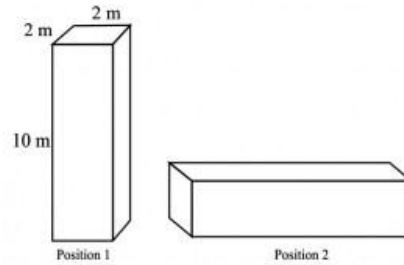
A cable car of mass 200 kg travels up a hill from an altitude of 1030 m to an altitude of 1150 m. During this period, the cable car moves through a total of 250 m cable length in 5 min. What is the rate of increase of potential energy?

- A 800 W

- B 1000 W
- C 39500 W
- D 48000 W

Question 48

A block made from steel falls from position 1 to position 2 as shown. How much potential energy is lost during the process? ($g = 10 \text{ m/s}$, density of steel = 8000 kg/m^3)



- A 12.8 MJ
- B 16.0 MJ
- C 25.6 MJ
- D 32.0 MJ

Question 49

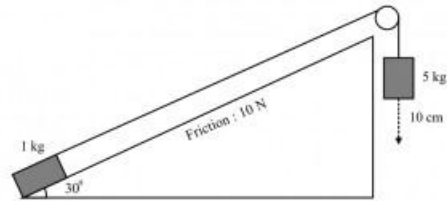
A block resting on a smooth horizontal floor is being pushed by a constant horizontal force. Find the following ratio:

Kinetic energy gained in 1 st second	:	Kinetic energy gained in 2 nd second	:	Kinetic energy gained in 3 rd second
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- A 1 : 2 : 3
- B 1 : 4 : 9
- C 1 : 3 : 5
- D 1 : 1 : 1

Question 50

A 1 kg mass and a 5 kg mass are held at a position along the ramp as shown. Given that the friction along the ramp is 10 N, what is the speed of the 1 kg mass after the masses are released and the 1 kg mass has moved for 10 cm?



- A 0.5 m/s
- B 1.1 m/s
- C 1.7 m/s
- D 2.5 m/s

END.

TO BE HANDED IN ON THE REPORTING DAY,