

SAT Physics practice paper

Question 1

There are three resistors in parallel in a circuit with resistances of 10Ω , 20Ω , and 30Ω . What is the equivalent resistance?

1. 1Ω
2. 5.45Ω
3. 6000Ω
4. 60Ω
5. 0.017Ω

Question 2

Suppose a planet has a mean distance from the sun four times that of Earth's. How many Earth years would it take this planet to orbit the sun?

1. 4 Earth years
2. 16 Earth years
3. 32 Earth years
4. 8 Earth years
5. 64 Earth years

Question 3

A 2.9kg crate slides across a floor for 5s before coming to rest 10m from its original position.

What is the force due to friction?

- 5N
- 1.6N
- 4N
- 0.8N
- 2.32N

Question 4

A 36kg girl bounces on a massless pogo stick. If the spring constant for the stick is $15,000\text{Nm}$, what is the maximum compression of the spring?

$g = -9.8\text{m/s}^2$

- 42.52m
- 0.02m
- 0.14m
- 0.2m
- 0.0004m

Question 5

A particle moves 80 cm South in 0.12 seconds and then 60 cm West in 0.08 seconds. What is the magnitude of the average velocity of the particle?

- A) 700 cm/s
- B) 1417 cm/s
- C) 500 cm/s
- D) 250 cm/s
- E) 709 cm/s

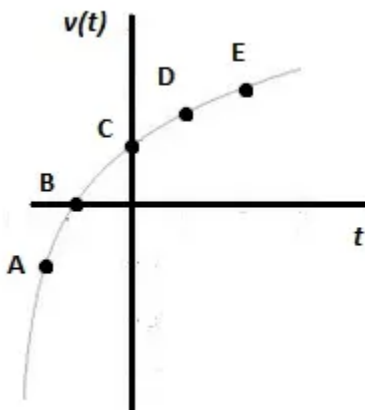
Question 6

When a car's speed changes from 20 m/s to 40 m/s, its kinetic energy

- A) stays the same
- B) is doubled
- C) is halved
- D) is tripled
- E) is quadrupled

Question 7

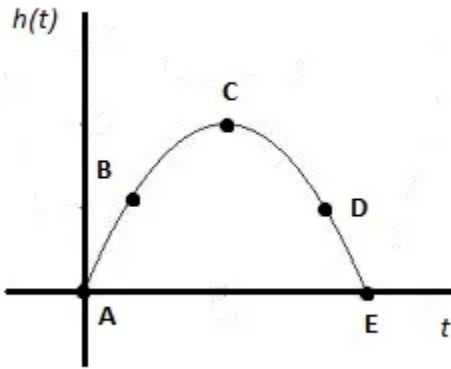
The graph below is that of the velocity of a moving particle. At which of the points A, B, C, D or E is the acceleration highest?



- A) A
- B) B
- C) C
- D) D
- E) E

Question 8

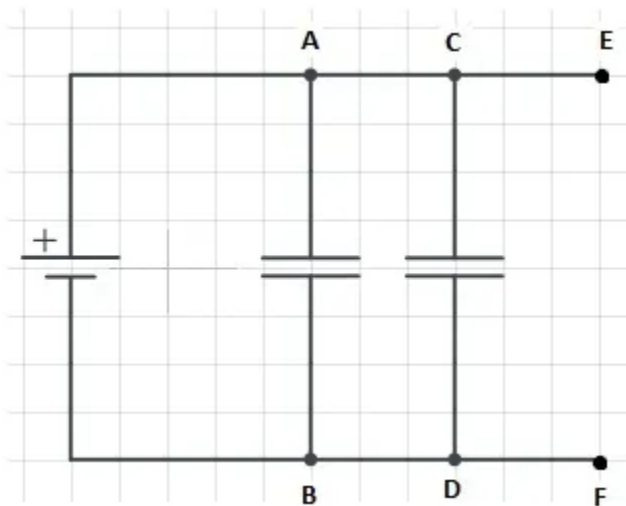
The graph below is that of the height of a ball thrown vertically upward. At which point is the velocity close or equal to zero?



- A) A
- B) B
- C) C
- D) D
- E) E

Question 9

The capacitors between A and B and C and D are equivalent and have capacitance C each. How many equivalent capacitors, with capacitance C , we need to put in series between E and F so that the total capacitance in the circuit is equal to $2.5C$?



- A) 2
- B) 3
- C) 4

- D) 5
- E) 6

Question 10

What is the magnitude of the friction force exerted by the floor on a 2.5 Kg mass accelerated by a horizontal force of 25 Newtons and the magnitude of the acceleration is 4 m/s²?

Question 11

What is the magnitude of the resultant force due to two forces of 30 Newtons and 40 Newtons acting on an object at a point such that the two forces are at right angle to each other?

Question 12

work forces F_1 and F_2 act on a mass m located at the origin of a system of axis $x - y$ and R is the resultant of the two forces. F_1 makes an angle of 33° with the x axis and has a magnitude of 10 Newtons. F_2 makes an angle of 123° with the x axis and has a magnitude of 20 Newtons. What angle does the resultant R makes with force F_1 ?

Question 13

An object of mass m rests on a horizontal plane. If we start inclining the plane at an angle θ with the horizontal, at which angle will the object start moving if the coefficient of friction is equal to 1?

Question 14

As the angle of an inclined plane increases, the kinetic force of friction exerted by the incline plane on a mass m :

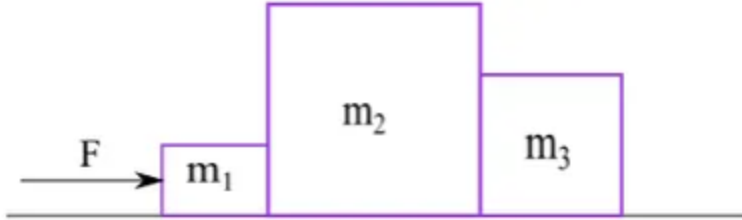
- A) remains the same
- B) increases then decreases
- C) decreases then increases
- D) increases
- E) decreases

Question 15

A 2-kilogram box is accelerated by a horizontal force F . If the magnitude of the acceleration is 2m/s^2 and the force of friction is 4 N, what is the magnitude of F ?

Question 16

A 10-newton force is pushing 3 masses $m_1=1\text{ Kg}$, $m_2=6\text{ Kg}$ and $m_3=3\text{ Kg}$ horizontally on a frictionless floor; see diagram below. What is the magnitude of force exerted by m_1 on m_2 ?



Question 17

If the weight of an object on a scale in an elevator is more than normal; this means that the elevator must

- A) be at rest
- B) be moving up
- C) have a negative acceleration
- D) have a positive acceleration
- E) be moving down

Question 18

According to Newton's first law, if a block is pushed on a frictionless floor until it reaches a speed of

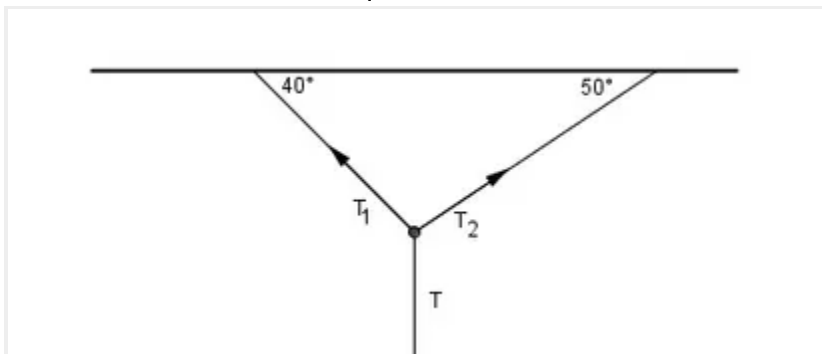
0.2m/s

0.2m/s then let go, it will

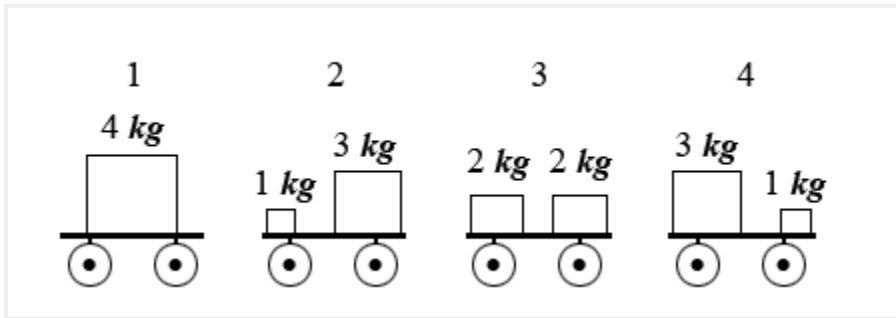
- A) move a small distance then stops
- B) move a large distance then stops
- C) continue moving at the same speed of 0.2 m/s
- D) accelerate
- E) decelerate

Question 19

Mass m 10 Kg is suspended using the three strings system. What are the magnitude of tensions T_1 and T_2 if mass m is at equilibrium?



Question 20



Each of the four identical carts shown above is loaded with a total mass of 4 kilograms. All of the carts are initially at rest on the same level surface. Forces of the same magnitude directed to the right act on each of the carts for the same length of time. If friction and air resistance are negligible, which cart will have the greatest velocity when the forces cease to act?

Select an Answer

- A Cart 1
- B Cart 2
- C Cart 3
- D Cart 4
- E All four carts will have the same velocity.

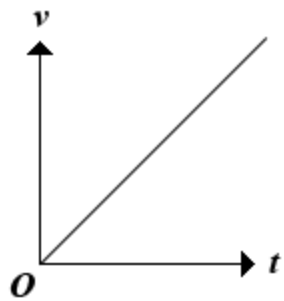
Question 21

The half-life of one isotope of radium is about $1,600$ years. In a given sample of this isotope, $15/16$ of the radium atoms will decay in a time most nearly equal to

Select an Answer

- A $1,000$ years
- B $1,500$ years
- C $1,600$ years
- D $3,200$ years
- E $6,400$ years

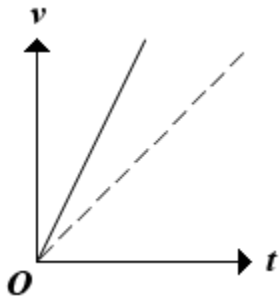
Question 22



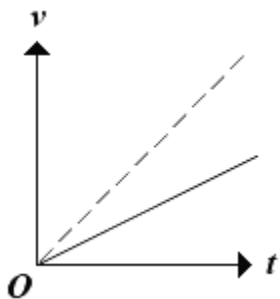
A block is pulled along a horizontal surface with a constant horizontal force of magnitude F . The surface exerts a frictional force of constant magnitude f on the block. The graph of speed v as a function of time t for the block is shown above. , instead, the block slides without friction but is pulled with the same horizontal force of magnitude F , which of the following would be a possible new graph of speed v as a function of time t ? (The dashed line represents the old graph.)

Select an Answer

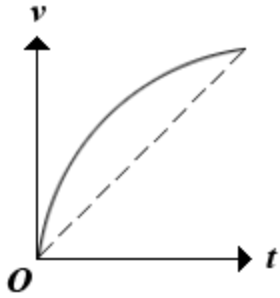
A



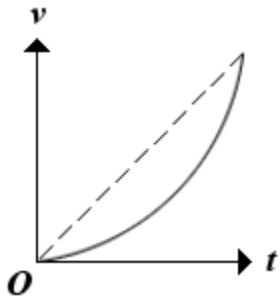
B



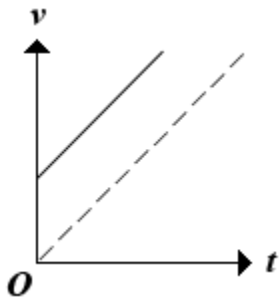
C



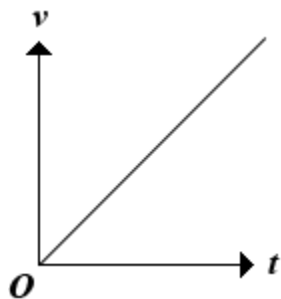
D



E



Question 23



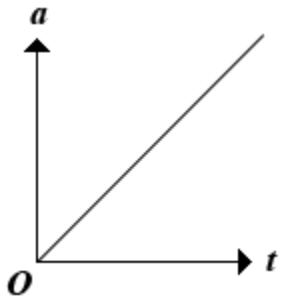
A block is pulled along a horizontal surface with a constant horizontal force of magnitude F .

The surface exerts a frictional force of constant magnitude f on the block. The graph of speed v as a function of time t for the block is shown above.

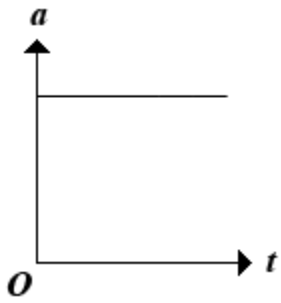
Which of the following shows the graph of acceleration a as a function of time t for the block?

Select an Answer

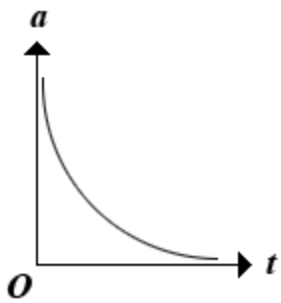
A



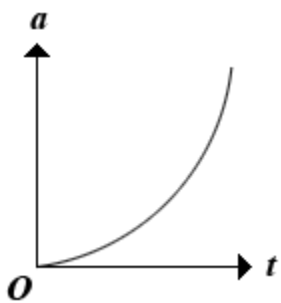
B



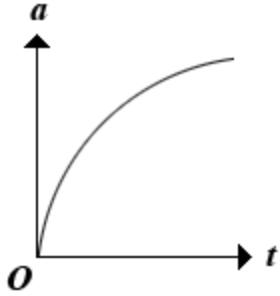
C



D



E



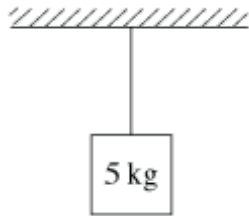
Question 24

When a vector of magnitude 6 units is added to a vector of magnitude 8 units, the magnitude of the resultant vector will be

Select an Answer

- A exactly 2 units
- B exactly 10 units
- C exactly 14 units
- D 0 units, 10 units, or some value between them
- E 2 units, 14 units, or some value between them

Question 25



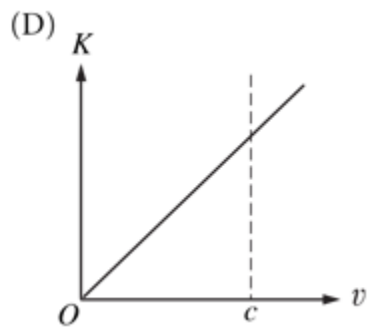
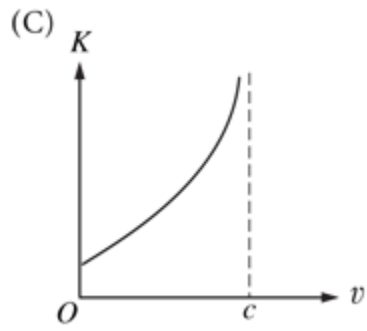
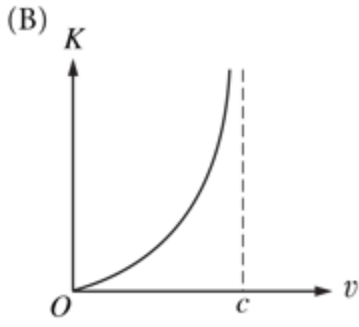
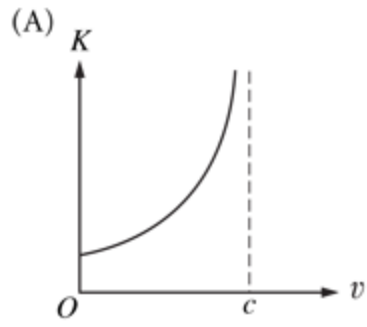
A 5-kilogram block is suspended by a cord from the ceiling, as shown above. The force exerted on the block by the cord is most nearly

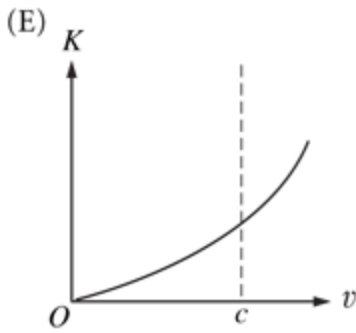
Select an Answer

- A zero
- B 25 N
- C 50 N
- D 100 N
- E 200 N

Question 26

Which of the graphs best represents the kinetic energy K of an elementary particle as a function of its speed v , where c is the speed of light?





Select an Answer

- A graph (A)
- B graph (B)
- C graph (C)
- D graph (D)
- E graph (E)

Question 27



A known positive charge is located at point P that is between two unknown charges, Q_1 and Q_2 , as shown above. P is closer to Q_2 than Q_1 . If the net electric force acting on the charge at P is zero, it may correctly be concluded that:

Select an Answer

- A
Both Q_1 and Q_2 are positive
- B
Both Q_1 and Q_2 are negative
- C
 Q_1 and Q_2 have opposite signs
- D
 Q_1 and Q_2 have the same sign, but the magnitude of Q_1 is greater than the magnitude of Q_2
- E

Q_1 and Q_2 have the same sign, but the magnitude of Q_2 is greater than the magnitude of Q_1

Question 28

Two small conducting spheres are identical except that sphere X has a charge of -10 microcoulombs and sphere Y has a charge of $+6$ microcoulombs. After the spheres are brought in contact and then separated, what is the charge on each sphere, in microcoulombs?

Select an Answer

A

Sphere X	Sphere Y
-4	0

B

Sphere X	Sphere Y
-2	-2

C

Sphere X	Sphere Y
+2	-2

D

Sphere X	Sphere Y
+4	0

E

Sphere X	Sphere Y
+6	-10

Question 29

A satellite moving in a circular orbit with respect to the Earth's center experiences a gravitational force. If the satellite is put into a new circular orbit of smaller radius, how will the gravitational force and the speed of the satellite change, if at all?

Select an Answer

A

Gravitational Force	Speed
Decrease	Decrease

B

Gravitational Force	Speed
Decrease	Increase

C

Gravitational Force	Speed
Remain the same	Remain the same

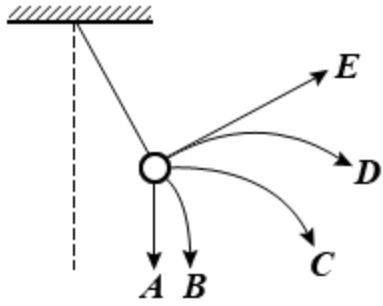
D

Gravitational Force	Speed
Increase	Decrease

E

Gravitational Force	Speed
Increase	Increase

Question 30



A pendulum is swinging upward and is halfway toward its highest position, as shown above, when the string breaks. Which of the paths shown best represents the one that the ball would take after the string breaks?

Select an Answer

- A)A
- B)B
- C)C
- D)D
- E)E