الإدارة المركزية للتعليم العام
تنمية مادة العلوم

Physics

الصف الثاني الثانوي

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الواجب المنزلي + التقييم

الاسم: .....
الفصل: .....
المدرسة: .....

الأسبوع 5



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Chapter (3) Newton's frist law & Newton's second law

First: Choose the correct answer:

1) A body of mass 2 kg moves with a velocity of 4 m/s, then accelerates at 3 m/s^2 for 5 seconds. The change in its momentum during this period is .....

a) 15 N·s b) 19 N·s c) 30 N·s d) 38 N·s

2) You have four bodies A, B, C, and D. The following table shows the mass and velocity of each:

	A	B	C	D
m	2 Kg	3 Kg	4 Kg	4 Kg
v	6 m/s	4 m/s	4 m/s	2 m/s

Which two bodies have the same momentum? .....

a) A, B b) B, C c) C, D d) D, A

3) A momentum of 60 kg·m/s means that a body .....

a) has a mass of 60 kg and an acceleration of 1 m/s^2

b) has a mass of 60 kg and a velocity of 10 m/s

c) has a mass of 60 kg and a speed of 10 m/s

d) has a mass of 6 kg and an velocity of 10 m/s

4) A father (90 kg) runs at a speed of 1 m/s in a race with his son (40 kg) who runs at 2.25 m/s. The father's momentum is ..... the son's momentum.

a) double b) half c) equal to d) a quarter of

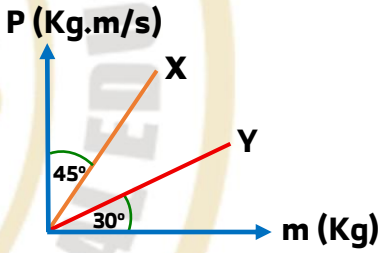
5) If the mass of a body is reduced to half and its momentum is doubled, then its velocity .....

a) does not change b) decreases to half c) doubles d) becomes four times

6) From the adjacent graph, the ratio between the velocities of the two bodies v_x/v_y equals ..

a) $1/\sqrt{2}$ b) $\sqrt{2}/1$

c) $1/\sqrt{3}$ d) $\sqrt{3}/1$



7) If an average force acts on a body for a certain period of time, then the product of this force and the time interval equals .....

a) velocity b) acceleration c) momentum d) change in momentum

8) When a body is acted upon by a constant resultant force(≠ zero), this means that the body is ..

a) at rest b) moving with constant velocity

c) moving with uniform acceleration d) moving with variable acceleration

9) The rate of change of momentum is measured in .....

a) joule·meter·second b) kg·m/s c) newton d) newton·second

10) Which of the following statements correctly expresses Newton's Second Law?

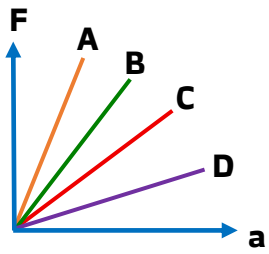
a) If the resultant force acting on a body is not zero, the body moves with uniform velocity or remains at rest.

b) If balanced forces act on a body and produce acceleration, then the resultant of these forces is directly proportional to both its mass and acceleration.

c) If a resultant force acts on a body and its velocity changes, the change in velocity equals this force × the time of action.

d) If unbalanced forces act on a body and produce acceleration, then the resultant force equals the rate of change of its momentum.

11) Several forces were applied to the bodies A, B, C, and D, and their motions are represented in the given graph. Which of the four bodies has the greatest mass?



a) C b) B

c) D d) A

12) If the force acting on a moving body is doubled, its mass .....

a) decreases to half b) doubles c) remains constant d) becomes four times

13) Two equal forces act on two bodies of masses 1 kg and 5 kg.

If the smaller body acquires an acceleration of 20 m/s^2, then the acceleration of the second body equals .....

a) 0.05 m/s^2 b) 0.25 m/s^2 c) 4 m/s^2 d) 20 m/s^2

14) A cart of 500 kg and another of 1500 kg move with the same acceleration.

The force acting on the larger cart ..... the force acting on the smaller one.

a) decreases one-third b) equals to c) doubles d) increases three times

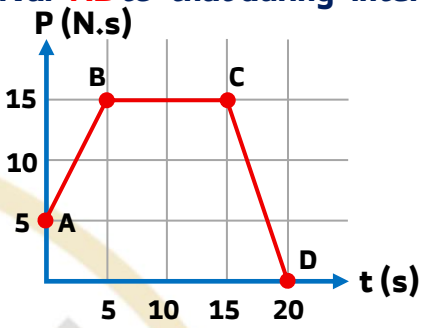
15) A body of mass (m) is acted upon by a force of (2F).

When a force of (5F/2) acts on another body of mass (3m), the ratio between the accelerations of the first and second bodies respectively equals .....

a) 6 / 5 b) 5 / 3 c) 15 / 4 d) 12 / 5

16) The opposite graph shows the relationship between the change in a body's momentum and time.

The ratio between the magnitude of the force during interval AB to that during interval CD equals .....



a) 1 / 1 b) 2 / 3

c) 3 / 2 d) 3 / 4

Second: Essay Questions

Two trucks designed for transporting goods – the first is empty (1) and the other fully loaded (2) are moving at the same speed. Compare the inertia of each and explain your answer.



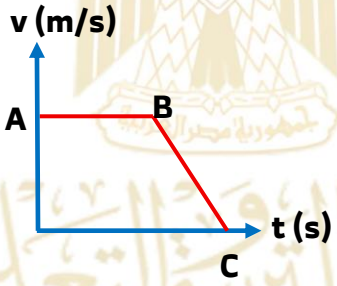
(أ)Car



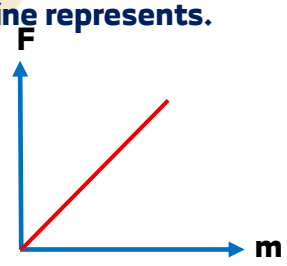
(ب)Car

18) A force of 10N acts on a wooden cube, giving it an acceleration (a). When the same force acts on another cube, it produces an acceleration equal to (3a). Calculate the ratio between the mass of the first cube and that of the second cube.

19) The opposite graph represents the motion of a car during two successive stages, AB and BC. In which of the two stages is the net force on the car not equal to zero, and why?



20) The opposite graph shows the relationship between the applied force and the masses of different bodies. From the graph, determine what the slope of the straight line represents.



Chapter (3) Newton's frist law & Newton's second law

First: Multiple Choice Questions

1) **Newton's First Law is called the Law of .....**

a) conservation of Energy b) inertia c) action and Reaction d) Conservation of Mass

2) **The mathematical expression of Newton's First Law can be written as .....**

a) $F_1 = -F_2$ b) $F = m \cdot a$ c) $\Sigma F = 0$ d) $\Sigma F \neq 0$

3) **According to Newton's First Law, if the net force acting on a body is zero, it moves with acceleration that is .....**

a) uniform b) negative c) zero d) positive

4) **The forward motion of passengers when a car suddenly stops is due to .....**

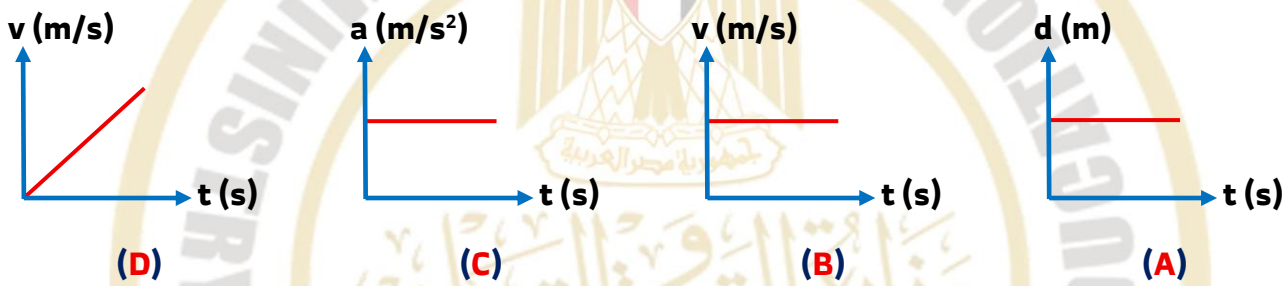
a) gravitational force b) the state of rest the car was in c) inertia d) acceleration of motion

5) **Two bodies are moving with the same speed.**

If the mass of the first is three times that of the second, then the inertia of the second body is ..... the inertia of the first.

a) three times b) equal to c) nine times d) one-third

6) **From the following graphs, the one that represents Newton's First Law is ..**



(D) (C) (B) (A)

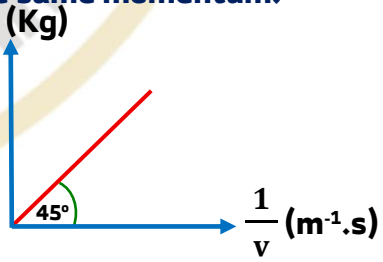
a) Graph C only b) Graphs A and B only c) Graphs A, B, and C only d) All the graphs

7) **The opposite graph shows the relationship between the mass (m) of several bodies and the reciprocal of their velocity (1/v) when all of them move with the same momentum.**

The momentum of any of them equals .....

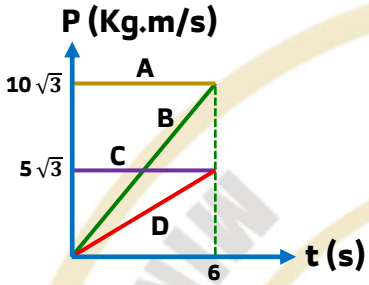
a) 0.1 kg·m/s b) 10^3 g·m/s

c) 1 kg·cm/s d) 10^{-3} g·m/s

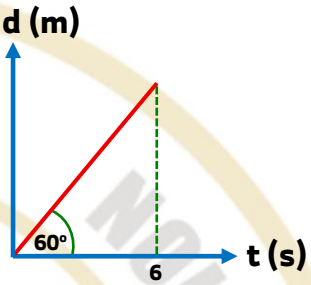


8) Figure (1) represents the graphical relationship between displacement (d) and time (t) for a body of mass 5 kg moving with a uniform velocity in a straight line.

The graph in Figure (2) that correctly represents the relationship between the momentum (P) of this body and time (t) during the same time interval is .....



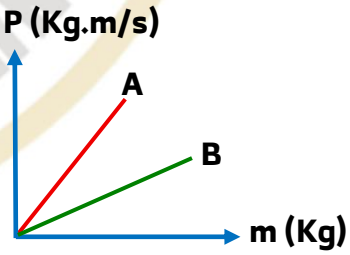
(2)



(I)

a) A b) B c) C d) D

9) The opposite graph shows the relationship between the momentum (P) of two bodies (A) and (B) and their respective masses (m). which of the following statements is correct?



a) The velocity of body (A) is greater than that of body (B)

b) The velocity of body (B) is greater than that of body (A)

c) The velocity of body (A) equals the velocity of body (B)

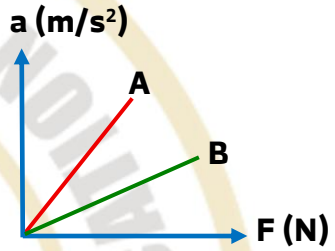
d) The momentum of body (B) is greater than that of body (A) if they have the same mass

10) The mathematical expression of Newton's Second Law can be written as .....

a) $F_1 = -F_2$ b) $F = m \cdot a$ c) $\Sigma F = 0$ d) $F = m \cdot v$

11) The opposite graph shows the relationship between the applied force and the motion of two bodies (A) and (B).

If both bodies are acted upon by the same force, then .....



a) The acceleration of body (A) is greater than that of body (B)

b) The acceleration of body (A) is smaller than that of body (B)

c) The acceleration of body (A) equals that of body (B)

d) The mass of body (A) is greater than the mass of body (B)

Second: Essay Questions

12) Space rockets do not consume fuel after leaving the Earth's gravitational field. Explain why.

13) A resultant force of 10 N acts on a body of mass 4 kg.

Calculate the acceleration of the body.

14) A body is acted upon by a force of 100 N, producing an acceleration of 4 m/s^2.

If the body is then acted upon by a force of 225 N, calculate the acceleration in the second case.

15) A car of mass 1000 kg is moving at a speed of 90 km/h in a straight path.

When the driver applies the brakes, the car comes to a completely stop after 10 seconds.

Calculate the magnitude of the frictional force acting on the car until it stops.

- The end –