الإدارة المركزية للتعليم العام
تنمية مادة العلوم

Physics

الصف الثاني الثاني

2026-2027

الواجب المنزلي + التقييم

الأسبوع 6

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



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Chapter 3 | Newton's Second Law – Newton's Third Law

First: Multiple Choice Questions

1) A car is moving at a speed of 4 m/s, which increased to 6 m/s in 2 seconds.

If the mass of the car is 2000 kg, the force causing this change in speed equals:

(A) 4000 N (B) 2000 N (C) 5000 N (D) 3000 N

2) A car of mass 200 kg is moving at 4 m/s. The driver presses the brakes, and the car stops after 2 seconds.The momentum of the car before braking and the force acting on the car are respectively:

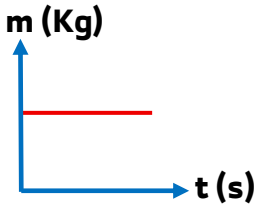
(A) 800 kg.m/s, –200 N (B) 800 kg·m/s, 200 N

(C) 800 kg·m/s, –400 N (D) 800 kg·m/s, 400 N

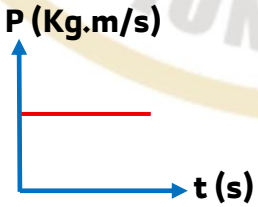
3) A force F_1 acts on a body, causing it to move with uniform acceleration.During its motion, it experiences a frictional force F_2.The product of the body's mass × its acceleration equals:

(A) $F_1 \div F_2$ (B) $F_1 - F_2$ (C) $F_1 + F_2$ (D) $F_2 - F_1$

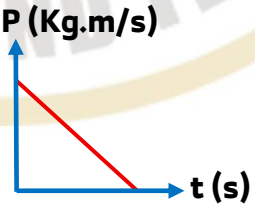
4) Which of the following graphs represents a body moving under the effect of frictional force?



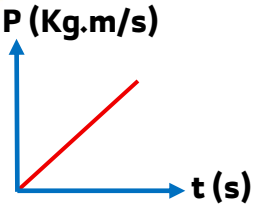
(A)



(B)

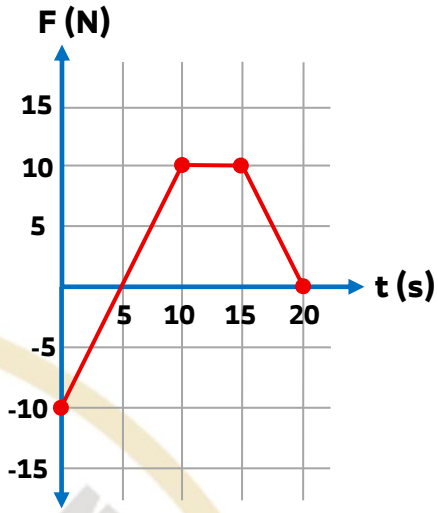


(C)



(D)

5) **The opposite graph shows the change of the resultant force acting on a car that started moving from rest, and the time of this change.According to the graph data, the change in momentum during 20 seconds is:**



(A) -75 N·s (B) 75 N·s

(C) -125 N·s (D) 125 N·s

6) **According to Newton's Third Law, the action and reaction forces:**

(A) act on the same body

(B) are equal in magnitude and have the same direction

(C) act on two different bodies and are equal in magnitude but opposite in direction

(D) act on the same body and have the same magnitude and same direction

7) **In the opposite figure, a hockey player hits the ball with his stick.**



The action and reaction forces do not cancel each other because:

(A) the force of the stick on the ball is greater than the force of the ball on the stick

(B) the two forces act on different bodies

(C) the force of the stick on the ball is less than the force of the ball on the stick

(D) the two forces act on the same body

8) **In the opposite figure, four books are placed on a table.**

Their weights are shown on the figure as 4 N, 5 N, 15 N, and 25 N.

The reaction force of the table on all the books together equals:



(A) 25 N **(B) 49 N** **(C) 5 N** **(D) 15 N**

9) **The acceleration of the body shown equals:**

(A) 0.2 m/s^2 **(B) 5 m/s^2** **(C) 10 m/s^2** **(D) 0**



10) **A force of 300 N acts on a body of mass 30 kg to move it. Neglecting friction, the acceleration gained by the body equals:**

(A) 0.1 N/kg **(B) 10 N/kg** **(C) 100 N/kg** **(D) 9000 N/kg**

11) **If a force of 50 N acts on a body of mass 20 kg, the rate of change of velocity of this body equals:**

(A) 2.5 N/kg **(B) 2.5 kg/N** **(C) 2.5 N/kg^{-1}** **(D) 2.5 N^{-1}·kg**

12) **Two cars are moving, and the ratio between their masses is 2 : 1, while the ratio between their accelerations is 2 : 1. The ratio between the resultant forces acting on them is:**

(A) 1 : 1 **(B) 1 : 2** **(C) 4 : 1** **(D) 1 : 4**

Second : Essay Questions

13) **A car of mass (m) and another car of mass (2m) start moving from rest with the same acceleration.**

Calculate the ratio between the driving (net) forces acting on the two cars, respectively.

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14) **A force of 1 N acts on a wooden cube and gives it a certain acceleration.**

When the same force acts on another cube, it produces an acceleration three times greater than the first case.

Deduce the relationship between the masses of the two cubes.

- The end -

Chapter (2) / (Acceleration)

First Choose the correct answer:-

1) The dimensional formula of acceleration is…….

(a) $M^0 L T^{-2}$ (b) $M^0 L^{-2} T^0$

(c) $M^0 L^{-1} T^{-2}$ (d) $M^{-2} L^0 T^0$

2- If the velocity of a car increases uniformly, its acceleration is .....

(a) always positive (b) always negative

(c) always zero (d) positive or negative depending on the direction of velocity

3- A car is moving north at a velocity of 90 km/h. If its acceleration is 3 m/s^2 south, its velocity after 6 s will be .....

(a) 25.2 m/s north (b) 7 m/s south

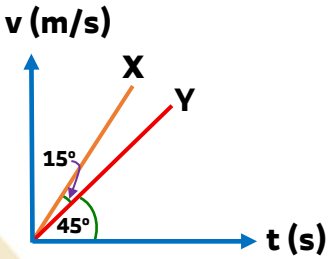
(c) 25.2 km/h north (d)7 km/h south

4- An object started moving from rest at a constant acceleration. Its average velocity during time (t) from the starting was 9 m/s. So, its average velocity during time (3t) from the starting is ....

(a) 9 m/s (b) 18 m/s

(c) 27 m/s (d) 3 m/s

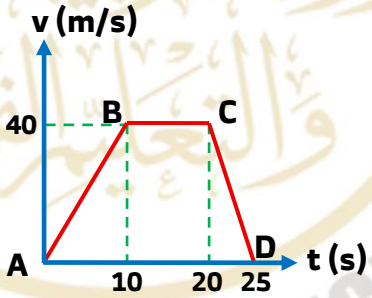
5- The corresponding graph shows the relationship between the velocity (v) of two objects (X) and (Y) and time (t). The ratio between the acceleration of objects (X) and (Y) respectively is .....



(a) $\frac{\sqrt{3}}{1}$ (b) $\frac{\sqrt{2}}{1}$

(c) $\frac{1}{\sqrt{3}}$ (d) $\frac{1}{\sqrt{2}}$

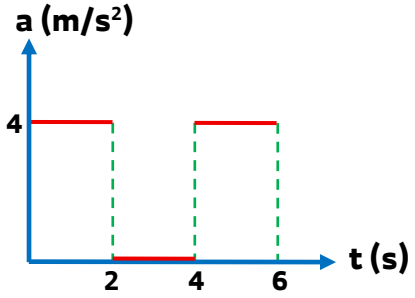
6- By studying the graph shown, the ratio between the magnitude of the acceleration in period (AB) and its magnitude in period (CD) is equal to .....



(a) $\frac{1}{2}$)b($\frac{1}{1}$

(c) $\frac{2}{1}$ (d) $\frac{5}{2}$

7- The corresponding graph shows the relationship between the acceleration of an object and the time it takes to move. According to the graph, the velocity of the object after 5 seconds from the starting of motion is equal to .....



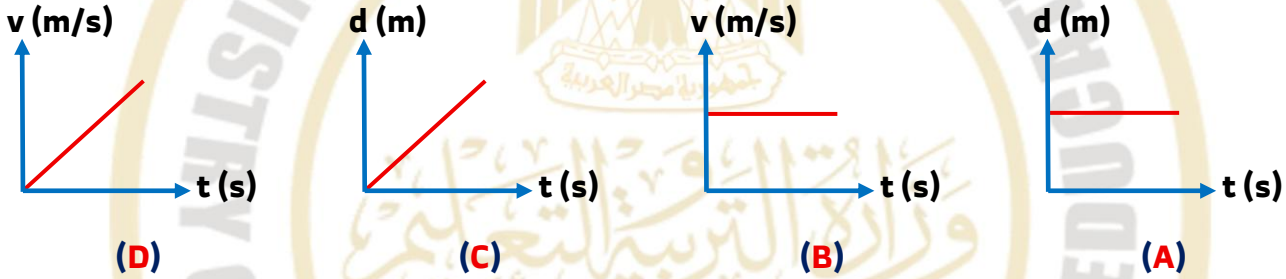
(a)8 m/s

(b)16 m/s

(c)4 m/s

(d)12 m/s

8- Based on your study of the following graphs, the relationship that expresses the motion of a body with acceleration = zero is .....



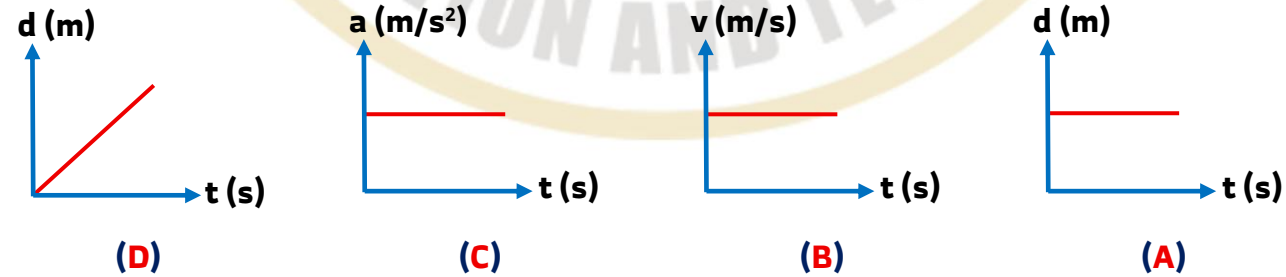
(a(Only graphs (C) and (B)

(b)Only graph (B)

(c)All the graphs

(d)Only graphs A, B and C

9- Based on your study of the following graphs, the relationship that expresses the motion of a body with a uniform acceleration is .....



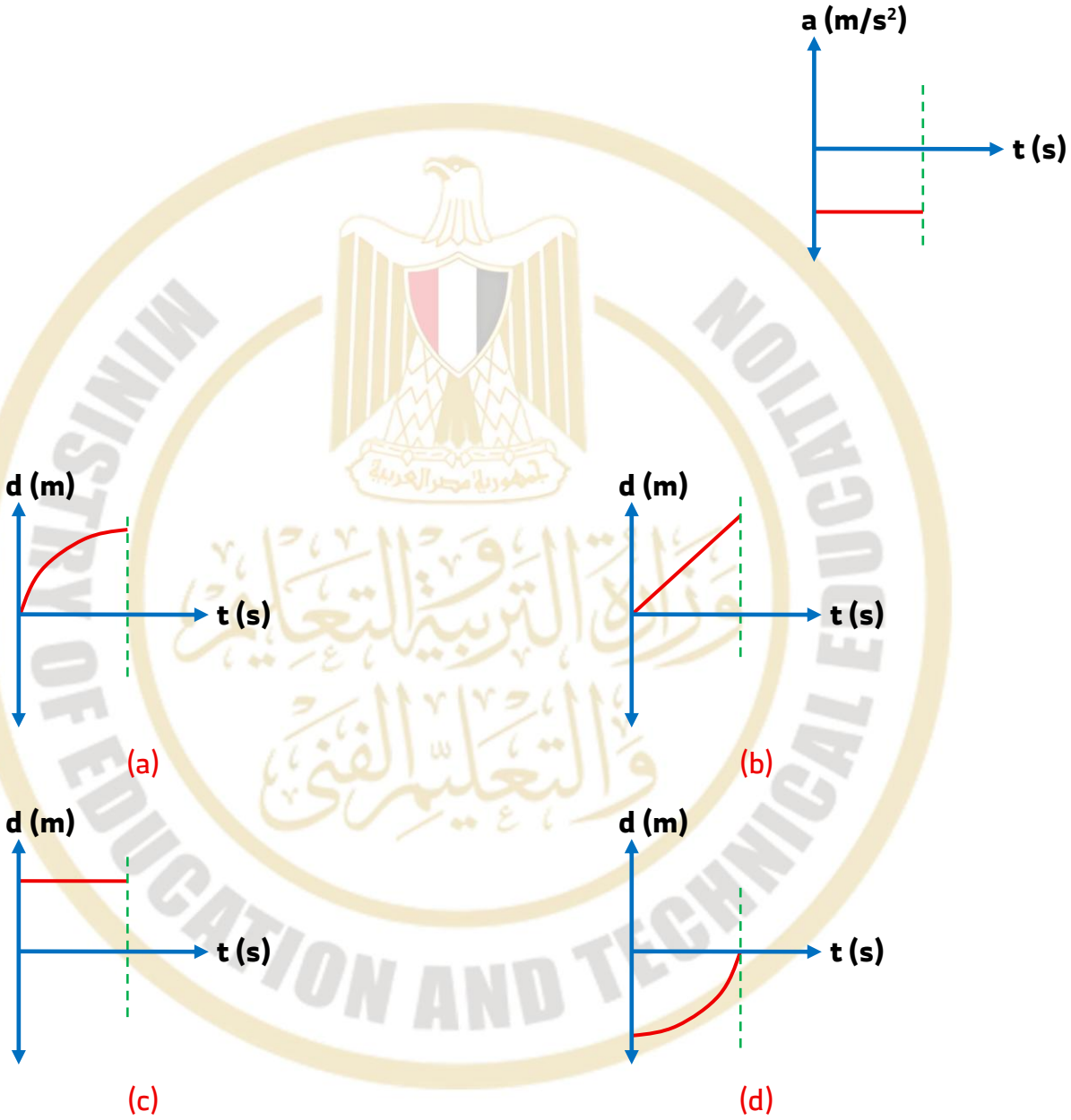
(a(Only graphs (B) and (C)

(b)Only graph (C)

(c)All the graphs

(d)Only graphs C and D

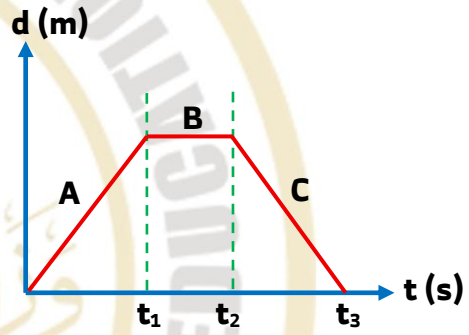
10- If the graph shows the acceleration of an object over time, then the graph showing the change in displacement of the same object over the same period of time is .....



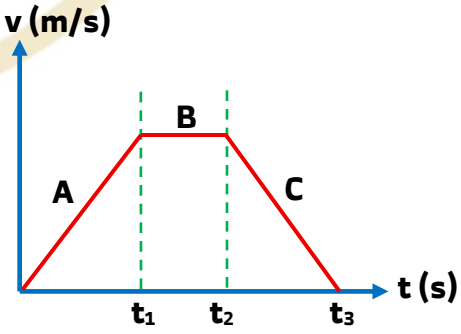
Second: Essay questions

11. An object moves from rest at a constant acceleration, and its average velocity is 12 m/s when its displacement is 24 m. Calculate its average velocity during the first 10 s of the motion.

12. The corresponding graph: Illustrates the relationship between displacement (d) and time (t) of an object. Draw a graph to illustrate the relationship expressing the acceleration (a) of the object in each time interval.



13. The corresponding graph: Illustrates the relationship between velocity (v) and time (t) of an object. Draw a graph to illustrate the relationship expressing the acceleration (a) of the object in each time interval.



14. A car is moving at a constant velocity of 90 km/h in a straight line. When the driver presses the brakes, the car starts to decelerates uniformly until stops after 12.5 s. Calculate the acceleration of the car before and after pressing the brakes and determine the type of each.

15. An object moves with a constant acceleration of 3 m/s^2. Calculate its velocity after 15 s if it started moving at a velocity of 30 m/s.