A+ Academy – Online Teaching

فيزياء طبية (تحضيري)

Topic: Medical physics

Instructor: Hamza Ahmad

Lecture: (2)

Motion in one dimension Part (1)

WhatsApp (00962781598320)

تنويه:

- الأكاديمية تقدم دورات تقوية خاصة، لطلبة الجامعات المختلفة مثل **جامعة العلوم والتكنولوجيا** و**الجامعة الأردنية** داخل الأردن، و**جامعات القدس** و**النجاح** و**الأمريكية** بالضفة الغربية وأي جامعة أخرى جاهزين لتدريس طلبتها.
- الدورات تشمل العديد من المساقات مثل: (الكيمياء العامة والعضوية والتحليلية و الحيوية والبيولوجيا والفيزياء والرياضيات والإحصاء ومواد الطب والصيدلة).
- وبالتالي يا ريت توصل للمهتمين من معارفك واقاربك والدارسين لهذه المواد والذين يجدون صعوبة فيها وبحبوا يلتحقوا بدوراتنا يتواصلوا مع الأستاذ على الواتس اب أو التلغرام.
- طبعا أي دورة تعطى بناء على الخطة المتبعة بهذه الجامعة، ويوجد دروس تجريبية لكل الدورات (عشان الطالب يوخذ فكرة عن آلية التدريس والمدرس قبل ما يدفع ويسجل).
- **الأكاديمية توفر ايضاً خدمة القبول وتسجيل الطلبة داخل الجامعات الأردنية.**

تابعنا على الإنستغرام

للإستفسار: التواصل مع الإدارة وتلغرام واتساب **(00962787124146)**

The Position, Velocity, and Acceleration Vectors

The displacement Δx of a particle is defined as its change in position in some time interval.

$\Delta x = x_f - x_i$	m

Where:

Δx: Displacement **(m).**
x_f : Final position (m).
x_i: Initial position (m).

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Distance is the length of a path followed by a particle

$d = x_f + x_i$	m

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The average velocity v_{avg} of a particle is defined as the particle's displacement Δx divided by the time interval Δt during which that displacement occurs:

$v_{avg} = \frac{\Delta x}{\Delta t}$	m/s

……..

The average speed $speed_{avg}$ of a particle, a scalar quantity, is defined as the total distance *d* traveled divided by the total time (t) required to travel that distance:

$speed_{avg} = \frac{d}{t}$	m/s

The instantaneous velocity:

$v_x = \frac{dx}{dt}$	m/s

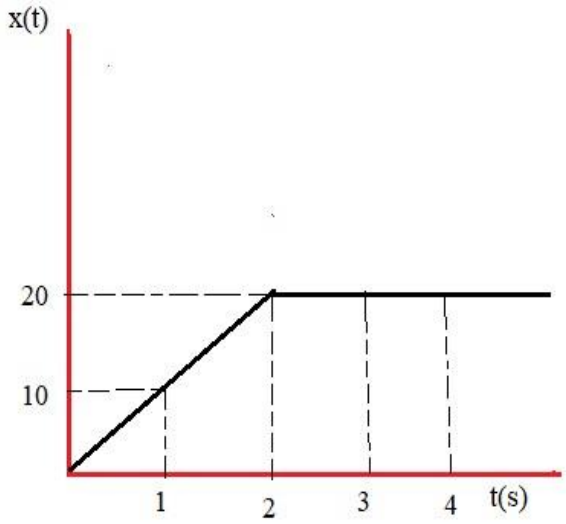
Example (1): A car moves 4 (m) in 2 (s) west, then its moves 12 (m) in 5 (s) east. Find

1. Total distance in (m).
2. Displacement in (m).
3. Average velocity in (m/s).
4. Average speed in (m/s)

Example (2): If the position of the car is given by $x(t) = 8t^2 + 2t + 1$ (m),Find

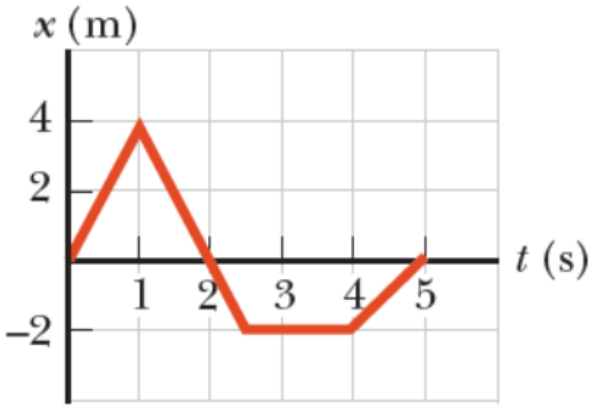
1. Displacement between $t_1 = 0$ (s) and $t_2 = 1$ (s) in (m).
2. Average velocity at $t_1 = 2$ (s) and $t_2 = 3$ (s) in (m/s).
3. Average speed at $t_1 = 2$ (s) and $t_2 = 3$ (s) in (m/s).
4. Instantaneous speed at $t = 3$ (s)

Example (3): An object is moving along the x-axis as the relation shown in the graph, where x in meter and t in second. What is the average speed between t = 1sec and t = 4sec.



Example (4): An object is moving along the x-axis as the relation shown in the graph, where x in meter and t in second.

1- What is the average velocity between t = 1sec and t = 4sec.
2- Find the velocity at t = 3s.



The average acceleration a_{avg} of the particle is defined as the *change* in velocity Δv_x divided by the time interval Δt during which that change occurs:

$a_{avg} = \frac{\Delta v}{\Delta t}$	m/s^2

……..

Instantaneous acceleration:

$a_x = \frac{dv}{dt}$	m/s^2

Example (5): A particle moves with velocity V(t) = t^2 + 2t + 1 (m/s), find the average acceleration between [0, 3] (s)

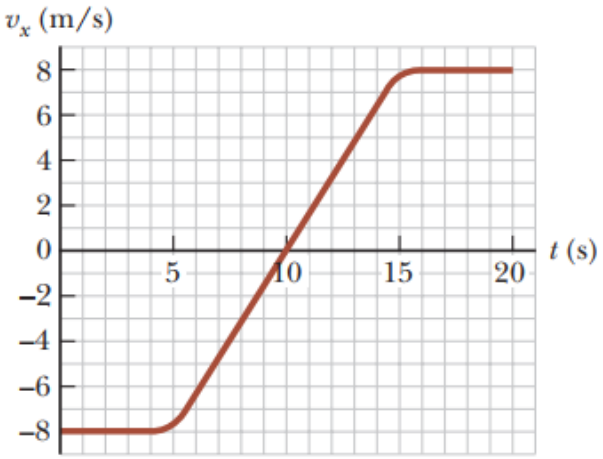
Example (6): The position of a car is given by $x(t) = t^2 + 2t + 1$, find the average acceleration between [1, 3] (s)

Example (7): The velocity of a stone is given by $v(t) = 3t^2 + 4t - 5$ (m/s), find the acceleration at $t = 2$ s .

Example (8): If the location of particle is given $x(t) = 3t^2 + 4t - 5$ (m), find the acceleration at 2 s .

Example (9): Two cars one moves toward each other , the first car moves with consist velocity with 140 m/s, where the second car moves with 60 m/s how many time need to meet each other if the distance between them was 20 m.

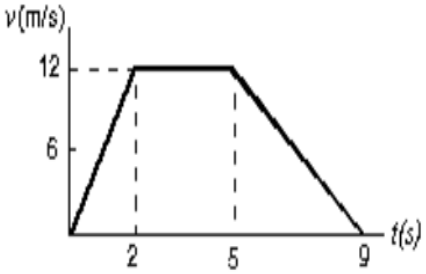
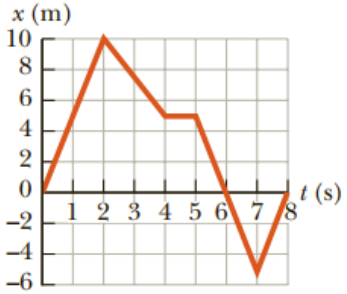
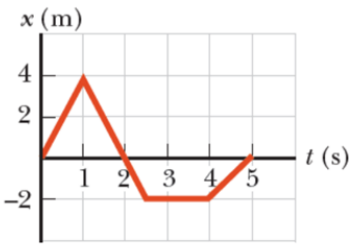
Example (10): A velocity–time graph for an object moving along the x axis is shown in Figure. Determine the average acceleration of the object in the time interval t = 5.00 s to t = 15.0 s



Example (11): A certain car is capable of accelerating at a rate of +0.70 m/s^2. How long does it take for this car to go from a speed of 30 mil ph to a speed of 90 mil ph?

1 mph = 0.447 m/s.

1	A person is moving along the negative x-axis. at t = 0, he is at x = 40m,and at 4 minute later, he is at x = 80 m. what is the average velocity of the whole trip? A) 0.17m/s B) -0.17m/s C) -0.5m/s D) 0.5m/s
2	An object moves in the x-axis where its position is given by the equation $x(t)= 1 -2t + t^2$, where t in second and x in meter. What is the average velocity of the object between t = 1 s and t = 4 s? A) 3m/s B) 1m/s C) 2m/s D) 4m/s
3	Particle moves along the x-axis according to the relation $X(t) =2-3t+t^3$ where x is in meters and t is in seconds. Find the average acceleration during the time interval t_1=1 sec and t_2=3 sec? A) $-12m/s^2$ B) $12m/s^2$ C) $24m/s^2$ D) $0m/s^2$
4	A bug is moving on a straight string with a constant speed of 2.5 m/s. after 20 s, the bug turns its direction back and moves with speed of 0.04 m/s for 120 s. find the average speed of the bug during its motion. A) 0.6m/s B) 0.39m/s C) 0.45m/s D) 0.77m/s
5	A car moves along the x-axis such that its displacement is given by $x(t) = t^3-27t$ (m), find the magnitude of the acceleration when the car velocity is equal zero? A) 2 m/s^2 B) 18 m/s^2 C) -9 m/s^2 D) 2.5 m/s^2
6	A person moves 70 m east, then 40 m west. What is the magnitude of its total displacement? A) 30 east B) 30 west C) 70 east D) 40 east
7	A person moves 70 m east, then 40 m west. What is the magnitude of its total distance? A) 30 B) -30 C) 110 D) 120
8	A truck is moving straight with constant speed 200 km/h for 100 km if its slow down with speed 125 km/h and travels another 25 km, find the average speed for whole tripe in unit (km/h). A) 150 B) 178.6 C)110 D) 120
9	A person is moving along the X-axis. At t=0, he is at position X= 40 m, and at 4 minute later, he is at X= - 80 m. What is the average velocity of the person for the whole trip? A) 0.7 i (m/s) B) 0.5i (m/s) C) 60 i (m/s) D) -0.5 i (m/s)
10	The position of an object moves along the x-axis is given by the equation $X(t) =2t^2+2t+4$. What its average velocity between t=1s and t=2s? A) 3(m/s) B) 8 (m/s) C) 4 (m/s) D) 1 (m/s)
11	A person moves 70 m east for first 14 s, then 40 m north in 2 s and finally 50 m west in 4 s. What is the magnitude of its average speed in the total 20 s? A) 10 (m/s) B) 6 (m/s) C)8 (m/s) D) 12 (m/s)
12	When is the average velocity of an object equal to the instantaneous velocity? A) always B) never C) only when the velocity is constant D) only when the velocity is increasing at a constant rate
13	A particle moves along the x-axis according to the relation $X(t) =2 - 3t - t^3$ where x is in meters and t is in seconds. Find the magnitude of acceleration at t=1 sec A) -6 (m/s^2) B) 6 (m/s^2) C) -2 (m/s^2) D) 0 (m/s^2)
14	If the apart distance between two particles is 40 km, and the particle A moves with 80 km/h behind particle B, how many time need to meet each other if the particle B moves with 60 km/h? A) 6 hours B) 4 hours C) 2 hours D) 3 houes
15	The diagram represents the straight line motion of a car. Which of the following statements

	is true? A) The car accelerates at 6 m/s for the first 2 s B) The car accelerates at –12 m/s for the last 4 s C) The car returns to its starting point when t = 9 s D) The car is moving for a total time of 12 s 
16	An object moving in the +x axis experiences an acceleration of 2.0 m/s2. This means the object is A) traveling at 2.0 m in every second. B) traveling at 2.0 m/s in every second. C) changing its velocity by 2.0 m/s. D) increasing its velocity by 2.0 m/s in every second
17	Suppose that an object is moving with constant acceleration. Make a statement concerning its motion with respect to time. A) In equal times its speed increases by equal amounts. B) In equal times its velocity changes by equal amounts. C) In equal times it moves equal distances. D) A statement cannot be made using the information given.
18	The slope of a position versus time graph gives A) position. B) velocity C) acceleration. D) displacement.
19	The slope of a velocity versus time graph gives A) position. B) velocity C) acceleration. D) displacement
20	A graph of position versus time for a certain particle moving along the x-axis is shown in Figure. Find the average velocity in the time intervals from 2.00 s to 7.00 s. A) -3.0 m/s B) 0.8 m/s C) 1.4 m/s D) 0.6 m/s 
21	A tennis player moves in a straight-line path as shown in Figure P2.8. Find her average velocity in the time intervals from 0 to 4.0 s. A) 1 m/s B) 0.5 m/s C) -0.5 m/s D) 0 m/s 

1	2	3	4	5	6	7	8	9	10	11	12	13
B	**A**	**B**	**B**	**B**	**A**	**C**	**B**	**D**	**C**	**C**	**C**	**B**
14	**15**	**16**	**17**	**18**	**19**	**20**	**21**					
C	**A**	**D**	**B**	**B**	**C**	**A**	**C**					