Physics 11 Test 1
Time : 1.5 hrs

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1 Preamble

This is a test covering what we have learnt so far in lecture, that being Sections 1,2,3. The time expected to complete this test is just under an hour and half granted that the student is adequately prepared. Throughout the test, the student must show all work to receive full marks.

2 Allowed Aids

The following aids are allowed on the Test

- Pencil, Pen, Eraser, Ruler, Protractor, Spare sheets of **blank** paper.
- Reference sheet **(FROM WEBSITE ONLY)**
- Basic scientific calculator

3 Restrictions:

The student is not allowed to communicate with any outside source, nor allowed to access any external aid on the internet,etc. The student may ask the instructor (ME) any questions or confusions but is advised to do so only when all else has failed due to the time constraints.

4 Name and Date:

Print your name and todays date below;

Name	Date

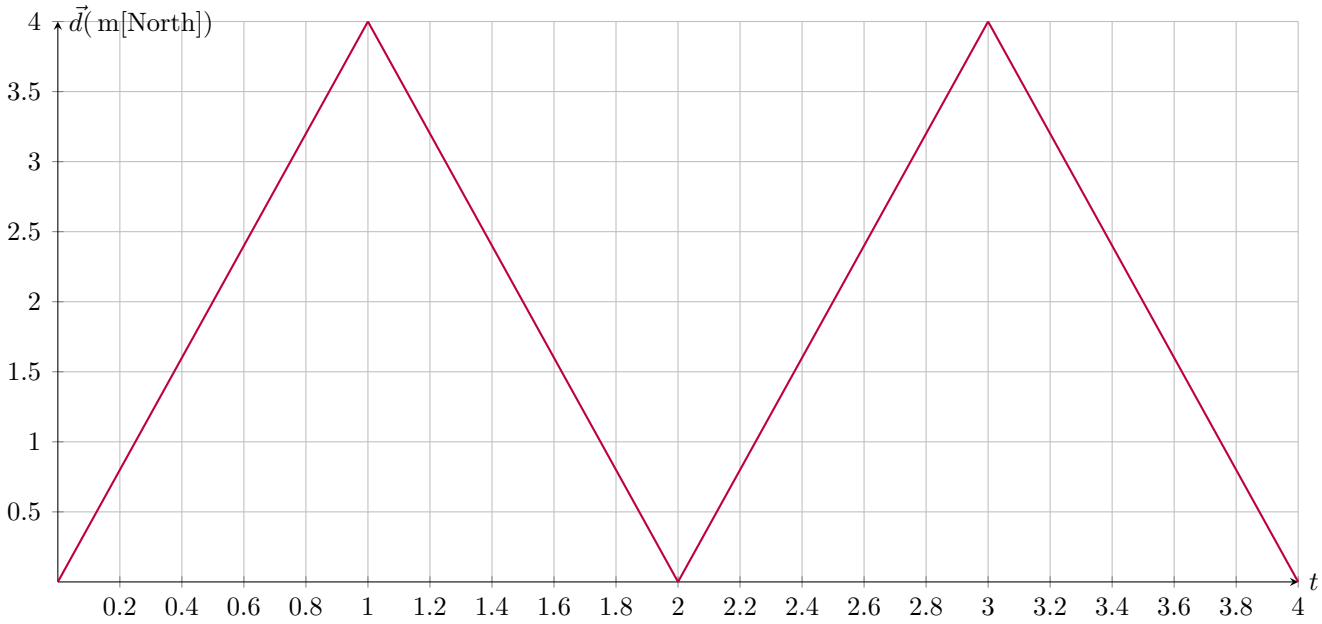
Question 1:

Answer the following True / False questions **(Assume [North],[East] is positive)**

1. The maximum height I can jump on a trampoline is $d = 5000\,\text{m}$. I jump 3 times on the trampoline and the time elapsed was $\Delta t = 20\,\text{s}$. (**Assume** that a single jump means I reached my maximum height **and** landed back on the trampoline)
   (a) My average velocity relative to the trampoline was $\vec{v}_{av} = +1700\,\text{m/s}$. (T / F)
   (b) My average speed was $v_{av} = 1.5\,\text{km/s}$. (T / F)
2. Suppose that relative to the center of a field, a batsmen stands at $\vec{d}_i = 50\,\text{m[East]}$. The batsmen bats a baseball at an average velocity of $\vec{v}_{av} = 350\,\text{m/s[West]}$. The time elapsed was $\Delta t = 15\,\text{s}$.
   (a) $\vec{d}_f = 5200\,\text{m[East]}$ is the final position vector. (T / F)
   (b) The magnitude of the average velocity is equal to the average speed. (T / F)
3. Consider the Moon orbiting the Earth
   (a) The average velocity of the Moon is always non-zero. (T / F)
   (b) The average speed of the Moon is always non-zero. (T / F)
4. Consider the equation of motion of Car A : $x = -\frac{3}{2}t + 12$ and Car B : $x = \frac{7}{2}t - 7$
   (a) Car A has a greater average velocity than Car B. (T / F)
   (b) Car B is initially [East] relative to the reference point. (T / F)
   (c) Car A is initially [West] relative to the reference point. (T / F)
   (d) Both drivers experienced uniform motion. (T / F)
   (e) Car A and Car B will meet at $t = 4\,\text{s}$. (T / F)
5. I kick a soccer ball at an average speed v_{av} and it takes Δt seconds to reach a distance of d meters.
   (a) Kicking the soccer ball at $2v_{av}$ will allow it to travel $\frac{d}{2}$ meters in Δt seconds. (T / F)
   (b) Kicking the soccer ball at $\frac{v_{av}}{2}$ implies that it would take $2\Delta t$ seconds to travel d meters. (T / F)

Question 2:

Answer the following multiple choice questions. Refer to the plot below for all Q1,Q2.



1. Which of the following scenarios best describe the motion depicted in the plot,
   (a) A ball rolling [North] across a flat road
   (b) A sprinter running on a circular track.
   (c) A man jumping on a trampoline.
2. Which of the following statements are correct about the plot?
   (a) The body experienced uniform motion within the time interval $[1, 2]$.
   (b) The body experienced uniform motion within the time interval $[0, 4]$
   (c) Within the time interval $[0, 2]$, the average velocity was $\vec{v}_{av} = +0\,\mathrm{m/s}$.
   (d) Within the time interval $[2, 3]$, the average velocity was $\vec{v}_{av} = +4\,\mathrm{m}/\ s$.
   (e) The average speed within the time interval $[0, 4]$ was $v_{av} = 4\,\mathrm{m/s}$.
3. I label three points on a straight line, F, G, H. Which of the following statements are true?
   (a) $\vec{d}_{FG} = \vec{d}_{GF} + \vec{d}_{GH}$
   (b) $\vec{d}_{HF} = (-\vec{d}_{FG}) + (-\vec{d}_{HG})$
   (c) $\vec{d}_{FH} = (-\vec{d}_{GF}) + (-\vec{d}_{HG})$
   (d) $-\vec{d}_{FG} = \vec{d}_{GH} + \vec{d}_{HG}$

Question 3:

Covert the following units to km/ h.

(a) 44200 m/ s

(b) 66 km/ s

(c) 5512 in/ min

Question 4:

Compute the **displacement** (or net displacement) given the position vectors. Assume that the reference point is $(0, 0)$ for all vectors.

(a) $\vec{d_1} = 514\,\text{m[West]}$, $\vec{d_2} = 332\,\text{m[West]}$

(b) $\vec{d_1} = 51\,\text{m[S]}$, $\vec{d_2} = 33\,\text{m[S]}$, $\vec{d_3} = 27\,\text{m[N]}$, $\vec{d_4} = 93\,\text{m[N]}$,$\vec{d_5} = 298\,\text{m[S]}$, $\vec{d_6} = 432\,\text{m[N]}$

(c) $\vec{d_1} = 4\,\text{m[East]}$, $\vec{d_2} = 4\,\text{m[West]}$, $\vec{d_3} = 4\,\text{m[North]}$, $\vec{d_4} = 4\,\text{m[East]}$

Question 5:

Determine the sum/difference of the following vectors **geometrically**. Use the $x-$dimensional coordinate system.

(a) $\vec{A} = +2$, $\vec{B} = -8$

$$\vec{A} + \vec{B}$$

(b) $\vec{A} = +4$, $\vec{B} = -3$, $\vec{C} = +10$, $\vec{D} = -12$, $\vec{E} = -13$, $\vec{F} = +20$

$$(\vec{A} + \vec{B}) - (\vec{C} - \vec{D}) + (\vec{E} - \vec{F})$$

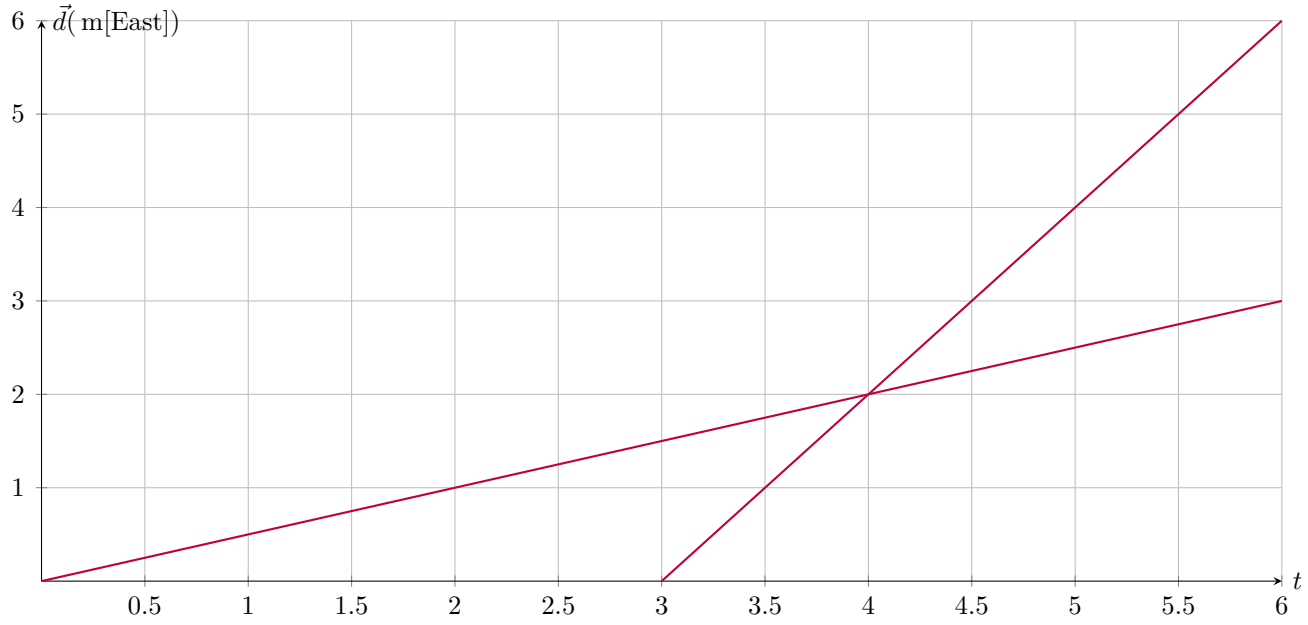
Question 6:

Suppose a train took the following route the other day to the following cities; Oshawa, Pickering, Markham, London (Starting at Oshawa). Given below are all of his position vectors along the trip (All relative to **Toronto**). Compute his average velocity as well as his average speed if the trip took 4 h.

- $\vec{d}_{OSH} = 224\,\text{km[East]}$
- $\vec{d}_{PKR} = 154\,\text{km[East]}$
- $\vec{d}_{MRK} = 72\,\text{km[West]}$
- $\vec{d}_{LND} = 556\,\text{km[East]}$

Question 8:

Two tourists, Tourist A, Tourist B, decide to tour a city, below we depict their Position V. Time plots, however, we were only able . Your task is to determine the equations of motion for both Tourists using the plots given.



Question 9:

(Half circle problem)

Question 10:

(Bunny hopping relative vetcor problem)

Question 11:

(Cliff problem)