Mohamed Boudiaf University of Msila.
Faculty of sciences
Field : Sciences of matter (SM)
1st year LMD   Semester 01.

جامعـة محمد بوضياف ـالمسيلـة
كليـة العلـوم
ميدان : علوم المادة
السنة الأولى ل م د - السداسي 01

Physics 01: Mechanics of point particle.

University Year 2023-2024

Evaluation exam

EXERCISE 01: (6 pts)

Let's be: $\vec{A} = -5\vec{\imath} - 3\vec{\jmath} + 2\vec{k}$ and $\vec{B} = -2\vec{\jmath} - 2\vec{k}$

1- Calculate the magnitude for each vector.

2- Calculate: $\vec{A}.\vec{B}$ *and* $\vec{A} \wedge \vec{B}$.

3- Calculate the angle between $\vec{A}$ and $\vec{B}$.

4- Find the components of a vector $\vec{C}$ that is perpendicular to $\vec{B}$, is in the (yoz) plane and has a magnitude of 5 units.

EXERCISE 02: (8 pts)

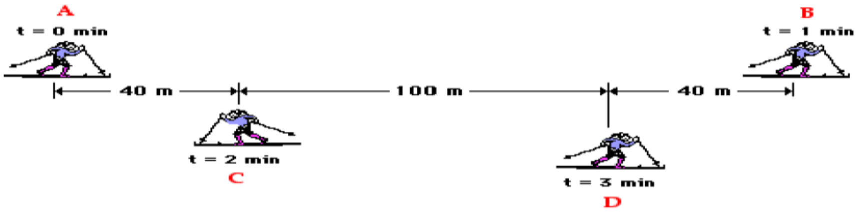
1- The position of a particle moving along the y-axis is given as: $y = At^2 - Bt^3$, where y is measured in meters and t in seconds. Find the dimensions of A and B.

2- Cite the various frames of reference, the coordinates and unit vectors of each referential.

3-a- Define the average speed and the average velocity.

3-b- Use the following diagram to determine the average speed and the average velocity of the skier during:

- 0 min and 3 min.
- 1 min and 3 min.



EXERCISE 03: (7 pts)

The polar coordinates of a material point are : $\rho(t) = ae^{\theta}$, $\theta = wt$, w: constant, a: constant

1- Write the vector position in polar coordinates.

2- Find the velocity and acceleration in polar coordinates and calculate their magnitudes.

2- Calculate the tangential acceleration and the normal acceleration.

4- Deduce the radius of curvature.

5- Calculate the curvilinear abscissa S(t) as a function of time.

Good luck

F. Mezahi, S. Hamrit