PHYS 250 Test 1 Ch2-3 Photo Upload

David Yang

TOTAL POINTS

92.5 / 100

QUESTION 1

1 7 / 10

   - **0 pts** Correct

   - **2 pts** Positive is to the right

✓ **- 1 pts** Starts at x>0

✓ **- 2 pts** Constant accel, so velocity is a straight line.

   - **2 pts** Constant accel, so position is a parabola

   - **1 pts** Initial velocity is negative

   - **3 pts** These appear to be diagrams- the question is asking for graphs

QUESTION 2

2 23 / 25

✓ **- 0 pts** Correct

   - **0.5 pts** Don't forget units.

✓ **- 2 pts** If x vs. t is parabolic, v vs t will be linear (constant accel)

   - **3 pts** For b, I'm afraid you are doing the wrong time interval.

   - **1 pts** a) forgot the negative

   - **4 pts** a) work not shown

   - **4 pts** b) incorrect formula

   - **12 pts** c) incorrect

   - **1 pts** b) lost the negative

   - **2 pts** b) delta t is 2s

   - **3 pts** c) correct except for 3-4 seconds

   - **4 pts** a) find slope

   - **7 pts** c) incorrect except for 2-3 s and 4-6s

   - **8 pts** c) Incorrect except for 0-2 s and 4-6 s

   - **3 pts** c) Correct except show horizontal line at the end.

   - **3 pts** a) need to focus on 2-3 second interval

   - **15 pts** No part c

   - **2 pts** Graph correct except for 4-6 seconds- should be positive velocity.

   - **5 pts** No answer for a.

   - **3 pts** a) incorrect denomenator

   - **3 pts** b) numerator incorrect

   - **3 pts** c) correct except 4-6 s not shown

   - **0 pts** Click here to replace this description.

   - **1 pts** b) lost the neagative

   - **15 pts** c) graph incorrect

QUESTION 3

3 2.5 / 5

   - **0 pts** Correct

✓ **- 2.5 pts** You have shown the radial accel, but there is also tangential accel.

   - **2 pts** Tangential accel. is in the same direction as the motion since it is speeding up.

   - **3 pts** Don't forget about radial accel.

   - **3 pts** Radial accel is towards the center. You did get tangential accel. correct

   - **5 pts** No accel shown

QUESTION 4

4 30 / 30

   + **30 pts** Correct

✓ + **5 pts** Clear diagram

✓ + **5 pts** Catalog of variables

✓ + **5 pts** Found components of v

✓ + **5 pts** Used const vel. in x-direction to find time

✓ + **10 pts** Used Const. accel in y-direction to find final position

✓ + **5 pts** Correctly stated x and y equations, but did not apply them.

   + **2 pts** Diagram of components of v, but did not find components

✓ - **1 pts** Calculation error

   - **3 pts** The particle does not move in a straight line.

   - **2 pts** Forgot y-accel is nagative

    - 2 pts You mixed up the x and y components of v

    - 2 pts Diagram doesn't accurately show wall.

    - 3 pts Only included a few known variables in the catalog

    - 2 pts Forgot the initial height

    + 0 pts Invalid equations used

    💬   Time calculation is wrong. Probably order of operations error.
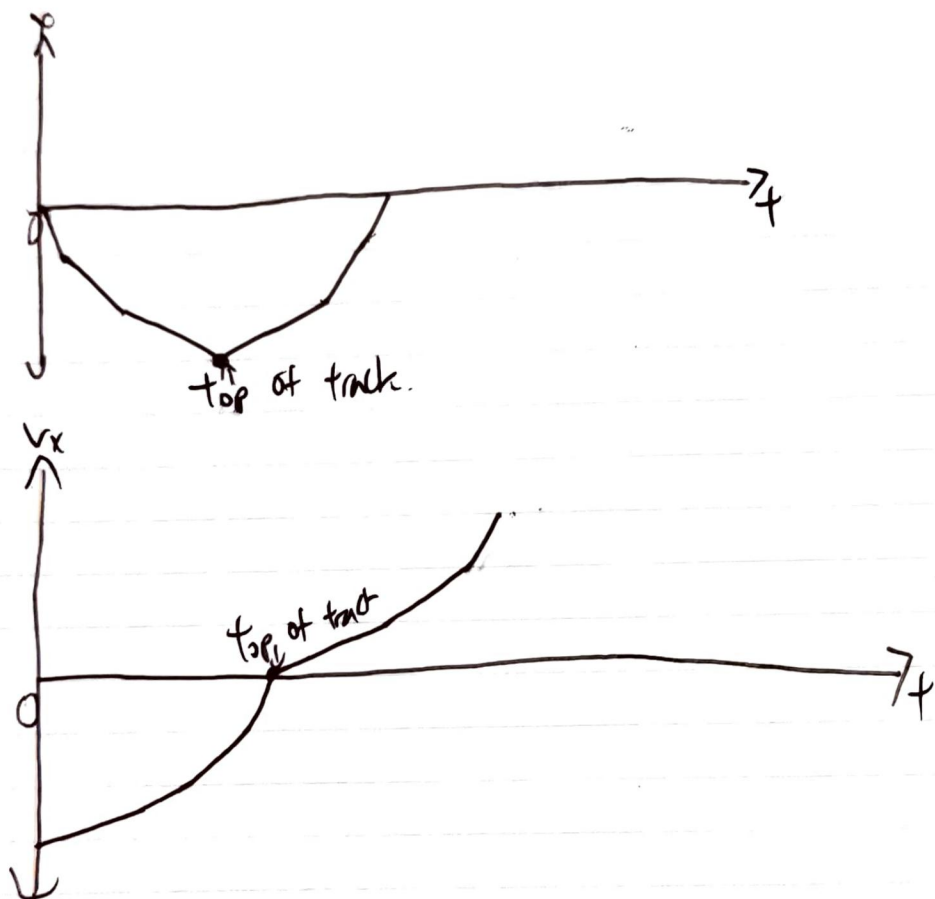
QUESTION 5

5 30 / 30

    ✓ **+ 30 pts** **Correct**

    + 10 pts Diagram showing three key moments

    + 5 pts Catalog of variables

    + 5 pts Found distance moved at constant velocity

    + 10 pts Use const. accel equation on second interval to find accel.

    - 1 pts calculation error

    - 2 pts XC is 150, not 60

    - 3 pts Forgot the negative

    - 2 pts delta_t_BC is 4 not 7

    - 1 pts missing units

    + 0 pts No answer

    - 0.5 pts forgot ^2 on the seconds.

    - 5 pts A pictoral diagram (rather than just a graph) is really helpful. Label key moments clearly

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Question 1.

top of track.

top of track

Question 2.

a. The instantaneous velocity at 2.5s is ~~the same~~.
   ~~velocity~~ is also the same as change in position at

a. $\dfrac{p(3) - p(2)}{t(3) - t(2)} = \dfrac{2m - 6m}{1s} = -\dfrac{4m}{s}$. The object at 2.5 seconds is on a linear slope, so we don't need calculus.

b. Average velocity from t=1s to t=3s

$\dfrac{p(3) - p(1)}{t(3) - t(1)} = \dfrac{2m - 4m}{3s - 1s} = \dfrac{-2m}{2s} = -1m/s$

1 7 / 10

- **0 pts** Correct
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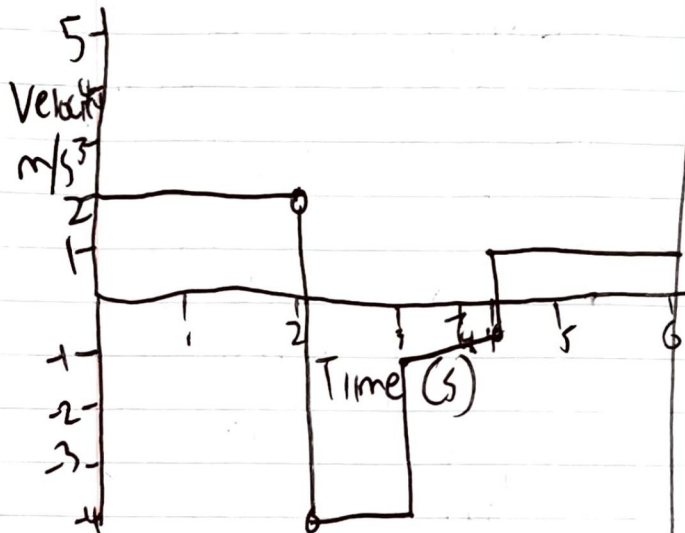- **3 pts** These appear to be diagrams- the question is asking for graphs

Question 1.

top of track.

top of track

Question 2.

The instantaneous velocity at 2.5s is ~~negative~~. velocity is also the same as change in position at

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$\dfrac{p(3) - p(1)}{t(3) - t(1)} = \dfrac{2m - 4m}{3s - 1s} = \dfrac{-2m}{2s} = -1 m/s$

Question 2 graph:

Velocity m/s

Time (s)

Question 3:

acceleration vector

Question 4.

$V_0 = 150 m/s$

$30°$

$1.5m$

$100m$
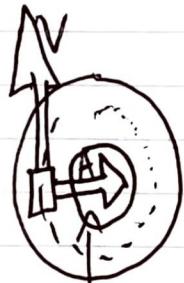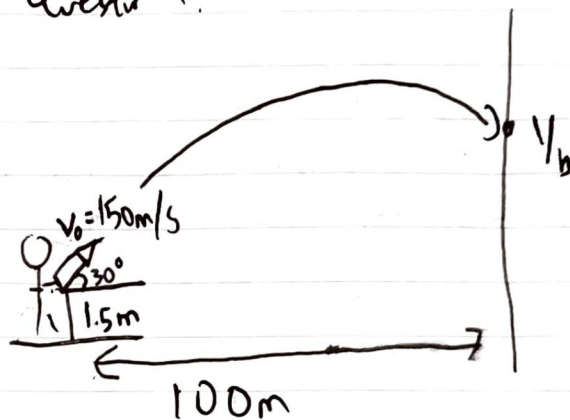
Variables:

$X_0 = 0 \quad X_b = 100 \quad Ⓧ = 30°$

$Y_0 = 1.5 \quad Y_b = ?$

$V_0 = 150 m/s$

$V_{x_0} = 150 \cos(30°)$

$V_{y_0} = 150 \sin(30°)$

$t_{\Delta AB} = ? \quad \downarrow$ X component to find time

$100 = 0 + 150 \cos(30°) \cdot t_{\Delta AB} + 0 \cdot (t_{\Delta AB})$

$100 = 150 \cos(30°) \times t_{\delta AB}$

$t_{\delta AB} = \dfrac{100}{150 \cos(30°)} = 1.\overline{33}$

$Y_B = Y_0 + 150 \sin(30°) \cdot t_{\delta AB} + \dfrac{-9.9}{2} \cdot$

$Y_B = 1.5 + 75 \cdot 1.\overline{33} + -4.9 (1.3\overline{3})^{(t_{\delta AB})}$

$Y_B = 92.7889 m$

The arrow hits the wall at 92.7889 meters above the ~~red~~ ground.

2 23 / 25

✓ - **0 pts** Correct

  - **0.5 pts** Don't forget units.

✓ - **2 pts** If x vs. t is parabolic, v vs t will be linear (constant accel)

  - **3 pts** For b, I'm afraid you are doing the wrong time interval.

  - **1 pts** a) forgot the negative

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  - **15 pts** No part c

  - **2 pts** Graph correct except for 4-6 seconds- should be positive velocity.

  - **5 pts** No answer for a.

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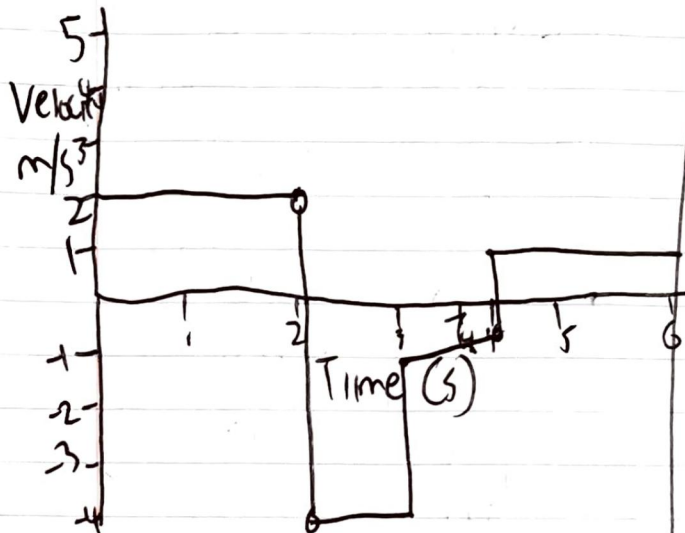 - **3 pts** b) numerator incorrect

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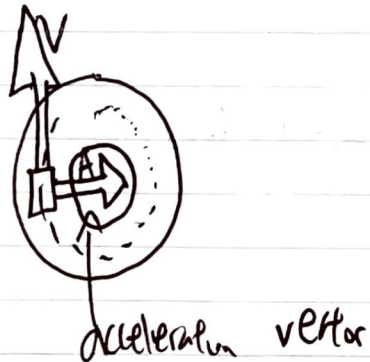 - **0 pts** Click here to replace this description.

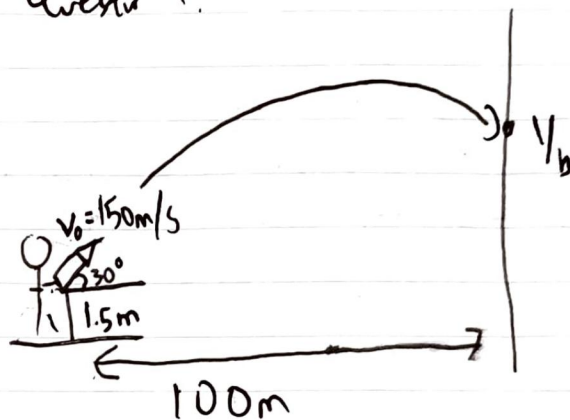 - **1 pts** b) lost the neagative

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Question 2 Graph.

Question 3.

acceleration vector

Question 4.

Variables:

$X_0 = 0$ $X_b = 100$ $\theta = 30°$

$Y_0 = 1.5$ $Y_b = ?$

$v_0 = 150 m/s$

$V_{xo} = 150 \cos (30°)$

$V_{yo} = 150 \sin (30°)$

$t_{\Delta AB} = ?$ ↓ X component to find time

$100 = 0 + 150 \cos (30°) \cdot t_{\Delta AB} + 0 \cdot (t_{\Delta AB})$

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3 2.5 / 5

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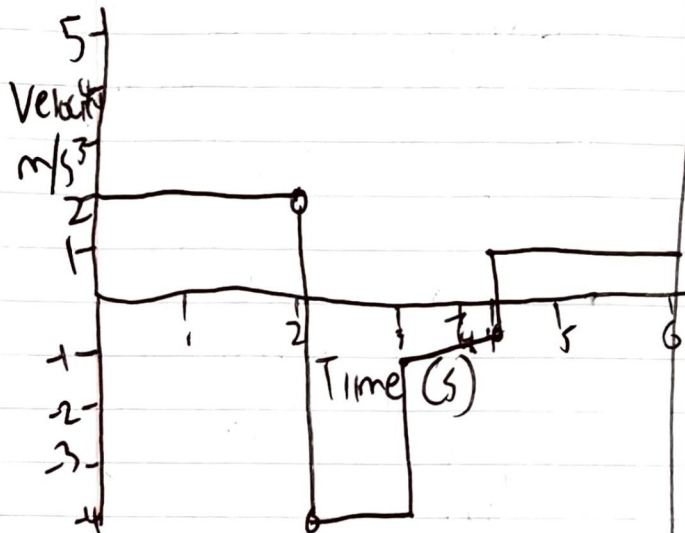
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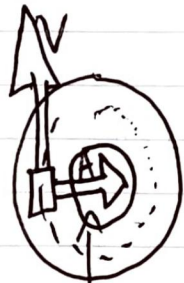
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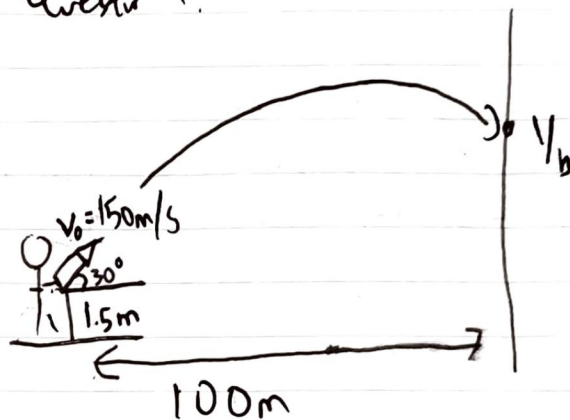
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Question 2 graph:

Question 3:

acceleration vector

Question 4.

Variables:

$X_0 = 0$ $X_b = 100$ $\theta = 30°$

$Y_0 = 1.5$ $Y_b = ?$

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4 30 / 30

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  ✓ **+ 5 pts** Clear diagram

  ✓ **+ 5 pts** Catalog of variables

  ✓ **+ 5 pts** Found components of v

  ✓ **+ 5 pts** Used const vel. in x-direction to find time

  ✓ **+ 10 pts** Used Const. accel in y-direction to find final position

  ✓ **+ 5 pts** Correctly stated x and y equations, but did not apply them.

    + 2 pts Diagram of components of v, but did not find components

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    - 3 pts The particle does not move in a straight line.

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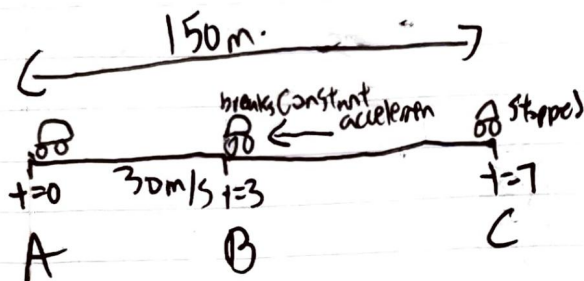   **- 3 pts** Only included a few known variables in the catalog

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Question 5.

Solve for a_{BC}

Variables: $v_A = 30 m/s$

~~$v_B = 30 m/s$~~ $v_B = 30 m/s$ $A = 0 m$

~~v_B~~ $v_C = ?$ $B = 90 m$ $3 \cdot 30 = 40 m$

$C = 150 m$

$a_{ab} = 0$

$a_{bc} = ?$

$t_{\Delta AB} = 3 s$

$t_{\Delta BC} = 4 s$

$t_{\Delta AC} = 7 s$

Use

$$x_B = x_A + v_A \delta t_{AB} + \frac{a_{AB}}{2} \cdot (\Delta t_{AB})^2$$

$$\downarrow$$

$$x_C = x_B + \left(v_B \cdot \Delta t_{BC} \right) + \left(\frac{a_{BC}}{2} \cdot (\Delta t_{BC})^2 \right)$$

$$150 m \approx 90 m + 30 \frac{m}{s} \cdot 4s + \frac{a_{BC}}{2} \cdot (4s)^2$$

$$\frac{a_{BC}}{2} \cdot (4s)^2 = -60 m$$

$$\frac{a_{BC}}{2} = \frac{-60 m}{(4s)^2}$$
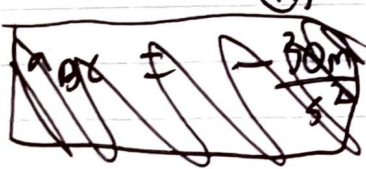
$$a_{BC} = \frac{-120 m}{16 s^2}$$

$$\boxed{a_{BC} = \frac{-7.5 m}{s^2}}$$

5 30 / 30

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    + 10 pts Diagram showing three key moments

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    + 5 pts Found distance moved at constant velocity

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