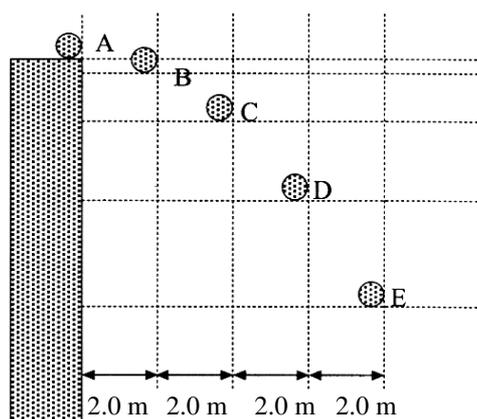


## Projectile Motion Assignment 2

1. Draw a diagram showing the path of a projectile thrown upwards at an angle from level ground. At the start, maximum height and end:

- draw a vector showing the direction and magnitude of velocity
  - draw a vector showing the direction and magnitude of the acceleration
- /3

2. The multi-image diagram below represents a projectile that has been thrown horizontally from the top of a cliff. The time interval between images is 0.20s.



(a) Explain how the diagram shows the horizontal component of acceleration is zero throughout the projectile's motion.

/2

(b) Calculate the velocity of the projectile 0.34 s after it has been thrown.

Include somewhere in your working a vector diagram showing how the horizontal and vertical components add to give the final velocity.

/5

3. Two projectiles are launched with the same initial speed, and from the same initial height, but at different launch angles. They result in the same range.

- (a) Draw a diagram showing both flight paths.
  - (b) Discuss the relationship between the two launch angles.
- /1  
/2

4. Describe the effect air resistance has on both the horizontal component and the vertical component of velocity, and hence the time of flight and the range, of a projectile launched horizontally from a height.

/3

5. An evil but very precise student throws a textbook from the 89.99 cm height of his desk at  $7.164 \text{ ms}^{-1}$ , at an angle of  $26.20^\circ$  above the horizontal. It lands on another student's desk which just so happens to be the same height.

- (a) Calculate the distance between the desks
  - (b) Calculate the maximum height of the throw
- /4  
/3

6. For a tennis ball and a table tennis ball travelling at the same speed:

- (a) State two reasons why the tennis ball has a greater force of air resistance.
  - (b) State why the table tennis ball has greater acceleration due to air resistance.
- /2  
/1

Total marks: /26