

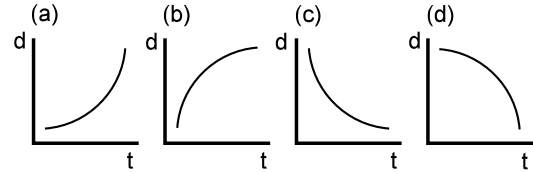
**PART A: MULTIPLE CHOICE (10 MARKS)**

Choose the best response in each case and place your answer in the appropriate space on your answer sheet.

- A passenger on a bus walks towards the back of the bus at 3.0 km/h relative to the bus, while the bus travels south at 15 km/h. The passenger's velocity relative to the road is:
  - 18 km/h[N]
  - 18 km/h[S]
  - 12 km/h[N]
  - 12 km/h[S]
- Which of the following motions is not uniform?
  - A satellite in orbit around the Earth.
  - A ball rolls along a table without changing velocity.
  - A jogger runs 50 m along a straight track at a constant speed.
  - An elevator moves vertically upward at zero acceleration.
- An athlete completes two laps of a circular track of circumference 100 m. At the end of the run the athlete's total distance travelled is:
  - 0 m
  - 50.0 m
  - 100 m
  - 200 m
- A bear searching for food walks 15 km[E], 5.0 km[S], 3.0 km[W], and 5.0 km[N]. The bear's resultant displacement is:
  - 12 km
  - 12 km[E]
  - 28 km
  - 28 km[E]
- A car travels 4.0 km[N] and then 3.0 km[S]. If the total trip requires 15 min, the average speed of the car for the trip is:
  - 4.0 km/h
  - 4.0 km/h[N]
  - 28 km/h
  - 28 km/h[N]

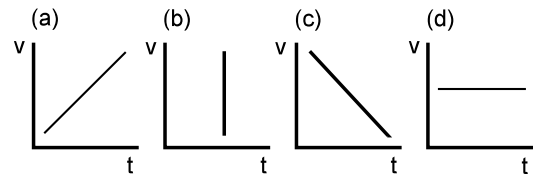
- Velocity can be obtained from:
  - the slope of an velocity-time graph.
  - the slope of a position-time graph.
  - the area under an velocity-time graph.
  - the area under a position-time graph.

Use the graphs below to answer questions 7 and 8.



- Which graph shows an object speeding up as it moves away from home?
- Which graph shows an object slowing down as it moves back toward home?

Use the graphs below to answer questions 9 and 10.



- Which graph represents the motion of an object increasing in velocity?
- Which graph represents an impossible situation?

**PART B: MATCH (5 MARKS)**

Match the definition from the 1<sup>st</sup> column to the best term in the 2<sup>nd</sup> column and place the matching letter in the appropriate space on your answer sheet.

- Total displacement of an object per unit time
- The area under this graph is used to construct the corresponding position-time graph.
- Quantity that has magnitude, but no direction.
- Total length of path travelled by an object as it moves from one position to another
- The slope of this graph is used to construct the corresponding velocity-time graph.

- acceleration
- acceleration-time graph
- displacement
- distance
- position-time graph
- scalar quantity
- speed
- vector quantity
- velocity
- velocity-time graph

**PART A: MULTIPLE CHOICE (10 MARKS)**

1	2	3	4	5	6	7	8	9	10
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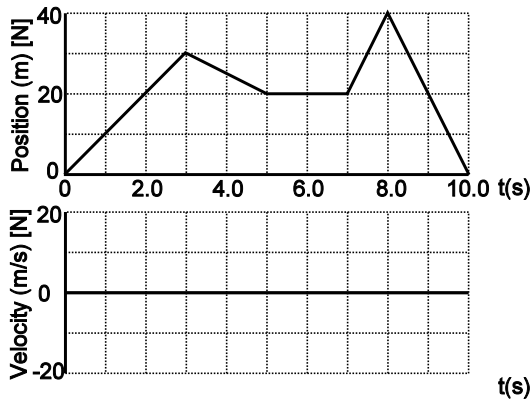
**PART B: MATCH (5 MARKS)**

1	2	3	4	5
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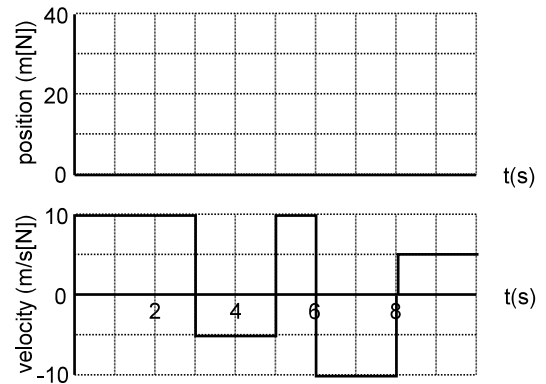
**PART C: SHORT ANSWER (20 MARKS)**

Answer the following questions in the space provided.

1. An object moves as shown on the d-t graph.



2. An object moves as shown on the v-t graph.



{5} (a) Sketch the graph of velocity vs time.

{5} (b) Determine the object's:

- ① position at 7.0 s \_\_\_\_\_ m[N]
- ② total distance \_\_\_\_\_ m
- ③ total displacement \_\_\_\_\_ m[N]
- ④ average speed for entire trip \_\_\_\_\_ m/s
- ⑤ average velocity for entire trip \_\_\_\_\_ m/s[N]

{5} (a) Sketch the graph of position vs time.

{5} (b) Determine the object's:

- ① velocity at 7.0 s \_\_\_\_\_ m/s[N]
- ② total distance \_\_\_\_\_ m
- ③ total displacement \_\_\_\_\_ m[N]
- ④ average speed for entire trip \_\_\_\_\_ m/s
- ⑤ average velocity for entire trip \_\_\_\_\_ m/s[N]

**PART D: PROBLEMS (25 MARKS)**

Answer the following questions on a separate sheet of paper. You may use the back of this sheet if you wish.

1. A dog, initially sitting next to its owner, runs first to a position 2.8 m[W] of its owner, and then secondly to a position 12.6 m[E] of its owner.
  - {4} (a) Draw a diagram showing the (i) position vectors and (ii) resultant displacement vector in this situation.
  - {4} (b) Determine the dog's total distance and total displacement.
  
- {5} 2. R.R. Hood is travelling to visit her grandmother. First, she travels at an average speed of 12 km/h for 10 km. Then she travels at 8.0 km/h for another 1.25 h. Calculate her average speed for the entire trip to grandma's house? (Don't worry about the return trip - she catches a ride with B.B. Wolf)
  
- {4} 3. A snowboarder starting from rest accelerates uniformly downhill at 2.7 m/s<sup>2</sup>[fwd]. How long will it take the boarder to reach a point 95 m[fwd] from the starting position?
  
- {4} 4. A plane travelling at 63 m/s[S] down a runway begins accelerating uniformly at 2.8 m/s<sup>2</sup>[S]. How far does it travel in 4.0 s?
  
- {4} 5. A flying saucer moving initially at 20 m/s[E] accelerates to 50 m/s[W] in 3.8 s. Find the saucer's average acceleration during the time interval.