Conceptual Questions for Motions

Question 1 A object goes from point X to Y and then come back from Y to X. What is the displacement and average velocity?

Answer Displacement is zero as it come back to it initial point

Now Average velocity is given Displacement/time. Since displacement is zero, Average velocity is also zero

Question 2 Write down the difference between Scalars and Vectors?

Answer

S.no	scalars	Vectors
1	It has magnitude only	It has magnitude and direction both
2	Example are speed,time,mass,charge	Example are velocity,displacement,acceleration,force

Question 3 Four Cyclist A,B,C ,D starts at the same point and at the same time and move in a straight line to reach destination .They all move with uniform velocities. They reach the destination in the following order

 C -> A -> B -> D

Answer the following questions

a) If the displacement-time graph is plotted for each cyclist, which will be having highest slope

b) Arrange the cyclist in decreasing order of velocity

Answer

Since C is fastest cyclist, it velocity is highest and Slope of displacement time graph will be highest for him. Velocity of cyclist in decreasing order

C > A > B > D

Question 4 What do you infer if?

1	Distance –time graph is straight line	

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2	Velocity –time graph is curved	
3	Displacement –time is zig zag	

Answer

1	Distance –time graph is straight line	Speed is constant
2	Velocity –time graph is curved	Acceleration is not uniform
3	Displacement –time is zig zag	Non uniform velocity

Question 5 What is the difference between Uniform Accelerated and Non Uniform accelerated motion?

Answer

S.no	Uniformly Accelerated	Non Uniformly accelerated
1	A body is said to be in uniform acceleration if it travels in a straight line and its velocity increases or decreases by equal amounts in equal intervals of time.	A body is said to be in non uniform acceleration if the rate of change of its velocity is not constant in equal intervals of time
2	Motion under acceleration under gravity is perfect example for uniform accelerated motion	A car moving in a straight line. Some time putting more pressure on the accelerator pedal is a perfect example of non uniform accelerated motion.
3	Following equations could be use here $$v^2 = u^2 + 2aS$$ $$v = u + at$$ $$s = ut + \frac{1}{2}at^2$$	No equation available

Question 6 What happens to speed, velocity acceleration when an object moves in a circle with uniform speed?

Answer Speed remains constant

Velocity magnitude remains constant, but direction changes continuously

Acceleration magnitude remains constant but direction changes continuously

Question 7 When an object is thrown upwards, what is true of velocity and acceleration at the highest point of motion of the object?

Answer Velocity becomes zero

Acceleration remains same as g

Question 8 True **and False Statements**

A) Displacement can be zero but distance never

B) Displacement magnitude can be greater than distance travelled by the object

C) Time is a vector quantity

D) If the velocity of the body decreases with time, the acceleration is negative (retardation), and the motion is called decelerated motion

E) The area of the velocity time graph gives displacement of the body

F) Acceleration is a scalar quantity

G) Motion and rest are relative terms

I) an object can be moving with Uniform speed but variable acceleration

Solutions

A) True

B) True

C) False

D) True

E) True

F) False

G) True

I) True

Question 9 Gave the formula for each

1	Relation between Initial, final velocity ,acceleration and displacement in a uniformly accelerated straight line motion	
2	Average velocity	
3	Relation between Initial, final velocity ,acceleration and time in a uniformly accelerated straight line motion	
4	Relation between Initial velocity ,acceleration ,displacement and time in a uniformly accelerated straight line motion	
5	Average acceleration	
6	Average speed	

Solutions

1	Relation between Initial, final velocity ,acceleration and displacement in a uniformly accelerated straight line motion	$v^2 = u^2 + 2aS$
2	Average velocity	$v = \dfrac{D}{t}$
3	Relation between Initial, final velocity ,acceleration and time in a uniformly accelerated straight line motion	$v = u + at$
4	Relation between Initial velocity ,acceleration ,displacement and time in a uniformly accelerated straight line motion	$s = ut + \dfrac{1}{2}at^2$
5	Average acceleration	$a = \dfrac{\Delta v}{t}$
6	Average speed	$s = \dfrac{d}{t}$

Question 10 Differences between Speed and Velocity?

Solution

Speed	Velocity
It is a Scalar quantity	It is a Vector Quantity
It is distance traveled by an object per unit time	It is the displacement covered by an object per unit of time.
It component are Distance, time	Its component are Distance, time and direction of motion
Average speed is given by Distance/time	Average Velocity is given by Displacement/time