

SATISH SCIENCE ACADEMY

DHANORI PUNE-411015

MOTION

Class 09 - Science

Maximum Marks: 115

Section A

- 1. A man walks on a straight road from his home to a market 5.5 km away with a speed of 5.5 km h⁻¹. Finding the [1] market closed he instantly turns and walks back with a speed of 7.5 km h⁻¹. What is the average speed and average velocity of the man between t = 0 to t = 104 min?
 - a) 6.36 km h⁻¹, 6.36 km h⁻¹ c) 0, 0 d) 6.36 km h⁻¹ d) 6.36 km h⁻¹
 - ^{d)} 6.36 km h⁻¹, 0
- 2. Usha swims in a 90 m long pool. She covers 180 m in one minute going either way. The average velocity is: [1]

b) zero

d) 90ms⁻¹

b) equal or less than 1

d) always equal to 1

a) 30ms⁻¹

Time Allowed: 3 hours

- c) 180ms⁻¹
- 3. The numerical ratio of displacement to distance for a moving object is
 - a) always less than 1
 - c) always more than 1
- The water drop falls at regular intervals from a tap 5 m above the ground. The third drop is leaving the tap at instant the first drop touches the ground. How far above the ground is the second drop at that instant? (Take g =

b) 1.25 m

d) 3.75 m

- 10 m S⁻²)
 - a) 2.50 m

c) 4.00 m

5. The diagram shows the velocity-time graph of two moving cars P and Q. The graph indicates that



- a) After 20 s, P is behind Q.
- c) Acceleration of the car Q is not zero at any point during whole journey.
- b) Car Q is moving with a constant acceleration from 0 to 40 seconds.
- d) The velocity of car P is increasing at a decreasing rate from 40 s to 45 s in same direction.

[1]

[1]

6.	What does the slope of the velocity-time graph give?		[1]
	a) acceleration	b) force	
	c) displacement	d) distance	
7.	If the v-t graph is a straight line inclined to the time as	xis, then:	[1]
	a) a $ eq 0$	b) a = constant \neq 0	
	c) a \neq constant \neq 0	d) a = 0	
8.	Two cars A and B race each other. The Car A ran for 2	2 min at a speed of 7.5 km/h, slept for 56 min and again ran	[1]
	for 2 min at a speed of 7.5 km/h. The average speed of	f the car A in the race is:	
	a) 10 km/hr	b) 5 km/hr	
	c) 0.5 km/hr	d) 50 km/hr	
9.	Area under a v - t graph represents a physical quantity	which has the unit	[1]
	a) _{ms} -1	b) m ²	
	c) m	d) m ³	
10.	Equation of motion can be used for a body having:		[1]
	a) uniform acceleration	b) non-uniform acceleration	
	c) uniform motion	d) non-uniform motion	
11.	Assertion (A): The speedometer of a car measures the	e instantaneous speed of the car.	[1]
	Reason (R): Average speed is equal to the total distant	ce covered by an object divided by the total time taken.	
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the	
	explanation of A.	correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
12.	Assertion (A): A boy goes from A to B with a velocit	y of 20 m/min and comes back from B to A with a	[1]
	velocity of 30 m/min. The average velocity of the boy	during the whole journey is zero.	
	to one.	Procity when the body is moving in one direction is equal	
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the	
	explanation of A.	correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
13.	Assertion (A): The position-time graph of a body mo	ving uniformly in a straight line is parallel to position-axis.	[1]
	Reason (R): The slope of the position-time graph in a	uniform motion gives the velocity of an object.	
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the	
	explanation of A.	correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
14.	Assertion (A): The speed or velocity of a car running	on a crowded city, road changes continuously.	[1]
	Reason (R): The movement of a car on a crowded cit	y road is an example of non-uniform acceleration.	
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the	

	explanation of A.	correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
15.	Assertion (A): Motion of satellites around their plane Reason (R): During their motion, the speed remains of continuously.	ts is considered as accelerated motion. constant, while the direction of motion changes	[1]
	a) Both A and R are true and R is the correct explanation of A.	b) Both A and R are true but R is not the correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
16.	Assertion (A): A tiger can accelerate from rest at the Reason (R): The velocity attained by it in 10s is 40 m	rate of 4 m/s ² . n/s.	[1]
	a) Both A and R are true and R is the correct explanation of A.	b) Both A and R are true but R is not the correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
17.	Assertion (A): Motion with uniform velocity is alway	/s along a straight-line path.	[1]
	Reason (R): In uniform velocity a motion, speed is th instantaneous velocity.	e magnitude of the velocity and is equal to the	
	a) Both A and R are true and R is the correct explanation of A.	b) Both A and R are true but R is not the correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
18.	Assertion (A): The speedometer of an automobile me	asure the average speed of the automobile.	[1]
	Reason (R): Average velocity is equal to total displace	ement per total time-taken.	
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the	
	explanation of A.	correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
19.	Assertion (A): The displacement of an object can be	either positive, negative or zero.	[1]
	Reason (R): Displacement has both the magnitude an	d direction.	
	a) Both A and R are true and R is the correct	b) Both A and R are true but R is not the	
	explanation of A.	correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
20.	Assertion (A): Velocity versus time graph of a particl to the time axis	e in uniform motion along a straight path is a line parallel	[1]
	Reason (B): In uniform motion the velocity of a parti-	cle increases as the square of the time elapsed.	
	a) Both A and B are true and B is the correct	b) Both A and R are true but R is not the	
	explanation of A.	correct explanation of A.	
	c) A is true but R is false.	d) A is false but R is true.	
21.	Under what condition will the displacement and distant	nce have the same magnitude?	[1]
22.	What does the path of an object look like when it is in	uniform motion?	[1]
23.	what do you understand by a uniform velocity?		[1]

24.	What is essential to describe the position of an object?	[1]
25.	What is a reference point?	[1]
26.	What is the quantity which is measured by the area occupied below the velocity-time graph?	[1]
27.	What is the quantity which is measured by the area occupied below the velocity time graph?	[1]
28.	What is the nature of the displacement time graph of a body moving with constant acceleration?	[1]
29.	The reference point from which the distance of a body is measured is called?	[1]
30.	Define acceleration of a body.	[1]
31.	What is negative acceleration?	[1]
32.	Define the term "velocity".	[1]
33.	When is an object in motion considered to be a point object?	[1]
34.	Define average velocity.	[1]
35.	Which of the following is true for displacement?	[1]
	a. It cannot be zero.	
	b. Its magnitude is greater than the distance traveled by the object.	
36.	What do you mean by positive acceleration?	[1]
37.	State SI unit of acceleration.	[1]
38.	Give an example of non-uniform acceleration?	[1]
39.	What is the nature of the displacement time graph of a body moving with constant velocity?	[1]
40.	What does the odometer of an automobile measure?	[1]
	Section B	
41.	A racing car has uniform acceleration of 4 ms ⁻² . What distance will it cover in 10 s after start?	[2]
42.	Abdul while driving to school computes the average speed for his trip to be 20 kmh ⁻¹ . On his return trip along	[2]
	the same route, there is less traffic and the average speed is 40 kmh ⁻¹ . What is the average speed for Abdul's trip?	
43.	Abdul, while driving to school, computes the speed for his trip to be 20 km/h. On his return trip along the same	[2]
	route, there is less traffic and the average speed is 30 km/h. What is the average speed for Abdul's trip?	
44.	Usha swims in a 90 m long pool. She covers 180 m in one minute by swimming from one end to the other and	[2]
	back along the same straight path. Find the average speed and average velocity of Usha.	
45.	A bus decreases its speed from 80 kmh ⁻¹ to 60 km h^{-1} in 5 s. Find the acceleration of the bus.	[2]
46.	A body starts to slide over a horizontal surface with an initial velocity of 0.5 m/s. Due to friction, its velocity	[2]
	decreases at the rate of 0.05 m/s ² . How much time will it take for the body to stop?	
47.	A bus decreases its speed from 80 kmh ⁻¹ to 60 kmh ⁻¹ in 5 s. Find the acceleration of the bus.	[2]
48.	The driver of a train travelling at 40 ms ⁻¹ applies the brakes as a train enters a station. The train slows down at a	[2]
	rate of 2 ms ⁻² . The platform is 400 m long. Will the train stop in time?	
49.	A bus decreases its speed from 80 km h^{-1} to 60 km h^{-1} in 5 s. Find the acceleration of the bus.	[2]
50.	A car acquires a velocity of 72 kmh ⁻¹ in 10 second after starting from rest. Find (a) the acceleration (b) the	[2]
	average velocity and (c) the distance travelled in this time.	
51.	A body is moving with a uniform velocity of 10 ms ⁻¹ . Find its velocity after 10 s?	[2]
52.	A bus starting from rest moves with a uniform acceleration of 0.1 ms ⁻² for 2 minutes. Find a) the speed acquiredb) the distance travelled.	[2]

53.	A car starts from rest and moves along the X-axis with constant acceleration 5 ms ⁻² for 8 seconds. If it is	[2]
	continue with constant velocity, what distance will the car cover in 12 seconds since it started from the rest?	
54.	The distance between two stations is 200 km. A train travels for the first 100 km at a speed of 50 kmh ⁻¹ . How	[2]
	fast should the train travel the next 100 km so as to average 70 kmh ⁻¹ for the whole journey?	
55.	An electric engine has a velocity of 120 kmh ⁻¹ . How much distance will it travel in 30 s?	[2]
56.	The brakes applied to a car produce an acceleration of 6 ms ⁻² in the opposite direction to the motion. If the car	[2]
	takes 2s to stop after the application of brakes, calculate the distance it travels during this time.	
57.	A train starting from a railway station and moving with uniform acceleration attains a speed 40 kmh $^{-1}$ in 10	[2]
	minutes. Find its acceleration.	
58.	A ball is gently dropped from a height of 20 m. If its velocity increases uniformly at the rate of 10 ms ⁻² , with	[2]
	what velocity will it strike the ground? After what time will it strike the ground?	
59.	Obtain a relation for the distance travelled by an object moving with a uniform acceleration in the interval	[2]
	between 4 th and 5 th second.	
60.	A car travels a certain distance with a speed of 40 kmh ⁻¹ and returns with a speed 40 kmh ⁻¹ . Calculate the	[2]
	average speed for the entire journey?	
61.	What happens when you shake a wet piece of cloth? Explain your observation.	[2]
62.	A farmer moves along the boundary of a square field of side 10 m in 40 s. What will be the magnitude of	[2]
	displacement of the farmer at the end of 2 minutes and 20 seconds?	
63.	Distinguish between terms speed and velocity.	[2]
64.	Four cars A, B, C and D are moving on a leveled road. Their distance versus time graphs are shown in figure.	[2]
	Which car is the slowest?	



65.	Define uniform velocity and uniform acceleration.	[2]	
66.	Under what condition(s) is the magnitude of average velocity of an object equal to its average speed?	[2]	
67.	Express average velocity when the velocity of a body changes at non-uniform rate and at uniform rate.	[2]	
68.	What is the nature of the distance time graphs for uniform and non-uniform motion of an object?	[2]	
69.	Under what conditions is the magnitude of average velocity of an object equal to its average speed?	[2]	
70.	An object has moved through a distance. Can it have zero displacement? If yes, explain with an example.	[2]	
Section C			
71.	Four cars A, B, C and D are moving on a leveled road. Their distance versus time graphs are shown in figure.	[3]	
	Which car is the slowest.		



72. Discuss the graphs A, B and C shown in the figure. Compare the total distance travelled and the displacements. [3]Which graph represents a motion with negative acceleration?



- 73. Suppose you go up a tower 80 m high and throw a ball horizontally with a velocity of 20m/s. What will be the [3] shape of the path followed by the ball? While falling, the motion of the ball will be a combination of two independent motions. Name these two motions.
- 74. State which of the following situations are possible and give an example for each of these. [3]
 - (a) An object moving with a constant acceleration but with zero velocity
 - (b) An object moving in a certain direction with an acceleration in the perpendicular direction.
- 75. Draw the graph for uniform retardation -

a. position - time graph

- b. velocity time graph
- c. Acceleration- time graph

[3]