	INDIAN SCHOOL SOHAR UNIT TEST I (2023-24) PHYSICS (042)		
CLASS: XI		Max Marks: 20	
DATE: 21/05/2023	SET-A	Time: 40 Minutes	

General Instructions:

- (i) There are 10 questions in all. All questions are compulsory.
- (ii) This question paper has five sections: Section A, Section B, Section C, Section D and Section E.
- (iii) Section A contains six questions of one mark each, Section B contain one question of two marks, Section C contain one question of three-marks, Section D contains one case studybased question of four marks and Section E contain one question of five marks.
- (iv) There is no overall choice. However, an internal choice has been provided in one question of five marks. You have to attempt only one of the choices in such questions.
- (v) You may use log tables if necessary but use of calculator is not allowed.

	Section - A				
All questions are compulsory. In case of internal choices, attempt any one of them.					
1	The velocity of a part	ticle v at an instant t i	is given by v = at + bt ² . T	he dimensions of b is	
	(a) [L]	(b) [LT ⁻¹]	(c) [LT ⁻²]	(d) [LT ⁻³]	1
2	Identify the pair whose dimensions are equal				
	(a) Torque and work	orque and work (b) Stress and energy		1	
	(c) Force and stress		(d) Force and w	ork	
3	An athlete completes one round of a circular track of radius R in 40 seconds. What will be his				
	displacement at the	end of 2 minutes 20 s	seconds?		1
	(a) Zero	(b) 2R	(c) 2πR	(d) 7πR	
4	A particle moves along a straight line such that its displacement at any time t is given by $s = t^3 - 6t^2$				
	+ 3t + 4. The velocity	when the acceleration	on is zero is		1
	(a) 2 m/s	(b) – 12m/s	(c) 42 m/s	(d) – 9m/s	
Two st	Two statements are given-one labelled Assertion (A) and the other labelled Reason ©. Select the correct answer to				wer to
these	these questions from the codes (a), (b), (c) and (d) as given below.				
a) Both A and R are true and R is the correct explanation of A					
b) Botl	b) Both A and R are true and R is not the correct explanation of A				
c) A is correct but R is incorrect d) A is incorrect and R is also incorrect.					
5	Assertion(A): The av	erage velocity of the	object over an interval o	f time is either smaller than or	
	equal to the average	speed of the object of	over the same interval. F	Reason(R): Velocity is a vector	1
	quantity and speed i	s a scalar quantity.			
6	Assertion(A): The po	osition-time graph of	a uniform motion in one	dimension of a body can have	
	negative slope. Reas	on(R): When the spe	ed of body decreases wi	th time, the position-time graph	1
	of the moving body h	nas negative slope.			
Section - B					
7	A body, starting from	n rest, moves with an	acceleration of 5 m/s ² ,	after 4 seconds from starting, the	
	force accelerating the	ne body is removed	and there is no opposir	ng force also. Draw velocity-time	2
	graph for first 8 seconds of the motion of the body and determine from the graph the distance				
	travelled in 8 second	S.			
					4

Section - C			
8	A body of mass m suspended from an ideal spring is executes simple harmonic oscillations The force constant of the spring(F/L)_ is k and the time period of the body is T show by dimensional method that the formula T = 2π m/k is incorrect. Establish its correct form.	3	
	Section - D (CASE STUDY)		
9	To solve the mathematical problems of physical quantities, it is important to have a brief knowledge of units and dimensions. The basic concept of dimensions is that only those quantities can be added or subtracted which have the same dimension. This concept helps us to derive relationships between physical quantities. Dimensional analysis is the study of the relation between physical quantities based on their units and dimensions. It is used to convert a unit from one form to another. While solving mathematical problems, it is necessary to keep the units the same to solve the problem easily. i) What are dimensionless quantities? (1)		
	ii) Who introduced Dimensional Analysis? (1)	4	
	iii) What are dimensional variables? Give any two examples (2)		
	OR		
	Check the correctness of the following relation using dimensional analysis.		
	a) $S = ut + 1/2at^2$ b) $v^2 - u^2 = 2as$.		
	Section - E		
	In case of internal choices, attempt any one of them.		
10	A man walks on a straight road from his home to a market 2.5 km away with a speed of 5 km h ⁻¹ Finding the market closed, he instantly turns and walks back home with a speed of 7.5 km h ⁻¹ What is the (a) Magnitude of average velocity, and (b) Average speed of the man over the interval of time (i) 0 to 30 min, (ii) 0 to 50 min, (iii) 0 to 40 min. OR The figure below shows the position-time graph of a body moving along a straight line. $\int \mathbf{R} (\mathbf{m}) = \int \mathbf{R} (\mathbf{m}) \int \mathbf{R} (\mathbf{m}) = \int \mathbf{R} (\mathbf{m}) \int$	5	
	ii) From the graph, find the displacement in 20 seconds.		
	III) Also write the two differences between distance and displacement.		

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CLASS: XI DATE: 21/05/2023

SET-B

Max Marks: 20 Time: 40 Minutes

General Instructions:

- (i) There are 10 questions in all. All questions are compulsory.
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- (v) You may use log tables if necessary but use of calculator is not allowed.

Section - A					
All que	stions are compul	sory. In case of internal cho	oices, attempt any o	one of them.	
1	The respective number of significant figures for the numbers 23.023, 0.0003 and 2.1 x 10 $^{-3}$ are				
	(a) 5 <i>,</i> 1, 2	(b) 5, 1, 5	(c) 5, 5, 2	(d) 4, 4, 2	1
2	If the velocity v (in then the dimensio	cms ⁻¹) of a particle is given ir ns of a. b and c	n terms of t (in second	I) by the relation $v = at + \frac{b}{t+c}$	1
	(a) [L], [LT], [T ²]	(b) [L ²], [T], [LT ⁻²]	(c) [LT ²], [LT], [I	L] (d) [LT ⁻²], [L] ,[T]	
3	The x-t equation is	given as $x = 2t + 1$. The corre	esponding v-t graph is		
	(a) a straight line p	assing through origin	(b) a straight line	not passing through origin	1
	(c) a parabola		(d) None of the a	bove	
4	The speed-time graph of a particle moving along a fixed direction is as shown in the figure. The distance traversed by the particle between t = 0 s to t = 10 s is				
	$v (ms^{-1}) = 12$ $c \xrightarrow{B} 10 \rightarrow t (s)$			1	
	(a) 20 m	(b) 40 m	(c) 60 m	(d) 80 m	
Two st these (a) Both	Two statements are given-one labelled Assertion (A) and the other labelled Reason ©. Select the correct answer t these questions from the codes (a), (b), (c) and (d) as given below. a) Both A and R are true and R is the correct explanation of A				iswer to
b) Botl	b) Both A and R are true and R is not the correct explanation of A				
c) A is	c) A is correct but R is incorrect d) A is incorrect and R is also incorrect.			-	
5	Assertion(A): Spec	ial functions such as trigonom	netric, logarithmic and	d exponential functions are	
	not dimensionless	. Reason(R): A pure number, r	ratio of similar physica	al quantities, such as angle	1

	and refractive index, has some dimensions.		
6	Assertion(A): The v-t graph perpendicular to time axis is not possible in practice.		
	Reason(R): Infinite acceleration cannot be realized in practice.	1	
	Section-B		
7	A bullet moving with a velocity of 10 m/s hits the wooden plank, the bullet is stopped when it		
	penetrates the plank 20 cm deep. Calculate retardation of the bullet.	2	
	Section-C		
8	The frequency of vibration (n) of a string depends upon length (I) of the string, tension/force (T) of the string and mass per unit length (m) of the string. Using the method of dimension, derive a	3	
	formula for the frequency of vibration of the string.	-	
	Section-D (CASE STUDY)		
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	Section-E		
	In case of internal choices, attempt any one of them.		
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	iii) Also write the two differences between distance and displacement.		