



*Sample Paper
&
Question Paper Pattern*

2022
2023

GOA BOARD

Physics
Model Question Paper 1 For the Academic year
Standard : XI Test 1

Time allowed : 60 minutes

Max. marks : 20

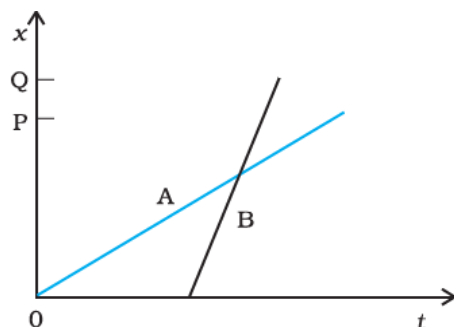
Instructions:

1. All questions are compulsory.
2. This question paper has three sections.
3. Section A contains **4** questions of **one** mark each. Section B contains **5** questions of **two** marks each. Section C contains **2** questions of **three** marks each.
4. There is no overall choice. However, internal choices have been provided in **one** question of **three** marks.
5. Use of calculators is not permitted. However, you may ask for mathematical tables.

Section A

Select and write the most appropriate options from those given below each question.

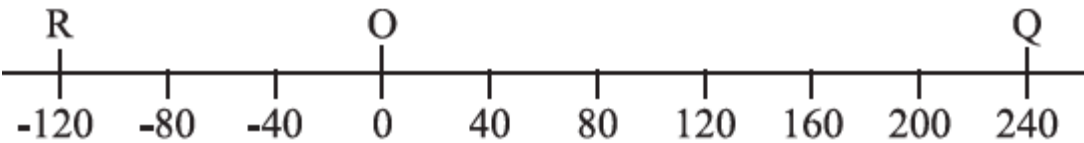
1



A and B are two children returning from their school O to their homes P and Q respectively as shown in the position-time ($x-t$) graph above. The correct statement according to the graph is:

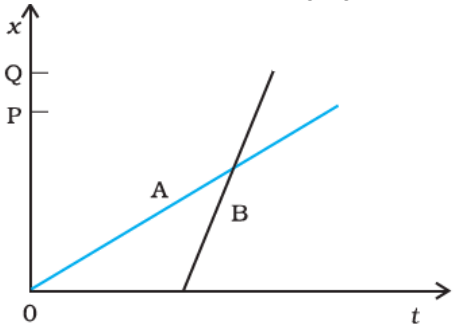
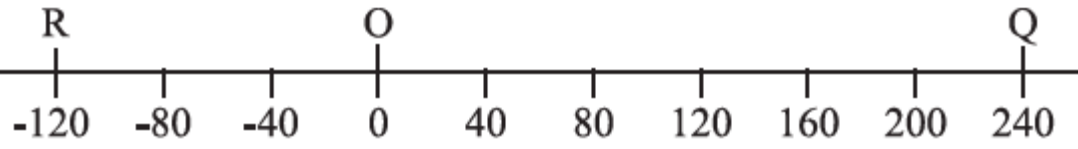
- B starts from the school earlier than A
- A walks faster than B
- B overtakes A along the way
- A walks more than B to reach home

1

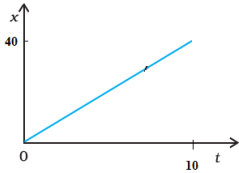
2	Four aircraft A, B, C and D fly together around a tower in concentric horizontal loops of radii 1 km, 2 km, 3 km and 4 km, completing each loop in the same time. Then the centripetal acceleration: • is same for A, B, C, and D • is lowest for A and highest for D • is lowest for D and highest for A • depends on the mass and size of each aircraft	1
Answer the following		
3	State the number of significant figures in the following values: (a) 6.320 J (b) 6.032 N m²	1
4	 A car is moving along a straight line RQ as shown. It moves from O to Q in 60 s and then to R in 90 s. State the difference between 'average speed' and 'average velocity' using this data.	1
Section B		
5	What is Least count error? Give an example.	2
6	Consider the equation: $\frac{1}{2}mv^2 = mgh$ where m is the mass of the body, v its velocity, g is the acceleration due to gravity and h is the height. Check whether this equation is dimensionally correct.	2
7	A car starts from rest and reaches a velocity of 40 m/s in 10 s. Draw the v-t graph for its motion. From this graph, how is the distance calculated?	2
8	An object undergoes uniform circular motion. With a neat diagram explain and obtain the formula for a) angular velocity, and b) centripetal acceleration.	2

9	Rain is falling vertically with a speed of 30 m/s. A woman rides a bicycle with a speed of 10 m/s in the north to south direction. Draw a vector diagram to show the direction in which she should hold her umbrella? (Calculation not required)	2
Section C		
10	A projectile is launched with initial velocity v_0 at an angle θ . Show that the projectile follows the path of a parabola. Draw the necessary diagram.	3
11	Two parallel rail tracks run north-south. Train A moves north with a speed of 54 km/h, and train B moves south with a speed of 90 km/h. What is: (a) velocity of B with respect to A ?, (b) velocity of ground with respect to B ?, and (c) velocity of a monkey running on the roof of the train A against its motion (with a velocity of 18 km/h with respect to the train A as observed by a man standing on the ground ?	3
/OR/		
11	A car has an acceleration of 8 m/s^2 . a) How much time is needed for it to reach a velocity of 24 m/s if it starts from rest? b) How far does it go during this period?	3

ANSWER KEY
Test 1 Paper 1

1	Motion in a Plane (U)  The correct statement according to the graph is: B overtakes A along the way	1
2	Motion in a Plane (U) Then the centripetal acceleration: is lowest for A and highest for D	1
3	Units and Measurements (K) State the number of significant figures in the following values: (a) 6.320 J - four (b) 6.032 N m² - four	1
4	Motion in a Straight line (U)  State the difference between 'average speed' and 'average velocity' using this data. For average speed, distance covered is 360 and time is 150 s For average velocity, displacement is 120 units and time is 150 s	1

Section B

5	Units and Measurements (K) What is Least count error? Give an example. The least count error is the error associated with the resolution of the instrument. For example, a vernier callipers has the least count as 0.01 cm; Measured values are good only up to this value	2
6	Units and Measurements (U) Consider the equation: $\frac{1}{2}mv^2 = mgh$ The dimensions of LHS are $[M] [L T^{-1}]^2 = [M] [L^2 T^{-2}]$ $= [M L^2 T^{-2}]$ The dimensions of RHS are $[M][L T^{-2}] [L] = [M] [L^2 T^{-2}]$ $= [M L^2 T^{-2}]$ <i>The equation is dimensionally correct</i>	2
7	Motion in a Straight line (K) A car starts from rest and reaches a velocity of 40 m/s in 10 s. Draw the v-t graph for its motion. From this graph, how is the distance calculated?  Distance is calculated by finding the area (of triangle) below the line.	2
8	Motion in a Plane (U) An object undergoes uniform circular motion. With a neat diagram explain and obtain the formula for a) angular velocity, and b) centripetal acceleration.	2

	Derivation of $v = R \omega$ and $a = \omega^2 R$	
9	Motion in a Plane (U) Draw a vector diagram to show the direction in which she should hold her umbrella? (Calculation not required)  The umbrella should be held along the direction R	2
Section C		
10	Motion in a Plane (U) Show that the projectile follows the path of a parabola. Draw the necessary diagram. Derivation & comparison to equation of parabola	3
11	Motion in a Straight line (A) Two parallel rail tracks run north-south. Train A moves north with a speed of 54 km/h, and train B moves south with a speed of 90 km/h. What is: (a) velocity of B with respect to A ?, Ans: $90 - (-54) = 144$ km/h or $90 - 54 = 36$ (b) velocity of ground with respect to B ?, Ans: -90 km/h and (c) velocity of a monkey running on the roof of the train A against its motion (with a velocity of 18 km/h with respect to the train A) as observed by a man standing on the ground ? Ans: $54 - 18 = 36$ km/h	3
/OR/		
11	Motion in a Straight line (A) A car has an acceleration of 8 m/s^2 . a) How much time is needed for it to reach a velocity of 24 m/s if it starts from rest? Ans: $v = at$, $t = v/a = 24/8 = 3\text{s}$ b) How far does it go during this period? Ans: $s = \frac{1}{2} a t^2 = \frac{1}{2} \times 8 \times 9 = 36 \text{ m}$	3

Blue Print

Chapter	Knowledge (K)			Understanding (U)			Application (A)			
	VSA (1)	SAI (2)	SAII (3)	VSA (1)	SAI (2)	SAII (3)	VSA (1)	SAI (2)	SAII (3)	
Units and Measurements	1	1			1					05
Motion in a Straight line		1		1					1	06
Motion in a Plane					2	1	2			09
	05			10			05			20

Physics

Model Question Paper 2 For the Academic year 2021 – 2022

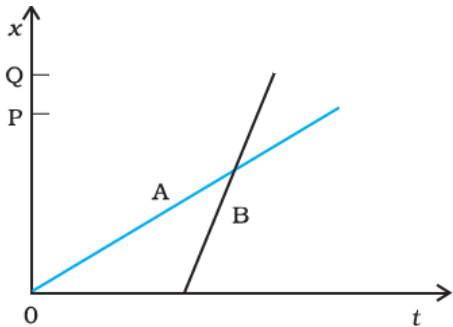
Standard : XI Test 1

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5. Use of calculators is not permitted. However, you may ask for mathematical tables.

Section A		
Select and write the most appropriate options from those given below each question.		
1	 A and B are two children returning from their school O to their homes P and Q respectively as shown in the position-time ($x-t$) graph above. The correct statement according to the graph is: • B starts from the school earlier than A • A walks faster than B • B overtakes A along the way • A walks more than B to reach home	1
2	A ball is kicked at an angle of 45° and lands 45 m away on a level ground. If it is kicked at the same initial velocity, then: • at an angle of 40° it will land 44 m away • at an angle of 50° it will land 46 m away • at an angle of 55° it will land 48 m away • at an angle of 60° it will land 50 m away	1

Answer the following

3	What is a systematic error?	1
4	State whether the following physical quantities are scalars or vectors: (i) angular frequency (ii) angular acceleration	1

Section B

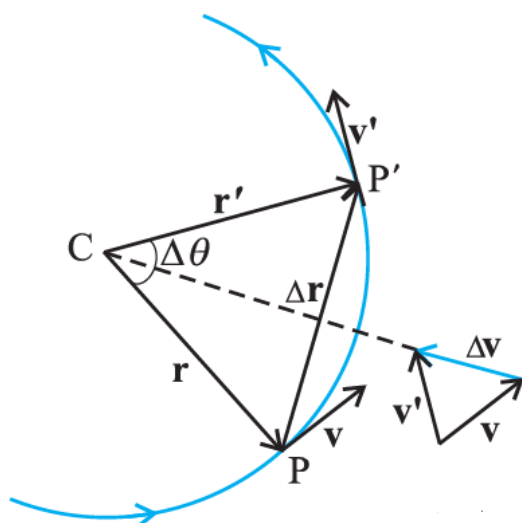
5	The equation for time period of a pendulum is $T = 2\pi\sqrt{\frac{l}{g}}$ Where l is length and g is acceleration due to gravity. Using dimensional representation, show that the right hand side represents time.	2
6	i) Density $d = \frac{4.237g}{2.51cm^2} = 1.68804 gcm^{-3}$ Express the result '1.68804' with the correct number of significant figures. ii) The accuracy in the measurement of time period 1.89 S is 0.01 S, find the relative percentage error in 1.89 S.	2
7	A car starting from rest undergoes constant acceleration of $4 m/s^2$ for 10 s. Draw the v-t graph for its motion. From this graph, calculate the distance travelled.	2
8	A projectile is launched with initial velocity v_0 at an angle θ . Derive an expression for its time of flight.	2
9	Rain is falling vertically with a speed of 30 m/s. A woman rides a bicycle with a speed of 10 m/s in the north to south direction. Draw a vector diagram and find the direction in which she should hold her umbrella?	2

Section C

10	A player throws a ball upwards with an initial speed of 29.4 m/s. To what height does the ball rise and after how long does the ball return to the player's hands? (Take $g = 9.8 m/s^2$ and neglect air resistance).	3
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11

3



The figure shows an object in uniform circular motion. Analyze the figure to derive the expressions for angular velocity and angular acceleration.

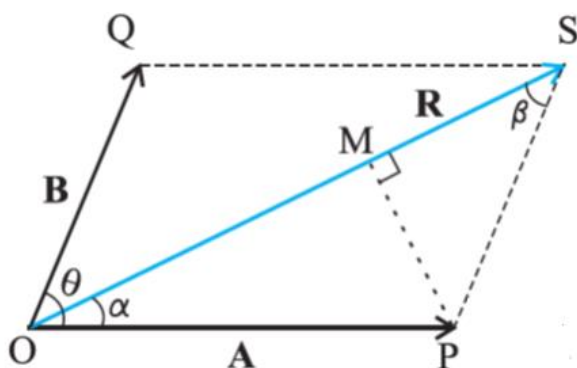
$$v = R \omega$$

$$a_c = \left(\frac{v}{R} \right) v = v^2 / R$$

/OR/

11

3



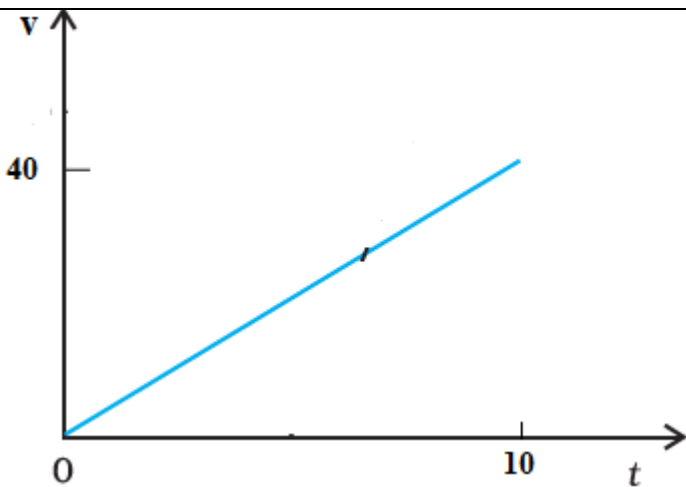
The figure shows the addition of two vectors A and B. Analyze the figure to obtain the expression for the resultant vector R and the relation between θ and α .

$$R = \sqrt{A^2 + B^2 + 2AB \cos \theta}$$

$$\frac{R}{\sin \theta} = \frac{B}{\sin \alpha}$$

ANSWER KEY
Test 1 Paper 2

1	Motion in a St Line U The correct statement according to the graph is: • B overtakes A along the way	1
2	Motion in a Plane U A ball is kicked at an angle of 45° and lands 45 m away on a level ground. If it is kicked at the same initial velocity, then: • at an angle of 40° it will land 44 m away	1
3	Units and Measurements K What is a systematic error? It is a type of error that tends to occur more in a particular direction, positive or negative that can therefore be compensated. It is a type of error in measurement that deviates by a fixed amount from the true value of measurement	1
4	Motion in a Plane K State whether the following physical quantities are scalars or vectors: (iii) angular frequency - scalar (iv) angular acceleration – vector	1
5	Units and Measurements U The equation for time period of a pendulum is $T = 2\pi \sqrt{\frac{l}{g}}$ $L^0 M^0 T^1 = L^1 M^0 T^0 / L^1 M^0 T^{-2}$	2
6	Units and Measurements U Density $d = \frac{4.237g}{2.51cm^2} = 1.68804 gcm^{-3}$ Ans: 1.69	2
7	Motion in a St Line U A car starting from rest undergoes constant acceleration of $4 m/s^2$ for 10 s. Draw the v-t graph for its motion. From this graph, calculate the distance travelled.	2



Distance travelled = area below the line = $\frac{1}{2} \times 40 \times 10 = 200 \text{ m}$

8 Motion in a Plane K

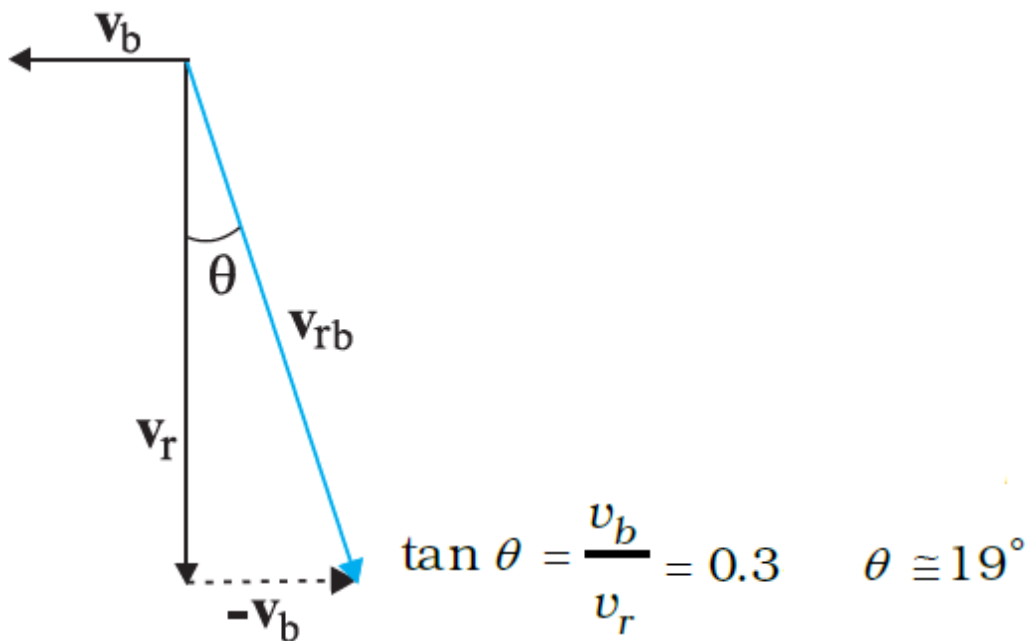
2

Derive an expression for its time of flight. Ans: $t = \frac{v_0 \sin \theta}{g}$

9 Motion in a Plane A

2

Draw a vector diagram and find the direction in which she should hold her umbrella?



10 Motion in a Straight line A

3

To what height does the ball rise and after how long does the ball return to the player's hands ?

Ans: initial speed = 29.4 m/s.

$$v^2 = u^2 + 2as$$

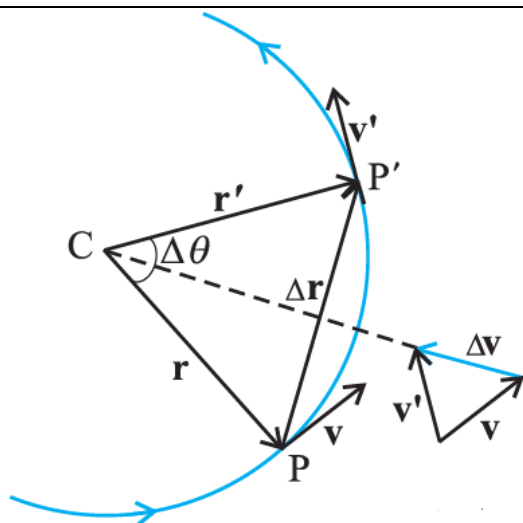
$$s = 45 \text{ m,}$$

$$v = u + at$$

$$t = 6 \text{ s}$$

11 Motion in a Plane U

3

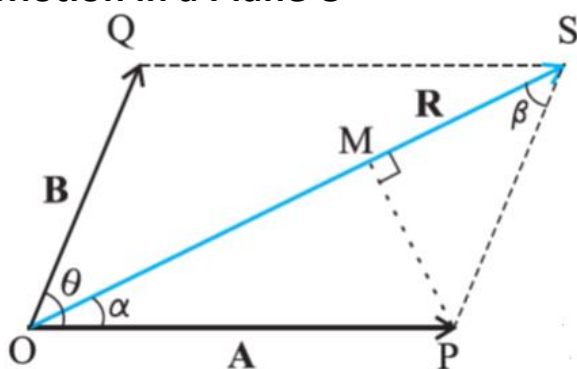


The figure shows an object in uniform circular motion. Analyze the figure to derive the expressions for angular velocity and angular acceleration.

/OR/

11 Motion in a Plane U

3



The figure shows the addition of two vectors A and B. Analyze the figure to obtain the expression for the resultant vector R, and the relation between θ and α .

Blue - Print

Chapter	Knowledge			Understanding			Application			
	VSA (1)	SAI (2)	SAII (3)	VSA (1)	SAI (2)	SAII (3)	VSA (1)	SAI (2)	SAII (3)	
Units and Measurements	<u>1</u>				<u>2</u>					05
Motion in a Straight line				<u>1</u>	<u>1</u>				<u>1</u>	06
Motion in a Plane	<u>1</u>	<u>1</u>		<u>1</u>		<u>1</u>		<u>1</u>		09
	05			10			05			20