**SINDHI HIGH SCHOOL, HEBBAL**

**UNIT TEST I-2024-25**

**PHYSICS (042)**

**Grade: XI Max. Marks: 25**

**Date: /07/2024 Reading time: 8.25am-8.35am**

**No of sides:4 Writing time: 8.35am-9.35am**

**General Instructions:**  
(1) There are 14 questions in all. All questions are compulsory.  
(2) This question paper has five sections: Section A, Section B, Section C, Section D and  
 Section E.  
(3) All the sections are compulsory.  
(4) Section A contains nine questions, seven MCQ and two Assertion Reasoning based of 1

mark each, Section B contains two questions of two marks each, Section C contains one

question of three marks, Section D contains one case study based question of four marks

and Section E contains one long answer questions of five marks.

(5) Use of calculators is not allowed.

**SECTION A**

1. A particle moves along the x axis. The position x of the particle with respect to time t from

the origin is given by x= b0 + b1t + b2t2 . The acceleration of the particle is **(1)**

a) b0 b) b1  c) b2 d) 2b2

2. The mass of a box measured by a grocer’s balance is 2.3 kg. Two gold pieces of mass

20.15 gram and 20.17 gram are added to the box. What is the total mass of the box and the

difference in the masses of the pieces to correct significant figures? **(1)**

a) 2.34 kg , 0 gram b) 2.3 kg , 0.02 gram

c) 2.34 kg, 0.02 gram d) 2.3 kg, 0 gram

3. If force (F) velocity (v) and time (T) are taken as fundamental units, then the dimensions of

mass is **(1)**

a) [FvT-1] b) [FvT-2] c) [Fv-1 T-1] d) [Fv-1 T]

4. Given a=2t + 5. Calculate the velocity of the body after 5 second if it starts from rest. **(1)**

a) 50 m/s b) 25 m/s c)100 m/s d) 75 m/s

̣

5. A stone is thrown vertically up from the ground. It reaches a maximum height of 50 m in

10 second. After what time will it reach the ground from the maximum height position? **(1)**

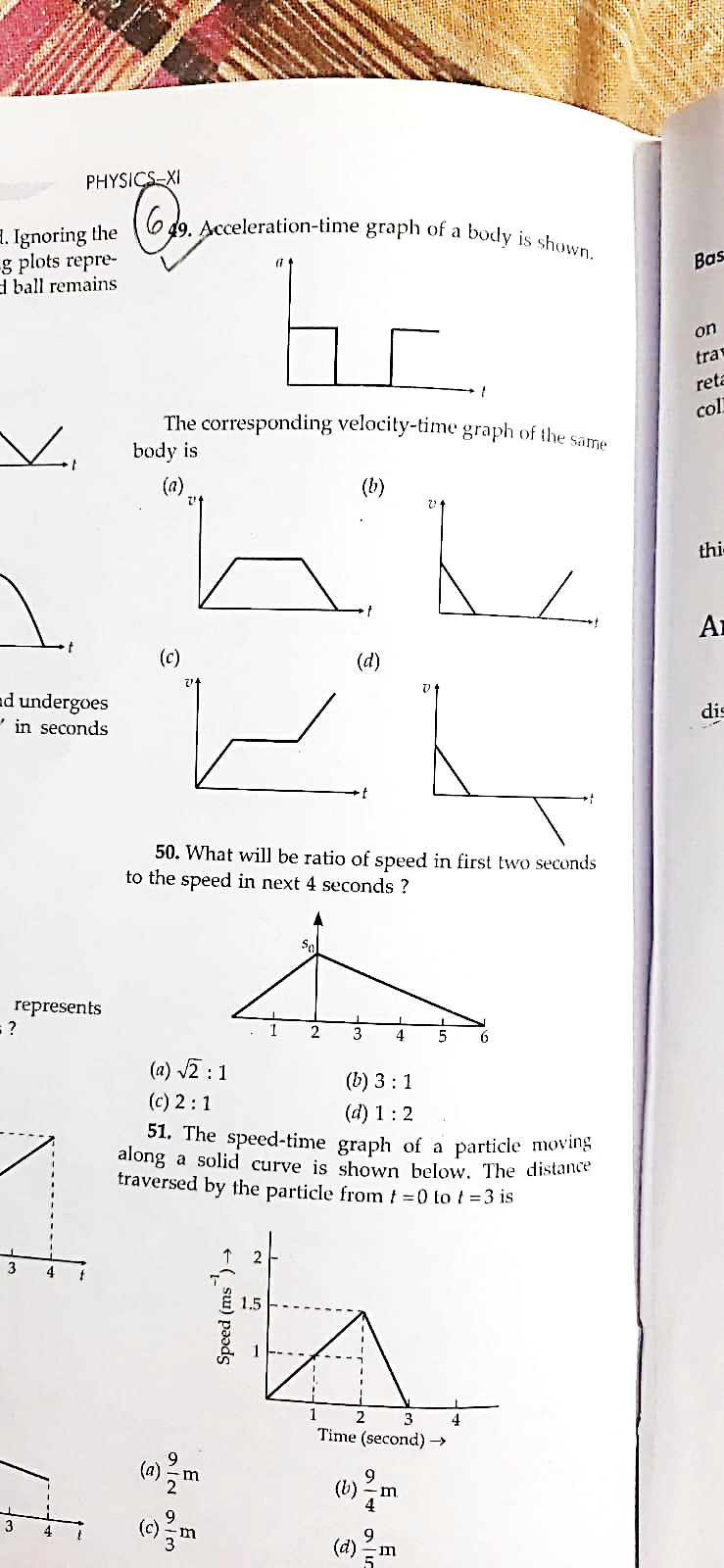
a) 1.2 s b) 10 s c) 5 s d) 25 s

6. If the unit of force is 1 kilo Newton ,the length is 1 km and time is 100 second, what will

be the unit of mass ? **(1)**

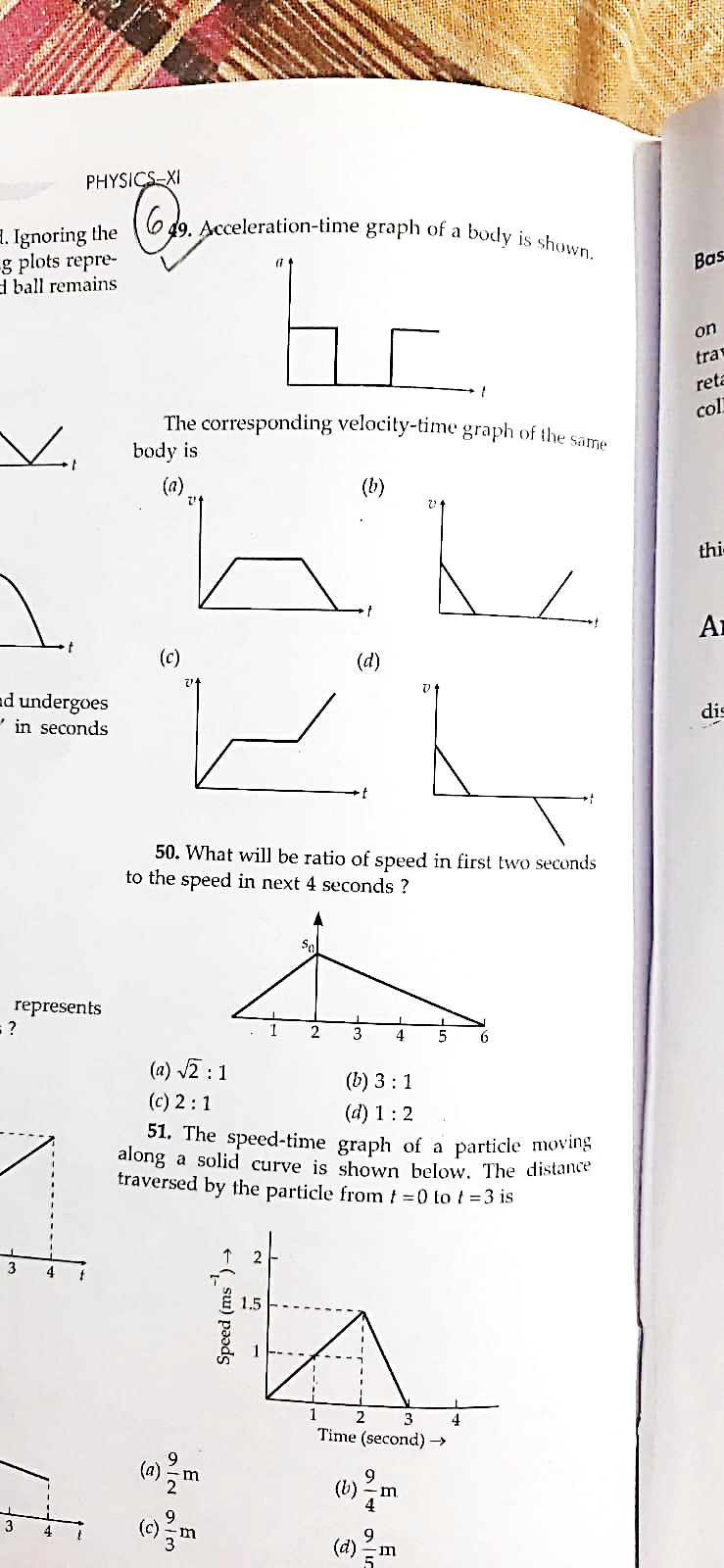
a) 1000 kg b) 1 kg c) 10,000 kg d) 100kg

**1**



7. The acceleration time graph of a body is shown. **(1)**

The corresponding velocity time graph of the same body is



**For Questions 8 and 9, two statements are given –one labelled Assertion (A) and other labelled Reason (R). Select the correct answer to these questions from the options as given below.**

**a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.**

**b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.**

**c) If Assertion is true but Reason is false.**

**d) If both Assertion and Reason are false**

**e) If Assertion is false but Reason is true**

8**. Assertion(A):**An object may have varying speed without having varying velocity.

**Reason(R):** If the velocity is zero at an instant, the acceleration may not be zero at that

instant **(1)**

9. **Assertion(A):** In a non uniform circular motion ,the acceleration of the particle is equal to

the sum of the tangential acceleration and the centripetal acceleration.

**Reason(R):** The two accelerations are perpendicular to each other **(1)**

**SECTION B**

10. The acceleration produced by a particle in ms-2 is given by a= 3t2 + 2t +2, where time t is

in second. If the particle starts with velocity v= 2 m/s at t =0, then find the velocity at the

end of 2 second **(2)**

11. A ball is released from the top of a tower of height h meter. It takes T second to reach the

ground. What is the position of the ball in T/ 3 second? **(2)**

**SECTION C**

12. The period of vibration of a tuning fork depends on the length of its prongs l, the density

d and Young's modulus Y of its material. Deduce an expression for the period of

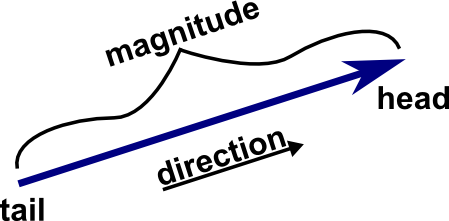
vibration on the basis of dimensions **(3)**

**2**

**SECTION D**

13. Case Study: **VECTORS (1X4=4)**

A vector is a physical quantity that has both a [magnitude](https://mathinsight.org/definition/magnitude_vector) and a direction. Geometrically, we can picture a vector as a directed line segment, whose length is the magnitude of the vector and the arrow indicating the direction. The direction of the vector is from its tail to its head.

[](https://mathinsight.org/image/vector)

Two vectors are the same if they have the same magnitude and direction. This means that if we take a vector and translate it to a new position (without rotating it), then the vector we obtain at the end of this process is the same vector we had in the beginning.

Two examples of vectors are those that represent force and velocity. Both force and velocity are in a particular direction. The magnitude of the vector would indicate the strength of the force or the speed associated with the velocity.

i) If a vector 2 + 3 + 8 is perpendicular to a vector 4 - 4 + α then the value of α is

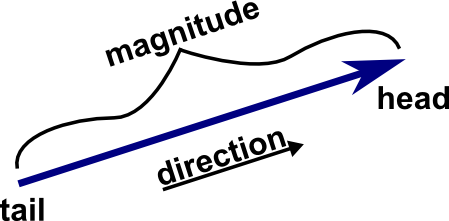
a) 1/2 b) – 1/2 c)1 d)-1

**3**

**SECTION D**

13. Case Study: **VECTORS (1X4=4)**

A vector is a physical quantity that has both a [magnitude](https://mathinsight.org/definition/magnitude_vector) and a direction. Geometrically, we can picture a vector as a directed line segment, whose length is the magnitude of the vector and the arrow indicating the direction. The direction of the vector is from its tail to its head.

[](https://mathinsight.org/image/vector)

Two vectors are the same if they have the same magnitude and direction. This means that if we take a vector and translate it to a new position (without rotating it), then the vector we obtain at the end of this process is the same vector we had in the beginning.

Two examples of vectors are those that represent force and velocity. Both force and velocity are in a particular direction. The magnitude of the vector would indicate the strength of the force or the speed associated with the velocity.

i) If a vector 2 + 3 + 8 is perpendicular to a vector 4 - 4 + α then the value of α is

a) 1/2 b) – 1/2 c)1 d)-1

**3**

ii) and are two vectors and θ is the angle between them. If = , then the

value of is

a) (A2+ B2 + 2AB)1/2 b) (A2 + B2 + )1/2 c) A+B d) (A2+ B2 + AB)1/2

iii) Two forces are such that the sum of their magnitude is 18 N and the resultant has a

magnitude of 12 N and its perpendicular to the smaller force. Then the magnitude of the

forces are

a )12N, 6N b) 13N,5N c) 10N,18N d)16N, 2N

iv) If = + and the values of and are 13 , 12 and 5 respectively, then the angle

between and will be

a) cos-1 (5/13) b) cos-1 (13/12) c) π/2 d) cos-1(12/5)

**SECTION E**

14 (i) A projectile is fired upward at an angle θ with the horizontal with a velocity u. Show

that its trajectory is a parabola. Obtain the expression for its time of flight and

horizontal range. At what value of θ will the range be maximum?

(ii) A body A of mass m is thrown with velocity v at an angle 300 to the horizontal and

another body B of the same mass is thrown with the velocity v at an angle of 60° to the

horizontal. Find the ratio of horizontal range and maximum height of A and B. **(5)**

**4**

ii) and are two vectors and θ is the angle between them. If = , then the

value of is

a) (A2+ B2 + 2AB)1/2 b) (A2 + B2 + )1/2 c) A+B d) (A2+ B2 + AB)1/2

iii) Two forces are such that the sum of their magnitude is 18 N and the resultant has a

magnitude of 12 N and its perpendicular to the smaller force. Then the magnitude of the

forces are

a )12N, 6N b) 13N,5N c) 10N,18N d)16N, 2N

iv) If = + and the values of and are 13 , 12 and 5 respectively, then the angle

between and will be

a) cos-1 (5/13) b) cos-1 (13/12) c) π/2 d) cos-1(12/5)

**SECTION E**

14 (i) A projectile is fired upward at an angle θ with the horizontal with a velocity u. Show

that its trajectory is a parabola. Obtain the expression for its time of flight and

horizontal range. At what value of θ will the range be maximum?

(ii) A body A of mass m is thrown with velocity v at an angle 300 to the horizontal and

another body B of the same mass is thrown with the velocity v at an angle of 60° to the

horizontal. Find the ratio of horizontal range and maximum height of A and B. **(5)**

**4**