



Indian School Al Wadi Al Kabir

Unit Test (2026-27)

Sub: Physics (042)

SET- 1

Class: XI

Max. Marks: 30

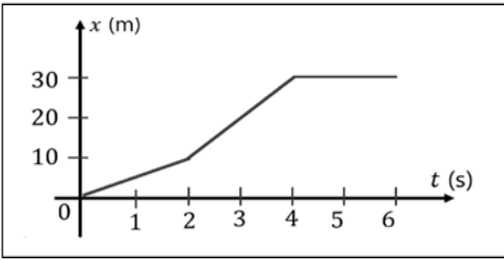
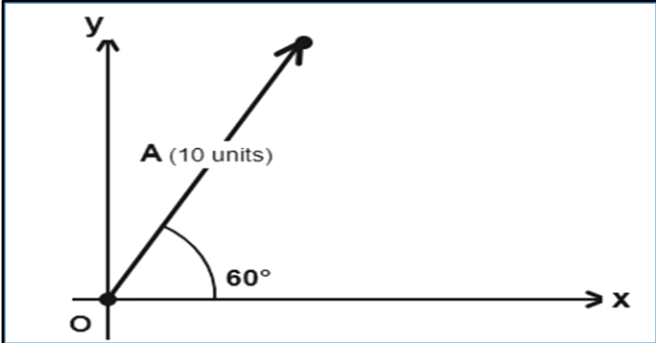
Date: 17/05/2026

Time: 1 Hour

General Instructions:

1. There are 15 questions in all. All questions are compulsory.
2. This question paper has 5 sections. Section A, Section B, Section C, Section D, and Section E.
3. All sections are compulsory.
4. Section A contains 8 questions, 6 MCQ and 2 Assertion -Reasoning of 1 mark each. Section B contains 2 questions of 2 marks each. Section C contains 3 questions of 3 marks each. Section D contains 1 case study-based question of 4 marks. Section E contains 1 long answer question of 5 marks.
5. There is no overall choice. However, an internal choice has been provided in 1 question in section B, 1 question in section C, 1 question in section D, and 1 question in section E. You have to attempt only one of the choices in such questions.
6. Use of calculators is not allowed.

SECTION- A		
Q. No.	Question	Marks
1.	A ball is thrown vertically downward with a velocity of 20m/s from the top of a tower. It hits the ground after some time with a velocity of 80m/s. The height of the tower is ($g = 10\text{m/s}^2$). (A) 360m (B) 340m (C) 320m (D) 300m	1
2.	A body moves with uniform velocity; its acceleration is: (A) Zero (B) Finite (C) Infinite (D) Negative	1
3.	An athlete finishes a round of a circular track of radius R in 40 seconds. What is his displacement at the end of 2 min 20 sec? (A) 2R (B) $2\pi R$ (C) $7\pi R$ (D) Zero	1
4.	What is the angle between the two vectors P and Q if the resultant of the vectors is given by $R^2 = P^2 + Q^2$? (A) 90° (B) 45° (C) 60° (D) 30°	1

5.	<p>The $x - t$ (distance- time graph) of an object moving in a straight line is shown. Calculate the average velocity in the time interval $t = 2\text{s}$ to $t = 4\text{ s}$.</p>  <p>(A) 10 m/s (B) 0 m/s (C) 5 m/s (D) 20 m/s</p>	1
6.	<p>The maximum height attained by a body thrown vertically upward with initial velocity u is</p> <p>(A) $h = u^2/2g$ (B) $h = u/2g$ (C) $h = u^2/g$ (D) $h = 2u^2/g$</p>	1
<p>For Questions 7 and 8, two statements are given – one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the options given below.</p> <p>(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 and R is also false.</p>		
7.	<p>Assertion(A): The average and instantaneous velocities have the same value in a uniform motion.</p> <p>Reason(R): In uniform motion, the velocity of an object increases uniformly.</p>	1
8.	<p>Assertion(A): Multiplying a vector A by a positive number λ gives a vector whose magnitude is changed by the factor λ, but the direction is the opposite as that of A.</p> <p>Reason(R): λ is a scalar quantity, so a scalar multiplied by a vector gives a scalar.</p>	1
SECTION- B		
9.	<p>A. (i) Define unit vectors. (ii) Find the unit vector of $2\hat{i} + 3\hat{j} + \hat{k}$.</p> <p style="text-align: center;">OR</p> <p>B. A vector A has a magnitude of 10 units and makes an angle of 60° with the positive x-axis. Find the x- and y-components of the vector, and express it in unit vector notation.</p> 	2
10.	<p>A bullet moving at 10 m/s hits the wooden plank and is stopped after penetrating it 20 cm. Calculate the retardation of the bullet.</p>	2

SECTION- C

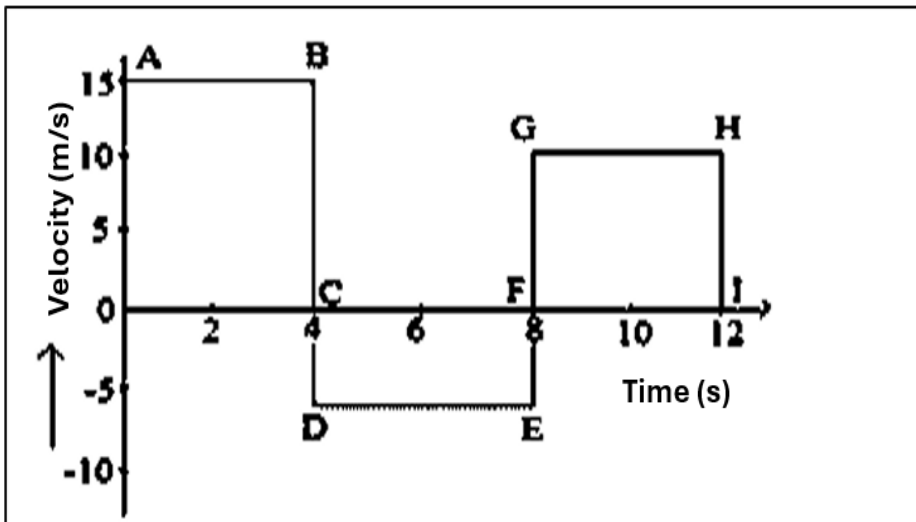
11.

A. A boy runs on a straight road from his home to a market 2.0 km away at a speed of 4 km/h. Finding the market closed, he at once runs back to his home at a speed of 6 km/h.
Calculate his (i) magnitude of average velocity, and (ii) average speed of the boy in the time interval (a) 0 to 30 minutes, (b) 0 to 40 minutes.

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OR

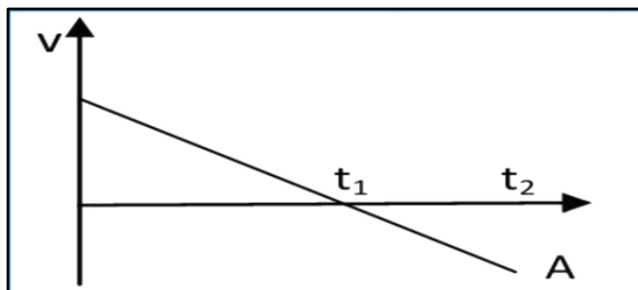
B. The velocity-time graph of a moving particle is shown. Find the displacement (i) 0 - 4s, (ii) 0 - 8s, and (iii) 0 - 12s from the graph.



12.

A. Identify the motion of object A from the given v-t graph.

3



B. Draw a position-time graph for the motion of a body with
(i) positive acceleration.
(ii) negative acceleration.

13.

A. State the parallelogram law of vector addition.

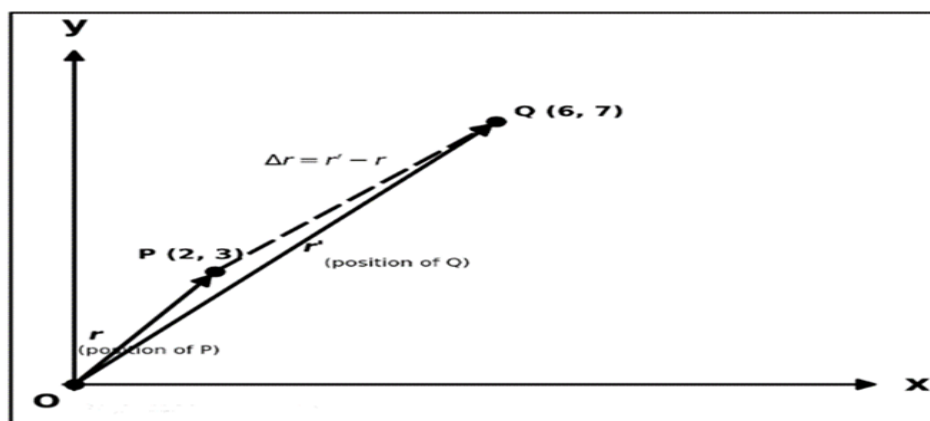
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B. Find the magnitude of the resultant of two vectors A and B inclined at an angle θ with the help of a diagram analytically.

SECTION- D

14.

4



A bird starts from point P, whose position vector with respect to the origin O is $r = 2\hat{i} + 3\hat{j}$ m. It then flies to point Q, whose position vector is $r' = 6\hat{i} + 7\hat{j}$ m. The displacement vector is defined as $\Delta r = r' - r$.

The bird does not fly in a straight line — it first goes via an intermediate point A before reaching Q, covering a total path length of 10 m. Recall that the displacement vector is always the straight line from the initial to the final position, and does not depend on the actual path taken.

The magnitude of displacement is therefore either less than or equal to the path length. The position of any object in a plane is completely described by its position vector $r = x\hat{i} + y\hat{j}$, where x and y are coordinates along the x- and y-axes, respectively.

- i. What is the displacement vector Δr of the bird from P to Q?
 - (A) $4\hat{i} + 4\hat{j}$ m
 - (B) $8\hat{i} + 10\hat{j}$ m
 - (C) $2\hat{i} + 3\hat{j}$ m
 - (D) $6\hat{i} + 7\hat{j}$ m

- ii. What is the magnitude of the displacement of the bird?
 - (A) 8 m
 - (B) $4\sqrt{2}$ m
 - (C) 4 m
 - (D) $\sqrt{8}$ m

- iii. The bird travels a path of 10 m to reach from P to Q via point A. Which of the following is true?
 - (A) Path length = magnitude of displacement.
 - (B) Path length > magnitude of displacement.
 - (C) Displacement depends on the path taken via A.
 - (D) Magnitude of displacement is always equal to path length.

- iv. The position vector of point P is $r = 2\hat{i} + 3\hat{j}$ m. What are the x- and y-coordinates of P?
 - (A) x = 3 m, y = 2 m
 - (B) x = 2 m, y = 2 m
 - (C) x = 2 m, y = 3 m
 - (D) x = 0 m, y = 0 m

OR

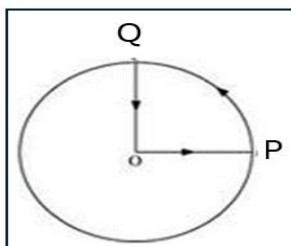
- v. After reaching Q, the bird flies back to its starting point P. What is its net displacement for the entire journey (P → Q → P)?
- (A) $8\sqrt{2}$ m
 (B) $4\hat{i} + 4\hat{j}$ m
 (C) Zero
 (D) 10 m

SECTION- E

15.

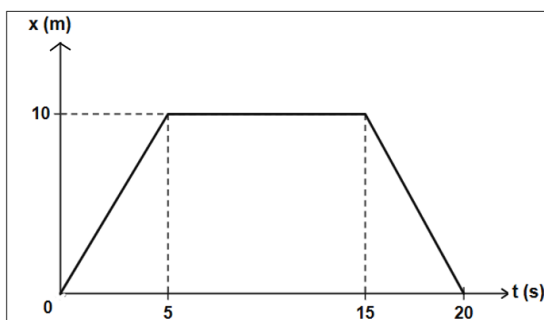
- A. (i) An object has an initial velocity 'u', moves with a constant acceleration 'a' along a straight line. It attains a velocity 'v' after time 't'. Draw its velocity-time graph and derive the velocity-time and position-velocity relations.
- (ii) A cyclist starts from the centre O of a circular park of radius 1 km, reaches the edge P of the park, then cycles along the circumference, and returns to the centre along QO as shown in the figure. If the round trip takes 10 min, what is the (a) net displacement, (b) average velocity, and (c) average speed of the cyclist?

5



OR

- B. The figure shows the position-time graph of a body moving along a straight line.



- (i) Draw the velocity-time graph of the body.
- (ii) From the graph, find the displacement in 20 seconds.
- (iii) Draw the velocity-time graph of uniformly accelerated motion. From the velocity-time graph of uniform accelerated motion, deduce the equation of motion in terms of distance and time.

All the Best