Chapter Test 2	**PARISHRAM PUBLICATIONS PUNE** **NAME of Student : _____** **Subject : PHYSICS** **Class : XI** **Max. Marks :- 80** **Topic : Motion in one dimension**	

Instructions :

(i) For each question in Section I, you will be awarded 3 Marks if you have darkened only the bubble corresponding to the correct answer and zero mark if no bubble is darkened. In all other cases, minus one (– 1) mark will be awarded.

(ii) For each question in Section II, you will be awarded 3 Marks if you have darkened only the bubble corresponding to the correct answer and zero mark if no bubble is darkened. In all other cases, minus one (– 1) mark will be awarded.

(iii) For each question in Section III, you will be awarded 3 Marks if you have darkened only the bubble corresponding to the correct answer and zero mark if no bubble is darkened. In all other cases, minus one (– 1) mark will be awarded.

(iv) For each question in Section IV, you will be awarded 2 marks for each row in which you have darkened the bubble(s) corresponding to the correct answer. Thus, each question in this section carries a maximum of 8 marks. There is no negative marking for incorrect answer(s) for this section.

(v) For each question in Section V, you will be awarded 3 marks if you darken the bubble corresponding to the correct answer and zero mark if no bubble is darkened. In all other cases, minus one (–1) mark will be awarded.

(vi) For each question in Section VI, you will be awarded 3 Marks if you have darkened only the bubble corresponding to the correct answer and zero mark if no bubble is darkened. In all other cases, minus one (– 1) mark will be awarded.

SECTION - I

This section contains 8 multiple choice questions. Each question has 4 choices (A), (B), (C) and (D), out of which ONLY ONE is correct.

Q.1 A motor boat is to reach at a point 30º upstream on other side of a river flowing the velocity 5 m/s. Velocity of motor boat with respect to water is $5\sqrt{3}$ m/sec. The driver should steer the boat an angle :

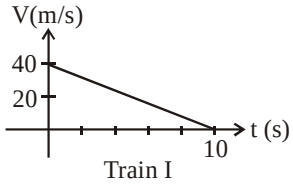
(A) 30º w.r.t. the line of destination from starting point.

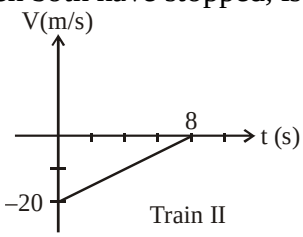
(B) 60º w.r.t. normal to the bank.

(C) 120º w.r.t. stream direction.

(D) None of these

Q.2 Two trains, which are moving along different tracks in opposite directions, are put on the same track due to a mistake. Their drivers, on noticing the mistake, start slowing down the trains when the trains are 300 m apart. Graphs given below show their velocities as function of time as the trains slow down, the separation, between the trains when both have stopped, is:



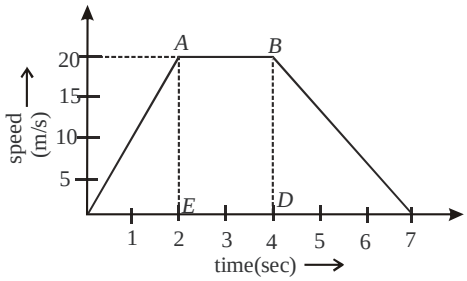


(A) 120 m (B) 280 m (C) 60 m (D) 20 m.

Q.3 Figure gives the speed-time graph of the motion of a car. What is the ratio of the distance travelled by car during the last two seconds to the total distance travelled in seven seconds–

(A) 1/9 (B) 2/9

(C) 1/3 (D) 4/9



Q.4 The greatest acceleration or deceleration that a train may have is a. The minimum time in which the train may reach from one station to the other separated by a distance d is –

(A) $\sqrt{\frac{d}{a}}$ (B) $\sqrt{\frac{2d}{a}}$ (C) $\frac{1}{2}\sqrt{\frac{d}{a}}$ (D) $2\sqrt{\frac{d}{a}}$

Q.5 A ball is thrown vertically upwards from the ground. It crosses a point at the height of 25m twice at an interval of 4 sec. The ball was thrown with the velocity of –

(A) 20 m/sec. (B) 25 m/sec. (C) 30 m/sec. (D) 35 m/sec.

Q.6 A stone is dropped from a height h. Simultaneously another stone is thrown up from the ground with such a velocity that it can reach a height of 4h. The two stones cross each other after time–

(A) $\sqrt{\left(\frac{h}{2g}\right)}$ (B) $\sqrt{\left(\frac{h}{8g}\right)}$ (C) $\sqrt{(8hg)}$ (D) $\sqrt{(2hg)}$

Q.7 A stone is thrown vertically upward with an initial speed 10m/s from the top of a tower, reaches the ground with a speed 30m/s. The height of the tower is (Take g = 10 m/s^2)

(A) 30m (B) 40m (C) 60m (D) 90m

Q.8 A point initially at rest moves along x-axis. Its acceleration varies with time as a = (6t + 5) m/s^2. If it starts from origin, the distance covered in 2s is –

(A) 20m (B) 18m (C) 16m (D) 25m

SECTION - II

This section contains 3 multiple choice questions . Each question has 4 choices (A), (B), (C) and (D), out of which one or more answers are correct.

Q.9 Choose the correct options –

(A) A particle moves rectilinearly. Its displacement x at time t is given by $x^2 = at^2 + b$. Its acceleration at time t is proportional to $1/x^3$.

(B) Two bodies begin to free all from same height at a time interval of N sec. If vertical separation between them is 1 after n sec. from the start of Ist body, then $n = \frac{1}{gN} + \frac{N}{2}$.

(C) A particle moves rectilinearly. Its displacement x at time t is given by $x^2 = at^2 + b$. Its acceleration at time t is proportional to $1/x^2$.

(D) Two bodies begin to free all from same height at a time interval of N sec. If vertical separation between them is 1 after n sec. from the start of Ist body, then $n = \frac{1}{gN} - \frac{N}{3}$.

Q.10 A particle is projected vertically upwards with a velocity u from a point O. When it returns to the point of projection –

(A) its average velocity is zero (B) its average speed is u/2

(C) its displacement is zero (D) its average speed is u.

Q.11 If velocity of the particle is given by $v = \sqrt{x}$, where x denotes the positions of the particle and initially particle was at x = 4, then which of the following are correct –

(A) at t = 2 sec, the position of the particle is at x = 9

(B) Particle acceleration at t = 2 sec is 1 m/s^2

(C) Particle acceleration is 1/2 m/s^2 throughout the motion

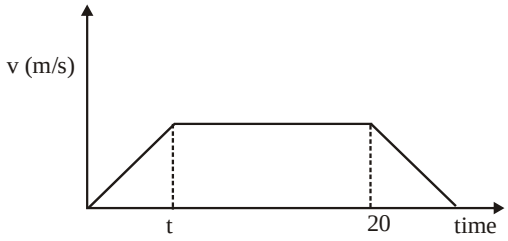
(D) Particle will never go in negative direction from it's starting position

SECTION - III

This section contains paragraph. Based upon each paragraph, 3 multiple choice questions have to be answered. Each question has 4 choices (A), (B), (C) and (D), out of which only one is correct.

Passage (Q.12-Q.14)

The velocity-time graph of a particle moving along a straight line is as shown in figure. The rate of acceleration and deceleration is constant and is equal to 5 m/s^2. If the average velocity during the motion is 20m/s, then –



Q.12 The value of t is –

(A) 5s (B) 10s (C) 20s (D) $5\sqrt{2}$s

Q.13 The maximum velocity of the particle is –

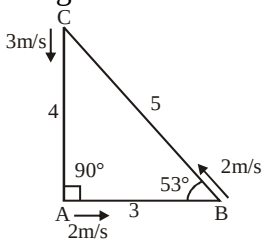
(A) 20m/s (B) 25m/s (C) 30m/s (D) 40m/s

Q.14 The distance travelled with uniform velocity is –

(A) 375m (B) 125m (C) 300m (D) 450m

Passage (Q.15-Q.17)

3 solid rods are joined together to form a triangle ABC. 3 ants a, b and c initially situated at A, B and C respectively start moving in directions along the rods AB, BC and CA respectively at time t = 0, with constant speeds as shown in figure.



After reaching any point among A, B or C they continue their motion in the anticlockwise direction along the sides of the triangle. Neglect any collision between ants.

Q.15 Find the velocity of approach of a and b at t = 0 sec.

(A) 4 m/s (B) 3.6 m/s (C) 3.2 m/s (D) None of these

Q.16 What will be the minimum distance between ant a and b during the motion ?

(A) 3m (B) $\frac{3}{\sqrt{2}}$ m (C) 0.9m (D) 1.7m

Q.17 At what time t the distance between a and c is minimum for the first time.

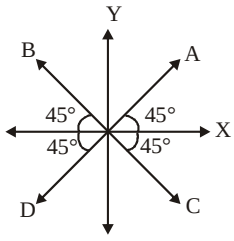
(A) t = 0 sec. (B) t = 4 sec. (C) t = sec. (D) None of these

SECTION - IV

This section contains match the column question. Four statements (A, B, C and D) are given in column I and four/five statements (p, q, r, s and t) in Column II. Any given statement in column I can have correct matching with one or more statement(s) given in column II.

Q.18 Consider the velocity vectors of four particles A, B, C and D as shown in figure. Speed of the particles is same. Take +x-axis in east and +y-axis in north direction.

Column I	**Column II**
(A) The particle(s) is/are going in north direction with respect to atleast one of the other particle.	(p) A
(B) The particle(s) is/are going in south direction with respect to atleast one of the other particle.	(q) B
(C) The particle(s) is/are going in east direction with respect to atleast one of the other particle.	(r) C
(D) The particle(s) is/are going in west direction with respect to atleast one of the other particle.	(s) D
	(t) None



SECTION - V

This section contains 5 questions. The answer to each of the questions is a single digit integer, ranging from 0 to 9.

Q.19 An airplane pilot sets a compass course due west and moves with a constant speed 12 km/hr with respect to air. After flying for 1/2 hour, he finds himself over a town that is 7.5 km west and 2 km south of his starting point. Find the magnitude of wind velocity (in km/hr).

Q.20 A lift is descending with uniform acceleration. To measure the acceleration, a person in the lift drops a coin at the moment the lift starts. The coin is 6ft above the floor of the lift at time it is dropped. The person observes that the coin strikes the floor in 1 second. As the person has a very keen interest in physics he calculates the acceleration of lift as $(14 + x)$ ft/s^2. What is the value of x? [Take g = 32 ft/s^2]

Q.21 Two trains A and B of length 400m each are moving in two parallel tracks with a uniform speed of 72 km/hr. in the same direction, with A ahead of B. The driver of B desires to overtake A and accelerates train B by some constant acceleration. If, water 50s, the guard of B just brushes past driver of A, and the initial distance between guard of A and driver of B is 450m then what is the acceleration (in m/s^2) of train B. (Assume that guard sits at the farthest possible distance from the driver.)

Q.22 River is flowing with a velocity $\vec{v}_R = (4\hat{i})\,m/s$. A boat is moving with a velocity $(-2\hat{i} + 4\hat{j})\,m/s$ relative to river. The width of river is 800 m along y direction. The drift of boat is x × 100m. Find the value of x.

Q.23 A car starts from rest and again comes to rest after travelling 200m in a straight line. If its acceleration and deceleration are limited to 10 m/s^2 and 20 m/s^2 respectively then minimum time the car will take to travel the distance is $x\sqrt{15}$ s. Find the value of x.

SECTION - VI

This section contains 2 questions. Each questions contain STATEMENT-1 (Assertion) and STATEMENT-2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which ONLY ONE is correct.

(A) Statement- 1 is True, Statement-2 is True, Statement-2 is a correct explanation for Statement -1

(B) Statement -1 is True, Statement -2 is True ; Statement-2 is NOT a correct explanation for Statement - 1

(C) Statement - 1 is True, Statement- 2 is False

(D) Statement -1 is False, Statement -2 is True

Q.24 **Statement 1 :** Retardation is directed opposite to the velocity.
Statement 2 : Retardation is equal to the time rate of decrease of velocity.

Q.25 **Statement 1 :** Two balls of different masses are thrown vertically upward with same speed. They will pass through their point of projection in the downward direction with the same speed.
Statement 2 : The height and the downward velocity attained at the point of projection are independent of the mass of ball.