**SAINIK SCHOOL GOPALGANJ**

**SUB: PHYSICS**

**CLASS - XI**

**SUMMER VACATION ASSIGNMENT**

**CHAPTER - 3**

1. A 150 *m* long train is moving with a uniform velocity of 45 *km/h*. The time taken by the train to cross a bridge of length 850 meters is

(a) 56 *sec* (b) 68 *sec* (c) 80 *sec* (d) 92 *sec*

1. A particle is constrained to move on a straight line path. It returns to the starting point after 10 *sec*. The total distance covered by the particle during this time is 30 *m*. Which of the following statements about the motion of the particle is false

(a) Displacement of the particle is zero

(b) Average speed of the particle is 3 *m*/*s*

(c) Displacement of the particle is 30 *m*

(d) Both (a) and (b)

1. A particle moves along a semicircle of radius 10*m* in 5 seconds. The average velocity of the particle is

(a)  (b)  (c)  (d) 

1. A man walks on a straight road from his home to a market 2.5 *km* away with a speed of 5 *km*/*h*. Finding the market closed, he instantly turns and walks back home with a speed of 7.5 *km*/*h*. The average speed of the man over the interval of time 0 to 40 *min*. is equal to

(a) 5 *km*/*h* (b)  *km*/*h* (c)  *km*/*h* (d)  *km*/*h*

1. The ratio of the numerical values of the average velocity and average speed of a body is always

(a) Unity (b) Unity or less (c) Unity or more (d) Less than unity

1. The initial velocity of a particle is  (at ) and the acceleration  is given by . Which of the following relation is valid

(a)  (b)  (c)  (d) 

1. The initial velocity of the particle is  and its retardation is . The distance moved by the particle in  second of its motion is

(a)  (b)  (c)  (d) 

1. A motor car moving with a uniform speed of  comes to stop on the application of brakes after travelling a distance of Its acceleration is

(a)  (b)  (c)  (d) 

1. The velocity of a body moving with a uniform acceleration of  is . Its velocity after an interval of 4 *sec* is

(a)  (b)  (c)  (d) 

1. A particle starting from rest travels a distance  in first 2 *seconds* and a distance  in next two *seconds*, then

(a)  (b)  (c)  (d) 

1. The initial velocity of a body moving along a straight line is 7 . It has a uniform acceleration of . The distance covered by the body in the 5th second of its motion is

(a) 25 *m* (b) 35 *m* (c) 50 *m* (d) 85 *m*

1. A body moves from rest with a constant acceleration of . Its instantaneous speed (in  at the end of 10 *sec*  is

(a) 50 (b) 5 (c) 2 (d) 0.5

1. A boggy of uniformly moving train is suddenly detached from train and stops after covering some distance. The distance covered by the boggy and distance covered by the train in the same time has relation

(a) Both will be equal (b) First will be half of second

(c) First will be 1/4 of second (d) No definite ratio

1. The displacement of a particle starting from rest (at ) is given by . The time in seconds at which the particle will attain zero velocity again, is

(a) 2 (b) 4 (c) 6 (d) 8

1. What is the relation between displacement, time and acceleration in case of a body having uniform acceleration

(a)  (b)  (c)  (d) None of these

1. Two cars *A* and *B* at rest at same point initially. If *A* starts with uniform velocity of 40 *m/sec* and *B* starts in the same direction with constant acceleration of , then *B* will catch *A* after how much time (a) 10 *sec* (b) 20 *sec* (c) 30 *sec* (d) 35 *sec*
2. The motion of a particle is described by the equation  where  *cm* and  *cm*/*s*2. Its instantaneous velocity at time 3 *sec* will be

(a) 36 *cm/sec* (b) 18 *cm/sec* (c) 16 *cm/sec* (d) 32 *cm/sec*

1. A body travels for 15 *sec* starting from rest with constant acceleration. If it travels distances  and  in the first five seconds, second five seconds and next five seconds respectively the relation between  and  is

(a)  (b) (c)  (d)

1. A body is moving according to the equation  where  displacement and  and  are constants. The acceleration of the body is

(a) a+2bt (b)  (c)  (d) 

1. A particle travels 10*m* in first 5 *sec* and 10*m* in next 3 *sec*. Assuming constant acceleration what is the distance travelled in next 2 *sec*

(a) 8.3 *m* (b) 9.3 *m* (c) 10.3 *m* (d) None of above

1. Velocity-time (*v-t*) graph for a moving object is shown in the figure. Total displacement of the object during the time interval when there is non-zero acceleration and retardation is

(a) 60 *m*

4

3

2

1

0

10

20

30

40

50

60

*t* (sec)

*ν* (*m/s*)

(b) 50 *m*

(c) 30 *m*

(d) 40 *m*

1. Figures (i) and (ii) below show the displacement-time graphs of two particles moving along the *x*-axis. We can say that

*X*

*t*

(*i*)

(*ii*)

*t*

*X*

(a) Both the particles are having a uniformly accelerated motion

(b) Both the particles are having a uniformly retarded motio

(c)Particle (i) is having a uniformly accelerated motion while particle (ii) is having a uniformly retarded motion

(d) Particle (i) is having a uniformly retarded motion while particle (ii) is having a uniformly accelerated motion

1. For the velocity-time graph shown in figure below the distance covered by the body in last two seconds of its motion is what fraction of the total distance covered by it in all the seven seconds

10

8

6

4

2

1

2

3

4

5

6

7

Velocity(*m/sec*)

Time(*sec*)

(a) 

(b) 

(c) 

(d) 

1. In the following graph, distance travelled by the body in metres is

15

10

5

0

10

20

30

40

Time(*s*)

*vm/s*

*X*

*Y*

(a) 200

(b) 250

(c) 300

(d) 400

1. The displacement-time graph of moving particle is shown below

*C*

*D*

*E*

*F*

Displacement

*s*

Time

*t*

The instantaneous velocity of the particle is negative at the point

(a) *D* (b) *F*

(c) *C* (d) *E*

1. Using calculus, derive the relation x − x0 = *ut* + ½ at2 , where symbols have their usual meanings.
2. Define acceleration. Using calculus, derive the velocity displacement relation of a body moving under constant acceleration.
3. Prove that the distance traveled by a body in the nth second is
4. Give the basis definitions of the following:
5. A reference system, path, uniform velocity, variable velocity, average velocity, uniform acceleration.
6. Distinguish between displacement and distance.
7. What is relative velocity? How do the velocities and when both bodies (*i*) move in the same direction (*ii*) move in opposite direction?
8. A body has initial velocity *u* and acceleration *a*. Derive the relation S = *ut* + ½ *at*2 from the velocity – time graph of the body.
9. Derive three kinematical equations by calculus method.
10. Plot DT and VT graph for uniform and non-uniform motion (All Cases, Use Graph Paper)