ANANDALAYA
PERIODIC TEST – 1
Class : XI

Subject: Physics   M.M: 40
Date   : 17/07/2019   Time: 2 Hours
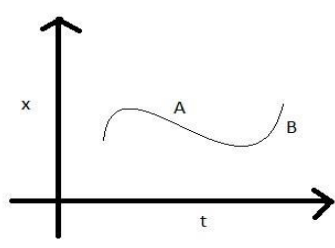
General Instructions
1. All questions are compulsory. There are 20 questions in all.
2. This question paper has four sections: Section A, Section B, Section C, and Section D.
3. Section A contains ten questions of one mark each, Section B contains four questions of two marks each, Section C contains four questions of three marks each and Section D contains two questions of five marks each.
4. You may use the following values of physical constants wherever necessary.

$$g = 10 \text{ m/s}^2$$
$$c = 3 \times 10^8 \text{ m/s} \qquad\qquad m_e = 9.1 \times 10^{-31} \text{ kg}$$
$$h = 6.63 \times 10^{-34} \text{Js} \qquad\qquad e = 1.6 \times 10^{-19} \text{ C}$$

SECTION A

1. What is the dimensional formula of acceleration due to gravity? (1)

2. Find the number of significant figures in the following numbers: (i) 0.008 (ii) 527.00 (1)

3. Distinguish between the two measurements 4.0 kg and 4.000 kg? (1)

4. Magnitude of force F experienced by a certain object moving with speed 'v' is given by $F = Kv^2$, where K is a constant.   Find the dimensions of K. (1)

5. A graph plotted between velocity and time of a body is found to be a straight line inclined with time axis. What type of motion the body undergoes? (1)

6. The x-t graph of a moving particle is as shown.   Comment on the signs of the velocities at the points A and B. (1)

7. Two masses in the ratio 1:2 are thrown vertically up with the same speed. What is the effect on the time by the mass? (1)

8. Is uniform circular motion an example of constant acceleration motion? Why? (1)

9. Evaluate: $\int \sqrt[5]{x}\, dx$ (1)

10. A boy is playing on the roof of a 10 m high building throws a ball with a speed of 10 m/s at an angle 30° with horizontal. How far from point of projection will the ball be at a height of 10 m from the ground? (1)

SECTION B

11. State the parallelogram law of vector addition. What is the magnitude of resultant of two vectors $\vec{P}$ and $\vec{Q}$ inclined at an angle $90°$ with each other? (2)

12. Two parallel rail tracks are running from North-South direction. In which train A moves North with a speed of 54km/h and train B moves South with a speed of 90 km/h. What is the (a) velocity of B with respect to A (b) velocity of ground with respect to B? (2)

13. Study the following graph for an object moving along a straight line. When the object is (a) stationary and (b) decelerating? (2)
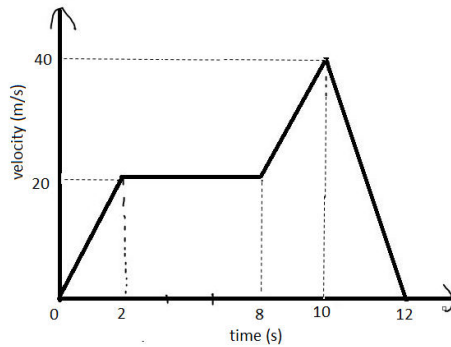
14. A physical quantity X is related to three observables, a, b and c as follows: (2)

$$X = \frac{ab^2}{\sqrt{c}}$$

The percentage errors of measurements in a, b and c are 1%, 3% and 2% respectively. What is the percentage error in the quantity X?

SECTION C

15. Describe a method to find the size of a large sized molecule. (3)

OR

Describe parallax method of measuring the distance of a distant star.

16. Derive the equation of motion $x_t = x_0 + ut + \frac{1}{2} a t^2$ for a uniformly accelerated body in one dimensional motion. x_0 is the position of the object at t = 0 , x_t are positions of the object at instant t and the acceleration of the body is a. (3)

17. An object travelling with an initial velocity u experiences a constant acceleration 'a'. Show that the displacement of the object during nth second is $u + \frac{a}{2}(2n - 1)$ (3)

18. A bus travels with 30 km with 30 km/h in a straight road. How fast does it have to travel the next 30 km so that the average speed becomes 40 km/h for the entire trip? (3)

SECTION D

19. Velocity of an object is given as $v = 5 t^2 + 3t - 8$ m/s where t is in seconds. Find: (5)
(a) the acceleration of the object at t = 2 s
(b) the time when the object was at rest.
(c) position at t = 1 s given that the object is at the origin, when t = 0.

20. An object is revolving in a circular path of radius R with a constant speed v. Derive an expression for the acceleration of the object. (5)