GR-D23-TEST ID-435-KINEMATICS
Class 11 - Physics

Time Allowed: 1 hour   **Maximum Marks: 30**

1. A body initially at rest is moving with uniform acceleration a. Its velocity after n seconds is v. **[1]**
   The displacement of the body in last 2s is:

   a) $\frac{2v(n-1)}{n}$ b) $\frac{v(n+1)}{n}$

   c) $\frac{2v(n+1)}{n}$ d) $\frac{v(n-1)}{n}$

2. For one-dimensional motion displacement is the change in position and is given by **[1]**

   a) $\Delta x = x_2 - x_1$ b) $\Delta x = (x_2 + x_1)/2$

   c) $\Delta x = x_2 + x_1$ d) $\Delta x = 2(x_2 + x_1)$

3. State true or false: **[1]**

   A body could have constant speed but varying velocity.

4. State true or false: **[1]**

   The ratio of the distances covered by a body falling freely from rest in the first, second and
   third seconds of its fall is 1 : 3 : 5.

5. State true or false: **[1]**

   A body has a constant velocity but varying speed.

6. State true or false: **[1]**

   A body having a non-zero acceleration can have a constant velocity.

7. State true or false: **[1]**

   A body, whatever its motion, is always at rest in a frame of reference which is fixed to the
   body itself.

8. State true or false: **[1]**

   A body can be at rest as well as in motion at the same time.

9. Fill in the blanks: **[1]**

   When a stone tied to a string is whirled in a circular path, the acceleration acting on it is
   always at _____ angles.

10. Fill in the blanks: **[1]**

    _____ velocity of a body is defined as the change in position or displacement divided by the
    time interval in which that displacement occur.

11. Fill in the blanks: **[1]**

    The motion in which a particle moves to and fro about a given point is known as _____.

12. **Assertion (A):** Displacement of a body is the signed sum of the area under the velocity-time **[1]**
    graph.

    Reason (R): Displacement is a vector quantity.

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 but R is true.

13. **Assertion:** A body can have acceleration even if its velocity is zero at an instant. **[1]**

Reason: A body is momentarily at rest when it reverses its direction of motion.

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 but R is true.

14. To find the sum of vectors $\vec{A}$ and $\vec{B}$, we place vector $\vec{B}$ so that its **[1]**

a) tail is at the tail of the vector $\vec{A}$

b) direction is the same as that of vector $\vec{A}$

c) tail is at the head of the vector $\vec{A}$

d) head is at the head of the vector $\vec{A}$

15. For vectors $\vec{A}$ and $\vec{B}$ making an angle 'θ', which one of the following relations is correct? **[1]**

a) $\vec{A} \times \vec{B} = \vec{B} \times \vec{A}$

b) $\vec{A} \times \vec{B} = AB\sin\theta$

c) $\vec{A} \times \vec{B} = AB\cos\theta$

d) $\vec{A} \times \vec{B} = -\vec{B} \times \vec{A}$

16. Fill in the blanks: **[1]**

The angle between $(\vec{A} + \vec{B})$ and $(\vec{A} + \vec{B})$ is _____degree.

17. Fill in the blanks: **[1]**

The magnitude of a vector is often called its _____, indicated by $|\mathbf{v}|$ = v.

18. **Assertion (A):** The trajectory of projectile is quadratic in x and linear in y. **[1]**

Reason (R): y component of trajectory is independent of x-component.

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 but R is true.

19. Which of the following options is correct for the object having a straight line motion represented by the following graph? **[2]**
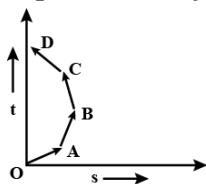

a) The object moves with constantly increasing velocity from O to A and then it moves with constant velocity.

b) The graph shown is impossible.

c) Velocity of the object increases uniformly.

d) Average velocity is zero.

20. A bus starts from rest with an acceleration of 1 m/sec^2. A man who is 48 meter behind the bus with a uniform velocity of 10 m/sec. Then the minimum time after which the man will catch the bus is **[2]**

a) 14 sec b) 4 sec

c) 10 sec d) 8 sec

21. With reference to the figure below which shows a particle moving along a straight line, the y-axis represents the position and x-axis represents time. If x_2 = 270m, the instantaneous velocity at x_2 in m/s is **[2]**
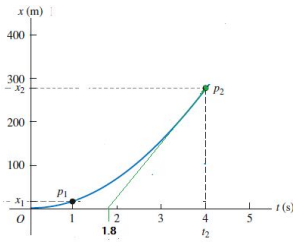

a) 123.0 b) 130

c) 145 d) 138

22. The speed-time graph of a particle moving along a solid curve is shown below. The distance traversed by the particle from t = 0 to t = 3 is: **[2]**
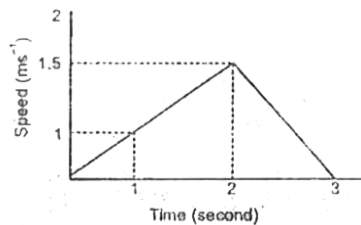
a) $\frac{9}{4}m$ b) $\frac{9}{5}m$

c) $\frac{9}{3}m$ d) $\frac{9}{2}m$

23. 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 anticlockwise from P to Q, and returns to the centre along QO as shown in figure. If the round trip takes 10 min, what is the **[2]**

  i. net displacement,

  ii. average velocity, and

  iii. average speed of the cyclist?
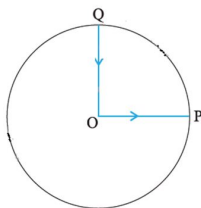
a) 0, 0, 11.4 km/hr b) 0, 0, 15.4 km/hr

c) 0, 0, 27.4 km/hr d) 0, 0, 21.4 km/hr

24. Two particles A and B are connected by a rigid rod AB. The rod slides along perpendicular rails as shown here. **[2]**
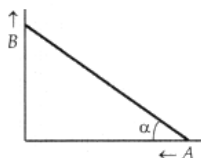
The velocity of A to the left is 10 m/s. What is the velocity of B when angle α = 60°?

a) 9.8 m/s

b) 10 m/s

c) 5.8 m/s

d) 17.3 m/s