NEET PHYSICS PRACITCE PAPER

Time : 60 Mins **2 KINEMATICS 1** **Marks : 200**

1. Which of the following is the essential characteristic of a projectile?
   a) Initial velocity inclined to the horizontal b) Zero velocity at the highest point
   c) Constant acceleration perpendicular to the velocity d) None of the above
2. If a_r and a_t represent radial and tangential accelerations, the motion of a particle will be uniformly circular if:
   a) $a_r=0$ and $a_t=0$ b) $a_r=0$ but $a_t\neq0$ c) $a_r\neq0$ but $a_t=0$ d) $a_r\neq0$ and $a_t\neq0$
3. Which of the following does not depend on the choice of the co-ordinate system?
   a) $\vec{P}+\vec{Q}+\vec{R}$ b) $(P_x + Q_x + R_x)\hat{i}$ c) $P_x\,\hat{i}+Q_y\hat{j}+R_z\hat{k}$ d) None of these
4. A cyclist moving on a circular track of radius 40 m completes half a revolution in 40 s. Its average velocity is
   a) zero b) 4π m S^{-1} c) 2 m S^{-1} d) 8π m S^{-1}
5. A force vector applied on a mass is represented as $\vec{F}=6\hat{i}-8\hat{j}+10\hat{k}$ and the mass accelerates with 1 m/s ^{2}. What will be the mass of the body?
   a) $10\sqrt{2}$kg b) $2\sqrt{10}$kg c) 10kg d) 20kg
6. Which of the following quantities is dependent of the choice of orientation of the coordinate axes?
   a) $\vec{A}+\vec{B}$ b) A_x+B_y c) $\left|\vec{A}+\vec{B}\right|$ d) Angle between $\vec{A}$ and $\vec{B}$
7. **Assertion:** An object has given two velocities $\vec{v}_1$ and $\vec{v}_2$ has a resultant velocity $\vec{v}=\vec{v}_1+.\vec{v}_2$
   Reason: $\vec{v}_1$ and $\vec{v}_2$ should be velocities with reference to some common reference frame.
   a) If both assertion and reason are true and reason is the correct explanation of assertion.
   b) If both assertion and reason are true but reason is not the correct explanation of assertion.
   c) If assertion is true but reason is false. d) If both assertion and reason are false.
8. Two parallel rail tracks run north -south. On one track train A moves north with a speed of 54 km h -I and on the other track train B moves south with a speed of 90 km h-I. The velocity of train A with respect to train B is
   a) 10 m s^{-1} b) 15 m s^{-1} c) 25 m s^{-1} d) 40 m s^{-1}
9. From the top of a tower 19.6 m high, a ball is thrown horizontally. Ifthe line joining the point of projection to the point where it hits the ground makes an angle of 45° with the horizontal, then the initial velocity of the ball is:
   a) 9.8 ms^{-1} b) 4.9 ms^{-1} c) 14.7 ms^{-1} d) 2.8 ms^{-1}
10. The maximum height attained by a projectile is increased by 5%. Keeping the angle of projection constant, what is the percentage increase in horizontal range?
    a) 5% b) 10% c) 15% d) 20%
11. The device used for measuring the mass of atoms and molecules is
    a) spring balance b) torsional balance c) mass spectrograph d) common balance
12. The energy of a system as a function of time t is given as $E(t) = A^2 \exp(-\alpha t)$, where α = 0.2 S-I. The measurement of A has an error of 1.25%. If the error in the measurement of time is 1.50%, the percentage error in the value of E(t) at t = 5 s is
    a) 2% b) 4% c) 3% d) 5%
13. Which of the following equations does not represent the kinematic equations of motion?
    a) v = u + at b) S = ut + $\frac{1}{2}$ at^2 c) S = vt + $\frac{1}{2}at^2$ d) $v^2 - u^2 = 2aS$
14. If a vector $2\hat{i}+3\hat{j}+8\hat{k}$ is perpendicular to the vector $4\hat{i}+4\hat{j}+\alpha\hat{k}$. Then the value of l is :
    a) -1 b) 1/2 c) -1/2 d) 1

15. What is the component $3\hat{i} + 4\hat{j}$ along $\hat{i} + \hat{j}$?
    a) $\frac{1}{2}(\hat{i} + \hat{j})$ b) $\frac{3}{2}(\hat{i} + \hat{j})$ c) $\frac{5}{2}(\hat{i} + \hat{j})$ d) $\frac{7}{2}(\hat{i} + \hat{j})$
16. A particle moves along a straight line OX. At a time t (in second) the distance x (in meters) of the particle is given by x = 40 + 12t - t^3. How long would the particle travel before coming to rest?
    a) 24 m b) 40 m c) 56 m d) 16 m
17. Ratio of minimum kinetic energies of two projectiles of same mass is 4: 1. The ratio of the maximum height attained by them is also 4: 1. The ratio of their ranges would be:
    a) 16: 1 b) 4:1 c) 8: 1 d) 2: 1
18. A ball is projected upwards. Its acceleration at the highest point is:
    a) zero b) directed upwards c) directed downwards d) such as cannot be predicted
19. **Assertion:** A uniform circular motion is an accelerated motion.
    Reason: Direction of acceleration is parallel to the velocity vector.
    a) If both assertion and reason are true and reason is the correct explanation of assertion.
    b) If both assertion and reason are true but reason is not the correct explanation of assertion.
    c) If assertion is true but reason is false. d) If both assertion and reason are false.
20. Two vectors are perpendicular, if:
    a) $\vec{A}.\vec{B}$=1 b) $\vec{A} \times \vec{B}$=0 c) $\vec{A}.\vec{B}$=0 d) $\vec{A} \times \vec{B}$=AB
21. The order of magnitude of the diameter of the earth is (Diameter of the earth is 1.28 x 10^7m)
    a) 5 b) 6 c) 7 d) 8
22. A vector of magnitude a is rotated through an angle θ. What is the magnitude of the change in the vector?
    a) 2a sin $\frac{\theta}{2}$ b) 2a cos $\frac{\theta}{2}$ c) 2a sin θ d) 2a cos θ
23. Dimensional formula of ΔQ, heat supplied to the system is
    a) $[ML^2T^{-2}]$ b) $[MLT^{-2}]$ c) $[ML^2T^{-1}]$ d) $[MLT^1]$
24. A cube has a side of length 1.2 x 10^{-2} m. Its volume up to correct significant figures is
    a) 1.7 x $10^{-6}m^3$ b) 1.73 x $10^{-6}m^3$ c) 1.78 x $10^{-6}m^3$ d) 1.732 x $10^{-6}m^3$
25. If $|\vec{A} \times \vec{B}| = \sqrt{3}\vec{A}.\vec{B}$ then the value of $|\vec{A} + \vec{B}|$ is:
    a) $(A^2 + B^2 + AB)^{1/2}$ b) $\left(A^2 - B^2 + \frac{AB}{\sqrt{3}}\right)^{1/2}$ c) (A+B) d) $(A^2 + B^2 + \sqrt{3}AB)^{1/2}$
26. The range of a rifle bullet on level ground is 6000 m. The range at an incline of 30° is:
    a) 4000 m b) 2000 m c) 6000 m d) 1000 m
27. A shot is fired from a point at a distance of 200 m from the foot of a tower100 m high so that it just passes over it. The direction of shot is:
    a) 30° b) 45° c) 60° d) 70°
28. The horizontal range of a projectile fired at an angle of 15° is 50 m. Ifit is fired with the same speed at an angle of 45°, then range will be :
    a) 60 m b) 71 m c) 100 m d) 141 m
29. 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)
30. If the angle between the vectors $\vec{A}$ and $\vec{B}$ is θ , the value of the product $(\vec{B} \times \vec{A}) . \vec{A}$ is equal to :
    a) $BA^2 \cos\theta$ b) $BA^2 \sin\theta$ c) $BA^2 \sin\theta \cos\theta$ d) zero
31. A body covers 20 m, 22 m, 24 m, in 8^{th}, 9^{th} and $I0^{th}$ seconds respectively. The body starts

a) from rest and moves with uniform velocity. b) from rest and moves with uniform acceleration.
c) with an initial velocity and moves with uniform acceleration.
d) with an initial velocity and moves with uniform velocity.

32. In which year SI system of units was developed and recommended by General Conference on Weights and Measures?
a) 1951 b) 1961 c) 1971 d) 1981

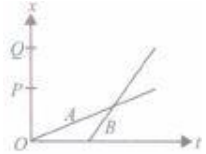
33. Which one of the following is not a unit of British system of units?
a) Foot b) Metre c) Pound d) Second

34. **Assertion:** A projectile that traverses a parabolic path show deviation from its idealised trajectory in the presence of air resistance.
Reason: Air resistance affect the motion of the projectile.
a) If both assertion and reason are true and reason is the correct explanation of assertion.
b) If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

35. Which of the following pairs of vectors are parallel?
a) $\hat{A} = \hat{i} - 2\hat{j}; \hat{B} = \hat{i} - 5\hat{j}$ b) $\hat{A} = \hat{i} - 10\hat{j}; \hat{B} = 2\hat{i} - 5\hat{j}$ c) $\hat{A} = \hat{i} - 5\hat{j}; \hat{B} = \hat{i} - 10\hat{j}$
d) $\hat{A} = \hat{i} - 5\hat{j}; \hat{B} = 2\hat{i} - 10\hat{j}$

36. If velocity of light c, Planck's constant h and gravitational constant G are taken as fundamental quantities then the dimensions of length will be
a) $\sqrt{\frac{ch}{G}}$ b) $\sqrt{\frac{hG}{c^5}}$ c) $\sqrt{\frac{hG}{c^3}}$ d) $\sqrt{\frac{hc^3}{G}}$

37. The position-time (x-t) graphs for two children A and B returning from their school O to their homes P and Q respectively are as shown in the
figure. Choose the incorrect statement regarding these graphs.



a) A lives closer to the school than B. b) A starts from the school earlier than B. c) A walks faster than B.
d) A and B reach home at the same time.

38. A stone dropped from the top of the tower touches the ground in 2 sec. The height of the tower is about:
a) 25 m b) 40 m c) 20 m d) 160 m

39. A particle is moving eastward with a velocity of 5 m/s. In 10 seconds, the velocity changes to 5 m/s northwards. The average acceleration in this time is:
a) $1/\frac{1}{\sqrt{2}}$ m/sec^2 (towards north-west) b) $1/\sqrt{2}$ m/sec^2 (towards north-east)
c) $1/\sqrt{2}$m/sec^2 (towards north-west) d) $\frac{1}{\sqrt{2}}$ m/sec^2 (towards north)

40. The range of a projectile when fired at 75° with the horizontal is 0.5 km. What will be its range when it is fired at an angle of 45°?
a) 0.5 km b) 1.0 km c) 1.5 km d) 2.0 km

41. Given that A = B. What is the angle between $\vec{A} + \vec{B}$ and $\vec{A} - \vec{B}$?
a) 30^o b) 60^o c) 90^o d) 180^o

42. The dimensional formula of physical quantity is [$M^aL^bT^c$]. Then that physical quantity is
a) surface tension if a = 1, b = 1, C = -2 b) force if a=1,b=1,c=2 c) angular frequency if a = 0, b = 0, c = -1
d) spring constant if a = 1, b = -1, c =-2

43. Two vectors $\vec{A}$ and $\vec{B}$ have equal magnitudes. If magnitude of $\vec{A}+\vec{B}$ is equal to n times the magnitude of $\vec{A}-\vec{B}$, then the angle between $\vec{A}$ and $\vec{B}$ is:

a) $cos^{-1}\left(\frac{n-1}{n+1}\right)$ b) $cos^{-1}\left(\frac{n^2-1}{n^2+1}\right)$ c) $sin^{-1}\left(\frac{n-1}{n+1}\right)$ d) $sin^{-1}\left(\frac{n^2-1}{n^2+1}\right)$

44. A calorie is a unit of heat energy and its value is 4.18 J where 1 J = 1 kg m^2s^{-2}. Suppose we use a new system of units in which unit of mass equals α kg, the unit of length equals β m and the unit of the time is γ see. Then the value of a calorie in the new system of units is

a) $4.18\frac{\gamma^2}{\alpha\beta^2}$ b) $4.18\frac{\alpha\beta^2}{\gamma^2}$ c) $4.18\frac{\gamma^2}{\alpha}$ d) $4.18\frac{\beta^2}{\alpha\gamma^2}$

45. A physical quantity which has a direction:

a) must be a vector b) may be a vector c) may be both scalar and vector d) none of the above

46. If $\vec{A}$ is a vector of magnitude 5 units due east. What is the magnitude and direction of a vector -5 $\vec{A}$?

a) 5 units due east b) 25 units due west c) 5 units due west d) 25 units due east

47. A particle reaches its highest point when it has covered exactly one half of its horizontal range. The corresponding point on the displacement-time graph is characterised by:

a) negative slope and zero curvature b) zero slope and negative curvature

c) zero slope and positive curvature d) positive slope and zero curvature

48. Particle moves so that its position vector is given by vector $\vec{r}$=cosωt $\hat{x}$+sin $\omega t\hat{y}$ where ω is a constant. Which of the following is true?

a) Velocity is perpendicular to vector rand acceleration is directed towards the origin.

b) Velocity is perpendicular to vector rand acceleration is directed away from the origin.

c) Velocity and acceleration both are perpendicular to vector r

d) Velocity and acceleration both are parallel to vector r

49. Three different objects of mass m_1, m_2, m_3 are allowed to fall from rest and from the same point O along three different frictionless paths. The speeds of the three objects on reaching the ground will be in the ratio of :

a) $m_1 : m : m_3$ b) $m_1 : 2m_2 : m_3$ c) 1 : 1 : 1 d) $\frac{1}{m_1} : \frac{1}{m_2} : \frac{1}{m_3}$

50. Which of the following instruments has minimum least count?

a) A vernier callipers with 20 divisions on the vernier scale coinciding with 19 main scale divisions.

b) A screw gauge of pitch 1mm and 100 divisions on the circular scale.

c) A spherometer of pitch 0.1 mm and 100 divisions on the circular scale.

d) An optical instrument that can measure length to within a wavelength of light.