Chapter no.4
MCQs

Motion In Two Dimensions

1. Projectile motion is:
   (a) One dimensional
   (b) Two dimensional
   (c) Three dimensional
   (d) Multi-dimensional
2. For projectile motion:
   (a) A body must be thrown vertically
   (b) Body must have constant horizontal velocity.
   (c) Body must fall under the action of gravity.
   (d) Body must have a constant horizontal velocity and at the same time it must fall freely under the action of gravity.
3. Vertical component of velocity of a projectile is zero at:
   (a) The point of projection
   (b) At the target
   (c) At the highest point
   (d) None of these
4. Velocity of a projectile is maximum at:
   (a) The highest point
   (b) The point of projection
   (c) The target point
   (d) A and b
   (e) B and c
5. Total time of flight of a given projectile depends upon:
   (a) Angle of projection
   (b) Initial velocity
   (c) Weight of the projectile
   (d) A and b
   (e) B and c
6. Horizontal range of a projectile depends upon:
   (a) Initial velocity
   (b) Angle of projection
   (c) Weight of projectile
   (d) A and b
   (e) A and c
7. If air resistance is not negligible then:
   (a) Horizontal range of the projectile deceases.
   (b) Time of flight becomes short
   (c) Vertical range decreases
   (d) A and b
8. Horizontal range of a projectile is maximum when it is fired at an angle of:
   (a) 30^o
   (b) 45^o
   (c) 60^o
   (d) 90^o
9. A given projectile has equal horizontal range for two angles of projection. If 0 is the smaller of the two angles then the larger angle is given by:
   (a) $0' = 90^o + 0$
   (b) $0' = 180^o + 0$
   (c) $0' = 180^o - 0$
   (d) $0' = 180^o + 0$
10. A projectile fired at 30^o and 60^o has the same horizontal range but its time of flight will be longer for:
    (a) 30^o angle
    (b) 60^o angle
    (c) Equal time for both the angles.
11. In order to hit a mobile target (such as an enemy tank etc.) it is better to fire a projectile at smaller of the two possible angles because:
    (a) Trajectory of the projectile will be flat.
    (b) Time of flight will be short.
    (c) Effect of air resistance will be negligible.
12. The trajectory of a projectile is:
    (a) Straight line
    (b) A circle
    (c) Hyperbola
    (d) Parabola
13. S.I unit of angular displacement is:
    (a) 0
    (b) Degree
    (c) Radian
    (d) Stradian
14. When distance covered by a body along a circular path is equal to radius of the circular path then the angle subtended at the center will be equal to:
    (a) 1 degree
    (b) 1 radium
    (c) 1 stradian
    (d) 1 minute

15. For a complete revolution the angular displacement of the body will be:

(e) Л radian
(f) 2Л radian
(g) Л/2 radian
(h) Л/4 radian

16. Centripetal acceleration is due to:

(a) A change in magnitude of velocity.
(b) A change in direction of velocity
(c) A change in unit of velocity
(d) A change in magnitude and direction of velocity

17. Centripetal acceleration is directed:

(a) Towards the center of circular path
(b) Away from the center of circular path
(c) Along the tangent to the circular path

18. Tangential acceleration is directed:

(a) Towards the center of circular path
(b) Away from the center of circular path
(c) Along the tangent to the circular path

19. A body moving with changing speed along a circular path has:

(a) Centripetal acceleration
(b) Tangential acceleration
(c) Centripetal and tangential acceleration both.

20. Angle between centripetal and tangential accelerations is:

(a) 0^o
(b) 30^o
(c) 60^o
(d) 99^o

21. Magnitude of the resultant of centripetal accelerations is:

(a) $A = ar_2 + a_c$
(b) $A = a_c + ar^2$
(c) $A^2 = \sqrt{a^c + ar^2}$
(d) $A = \sqrt{a_c^{-2} + ar^2}$

22. Different points on are removing disk moves with:

(a) Constant linear but different angular velocity
(b) Different linear but constant angular velocity
(c) Constant linear and angular velocities.
(d) Different linear and angular velocities

23. Linear and angular velocities are related by:

(a) $v = {}^{(1)}/r$
(b) $^{\omega} = r\ v$
(c) $V = r^{(1)}$

24. At any instant the linear velocity of a boy moving along a circular path is directed:

(a) Towards the center of the circular path.
(b) Away from the center of circular path.
(c) Along the tangent to circular path.
(d) None of these.

25. Angular velocity of a body moving along a circular path is directed:

(a) Towards the center of the circular path.
(b) Away from the center of circular path.
(c) Perpendicular to the axis of rotation.
(d) Along the axis of rotation.

26. The magnitude of centripetal force required to keep a body in motion along a circular path is given by:

(a) $F_c = m\ v/r$
(b) $F_c = m\ v^2/r$
(c) $F_c = m^2\ v/r$
(d) $F_c = m\ v/r^2$

27. Friction between road and tyres of a car moving along a circular track provides.

(a) Centripetal acceleration.
(b) Centripetal force
(c) Centrifugal force
(d) Angular momentum

28. If speed of the body is doubled then the centripetal force required to keep it in motion along the circular path of same radius will have to be:

(a) Doubled
(b) Tripled
(c) Quadrupled
(d) Decreased by two times

29. Angular acceleration is directed:

a) Towards the centre of the circular path
b) Away from the centre of the circular path
c) Along the tangent to the circular path
d) Along the axis of rotation

30. A body moving along a circular path may have constant:

a) Speed
b) Velocity
c) Acceleration
d) Momentum

31. One radian is equal to:

a) 1^o
b) 5.73^o
c) 57.3^o
d) 573^o

32. The range of a projectile becomes half of its maximum value if the angle of projection is:

a) 15^o
b) 30^o
c) 45^o
d) 60^o

33. The relation between length of an areas radius r and angle 0 subtended by the are at the centre is:

a) S = r 0.
b) S = r/0
c) 0 = s/r
d) R = 0/s

34. Angle subtended at the centre of a circle for one complete revolution of a body is 360* the value of this angle in radar, will be:

a) Л radian
b) 2Л radian
c) 3Л radian
d) 4Л radian

35. Rate of angular displacement of a body is known as:

a) Angular speed.
b) Angular velocity.
c) Angular acceleration.
d) Angular momentum.

36. Direction of angular velocity can be determined by:

a) Law of Sine.
b) A right hand rule.
c) Left hand rule.
d) Law of cosine.

37. Whenever a body is moved along a circular path……..is needed to keep it moving along the path.

a) Force
b) Centripetal force
c) Centrifugal force
d) Momentum

38. Rate of change of angular velocity is called:

a) Angular frequency.
b) Angular speed.
c) Angular acceleration.
d) Angular momentum.

39. Every point on a rotting body has constant: (3-a ii, 1996)

a) Linear velocity
b) Angular velocity
c) Angular momentum

40. The range of a Ghori missile is: (3-2 iii, 1998)

a) 1500 km.
b) 2000 km
c) 2500 km

41. Maximum height of a projectile depends on: (3-a I, 2000)

a) Angle of projection.
b) Velocity of projection.
c) Both angle and velocity.

41. S.I unit of angular velocity is: (3-a ii, 2000)

a) m/s
b) Radian/sec.
c) deg. /sec.
d) rev./sec

42. When a body moves along circumference of a circle with uniform speed, changer; take place in it's: (3-a iii, 2000)

a) Linear velocity.
b) Tangential acceleration.
c) Both.

43. When a body moves along a projectile path, which component of its velocity does not change: (3-a iv, 2000?)

a) Horizontal.
b) Vertical.

44. One radian is equal to: (3-a I, 01)

a) 57.3^o
b) 0.017^o
c) 35.7^o
d) 1^o

45. Every point on a rotating rigid body has the same: (3-a ii, 2001)

a) Liner velocity.
b) Linear momentum.
c) Angular velocity.
d) Linear acceleration.

46. The angle between centripetal acceleration and tangential acceleration is: (3-a iii, 2001)

a) 0^o
b) 90^o
c) 180^o
d) 45^o

47. If a projectile is launched at 45^o with a velocity of 100 m/s, it hits the target. It will have double the range if its velocity is: (4-a I, pre-med.2002)

a) 141.4 m/s
b) 200 m/s
c) 173.2 m/s
d) 400 m/s

48. If projectile is thrown at an angle of 35^o it hits a certain target. It will have the same range if it is thrown at an angle of: (4-a iii, pre-med. 2002)

a) 45^O
b) 55^O
c) 10^O
d) $7c^O$

49. Due to presence of air resistance the total time of flight of a projectile:

a) Remains the same.
b) Decreases.
c) Becomes zero.
d) Increases.

50. A projectile is fired with the initial velocity of 90 m/s to hit a ground level target. Its maximum range will be: (4-a iii, pre-ded.2003)

a) 9.2 m
b) 826.5 m
c) 41.3 m
d) 81 m

51. In projectile motion a body moves with: (3-a iii, pre-Eng.2003)

a) Constant vertical component of velocity.
b) Constant horizontal component of velocity.
c) Both changing horizontal and vertical components of velocity.
d) Horizontal component changing but vertical component of velocity constant.

52. If r is the linear and angular velocities are: (4-a ii, pre-med.2002)

a) $\underset{V}{\rightarrow} = \underset{\omega}{\rightarrow} \times \underset{r}{\rightarrow}$
b) $\underset{V}{\rightarrow} = \underset{a}{\rightarrow} \times \underset{\omega}{\rightarrow}$
c) $\underset{\infty}{\rightarrow} = \underset{V}{\rightarrow} \times \underset{r}{\rightarrow}$
d) $\underset{\infty}{\rightarrow} = \underset{r}{\rightarrow} \times \underset{V}{\rightarrow}$

53. The centripetal acceleration of a body moving along, a circle is:

a) $4T^2 r/\Pi^2$
b) $4 \Pi^2 r/T^2$
c) $4r^2T^2/\Pi^2$
d) $4\Pi^2/T^2r$

54. A body is moving along a circle with an increasing speed. It possesses:

a) Tangential acceleration a_T only.
b) Centripetal acceleration a_c only.
c) Both tangential and centripetal accelerations (a_T and a_c)
d) No acceleration.

55. The motion on a curved path when one component of velocity is constant and the other is variable is called: (2a ii 04)

a) Circular motion
b) Projectile motion
c) Vibratory motion

56. If ∞ is the angular speed of a particle moving in a circle of radius 'r', the centripetal acceleration will be:

a) $\omega\ r$
b) $\omega\ r^2$
c) $\omega^2\ r$

57. Every point on a rotating body has the same: (4a ii 04)

a) Linear velocity
b) Angular velocity
c) Linear acceleration

58. When a body moves with a constant speed in a circle; (2a iii, 05)

a) It's velocity is changing
b) It's acceleration is zero
c) It's acceleration is increasing
d) It's velocity is uniform

59. The angle between centripetal acceleration and tangential acceleration is; (3a I, 05)

a) 0^o
b) 90^o
c) 180^o
d) 45^o

60. One radian is equal to:

a) 0.017^o
b) 57.3^o
c) 35.7^o
d) 0.117^o

61. If "$\underset{r}{\rightarrow}$" is the radius of the circular path of a particle, it's linear Acceleration "$\underset{a}{\rightarrow}$ "and angular acceleration "$\underset{\alpha}{\rightarrow}$ "are related by:

a) $\underset{a}{\rightarrow} = \underset{\alpha}{\rightarrow} \times \underset{r}{\rightarrow}$
b) $\underset{a}{\rightarrow} = \underset{r}{\rightarrow} \times \underset{\alpha}{\rightarrow}$
c) $\underset{\alpha}{\rightarrow} = \underset{a}{\rightarrow} \times \underset{r}{\rightarrow}$
d) $\underset{\alpha}{\rightarrow} = \underset{a}{\rightarrow} \underset{r}{\rightarrow}$

62. Centripetal force is also called: (2a I 07)

a) Centrifugal force
b) Centre seeking force
c) Tangential force
d) Non

63. The rate of change of angular momentum with respect to time: (2a ii 07)

a) Force
b) Angular velocity
c) Angular acceleration
d) Torque

64. An angle subtended at its centre by an arc whose length is equal to its radius is: (2a ii 08)

a) 37.3^o
b) 47.3^o
c) 57.3^o
d) 67.3^o

65. Two particles A and B are thrown up with the same speed at an angle of 60^o and 30^o respectively. With the horizontal, then:

a) The range of A will be greater.
b) The range of B will be greater.
c) The range of A and B will be the same.
d) The range is independent of the angle.

66. A body moving along a circular path with an increasing speed possesses:

a) Tangential acceleration only.
b) Centripetal acceleration only.
c) Both tangential and centripetal accelerations

67. A projectile is thrown at an angle of 30^o with the horizontal having a certain initial velocity. It will have the same range if thrown with the same velocity at an angle of (4-I, 2009)

a) 45^o
b) 60^o
c) 75^o
d) 15^o

68. The horizontal range of a projectile depends upon:

a) The angle of projection.
b) The velocity of projection.
c) '9' at the place.
d) All of them.

69. When the angular velocity of a disk increases, angular acceleration a and angular velocity ∞ are:

a) Parallel.
b) Non parallel.
c) Perpendicular
d) None of these.

70. the rate of change of angular momentum with respect to time is: 1-viii, 2011)

a) Force.
b) Angular velocity.
c) Angular acceleration.
d) Torque.

ANSWERS

1. Two dimensional.
2. Body must have a constant horizontal velocity and at the same time it must fall freely under the action of gravity.
3. At the highest point.
4. B and c.
5. A and b.
6. A and b.
7. A and b.
8. 45^o.
9. $0' = 90^o - 0$.
10. 60^o angle.
11. Time of flight will be short.
12. Parabola.
13. Radian.
14. 1 radian.
15. 2Л radian.
16. A change in direction of velocity.
17. Towards the centre of circular path.
18. Along the tangent to the circular path.
19. Centripetal and tangential accelerations both.
20. 90^o.
21. $A = \sqrt{a}_c^2 + a_T^2$.
22. Different linear and constant angular velocity.
23. $V = r\infty$.
24. Along the tangent to the circular path.
25. Along the axis of rotation.
26. $F_c = m v^2/r$.
27. Centripetal force.
28. Quadrupled.
29. Along the axis of rotation.
30. Speed.
31. 57.3^o
32. 15^o.
33. $S = r 0$.
34. 2Л radian.
35. Angular velocity.
36. Right hand rule.
37. Centripetal force.
38. Angular acceleration.
39. Constant angular velocity.
40. 2500 km.
41. Both angle and velocity.
42. Radians/sec.
43. Linear velocity.
44. Horizontal.
45. 57.3^o
46. Angular velocity.
47. 90^o.
48. 141.4 m/s.
49. 55^o.
50. Decreases.
51. 826.5 m/s.
52. Constant horizontal component of velocity.
53. $\vec{V} = \vec{\omega} \times \vec{r}$
54. $4Л^2r/T^2$
55. Both tangential and centripetal accelerations (a_T & a_c)
56. Projectile motion.
57. $\omega^2 r$
58. Angular velocity
59. Its velocity is changing.
60. 90^o
61. 57.3^o
62. $\vec{a} = \vec{r} \times \vec{\alpha}$
63. Centre seeking force.
64. Torque.
65. 57.3^o
66. The range of A and B will be the same.
67. Both tangential and centripetal accelerations.
68. 60^o
69. All of them.
70. Parallel.
71. Torque.