1. A stone falls from a balloon that is descending at a uniform rate of $12\ m/s$. The displacement of the stone from the point of release after 10 *sec* is

(a) 490 m (b) 510 m

(c) 610 m (d) 725 m

2. A ball is dropped on the floor from a height of 10 *m*. It rebounds to a height of 2.5 *m*. If the ball is in contact with the floor for 0.01 *sec*, the average acceleration during contact is

(a) 2100 $m/\sec^2$ downwards

(b) 2100 $m/\sec^2$ upwards

(c) 1400 $m/\sec^2$

(d) 700 $m/\sec^2$

3. A body *A* is projected upwards with a velocity of $98\ m/s$. The second body *B* is projected upwards with the same initial velocity but after 4 *sec*. Both the bodies will meet after

(a) 6 sec (b) 8 sec

(c) 10 sec (d) 12 sec

4. Two bodies of different masses m_a and m_b are dropped from two different heights a and b. The ratio of the time taken by the two to cover these distances are

(a) $a:b$ (b) $b:a$

(c) $\sqrt{a}:\sqrt{b}$ (d) $a^2:b^2$

5. A body falls freely from rest. It covers as much distance in the last second of its motion as covered in the first three seconds. The body has fallen for a time of

(a) 3 s (b) 5 s

(c) 7 s (d) 9 s

6. A stone is dropped into water from a bridge 44.1 m above the water. Another stone is thrown vertically downward 1 *sec* later. Both strike the water simultaneously. What was the initial speed of the second stone

(a) 12.25 m/s (b) 14.75 m/s

(c) 16.23 m/s (d) 17.15 m/s

7. An iron ball and a wooden ball of the same radius are released from the same height in vacuum. They take the same time to reach the ground. The reason for this is

(a) Acceleration due to gravity in vacuum is same irrespective of the size and mass of the body

(b) Acceleration due to gravity in vacuum depends upon the mass of the body

(c) There is no acceleration due to gravity in vacuum

(d) In vacuum there is a resistance offered to the motion of the body and this resistance depends upon the mass of the body

8. A body is thrown vertically upwards. If air resistance is to be taken into account, then the time during which the body rises is

(a) Equal to the time of fall

(b) Less than the time of fall

(c) Greater than the time of fall

(d) Twice the time of fall

9. A ball *P* is dropped vertically and another ball *Q* is thrown horizontally with the same velocities from the same height and at the same time. If air resistance is neglected, then

(a) Ball *P* reaches the ground first

(b) Ball *Q* reaches the ground first

(c) Both reach the ground at the same time

(d) The respective masses of the two balls will decide the time

10. A body is released from a great height and falls freely towards the earth. Another body is released from the same height exactly one second later. The separation between the two bodies, two seconds after the release of the second body is

(a) 4.9 m

(b) 9.8 m

(c) 19.6 m (d) 24.5 m

11. An object is projected upwards with a velocity of 100 m/s. It will strike the ground after (approximately)

(a) 10 sec (b) 20 sec

(c) 15 sec (d) 5 sec

12. A stone dropped from the top of the tower touches the ground in 4 sec. The height of the tower is about

(a) 80 m (b) 40 m

(c) 20 m (d) 160 m

13. A body is released from the top of a tower of height h. It takes t *sec* to reach the ground. Where will be the ball after time $t/2$ sec

(a) At $h/2$ from the ground

(b) At $h/4$ from the ground

(c) Depends upon mass and volume of the body

(d) At $3h/4$ from the ground

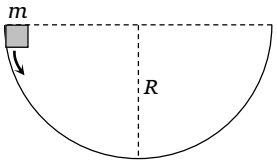
14. A mass m slips along the wall of a semispherical surface of radius R. The velocity at the bottom of the surface is

(a) $\sqrt{Rg}$

(b) $\sqrt{2Rg}$

(c) $2\sqrt{\pi Rg}$

(d) $\sqrt{\pi Rg}$



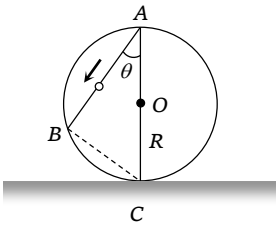
15. A frictionless wire *AB* is fixed on a sphere of radius *R*. A very small spherical ball slips on this wire. The time taken by this ball to slip from *A* to *B* is

(a) $\frac{2\sqrt{gR}}{g\cos\theta}$

(b) $2\sqrt{gR}.\frac{\cos\theta}{g}$

(c) $2\sqrt{\frac{R}{g}}$

(d) $\frac{gR}{\sqrt{g\cos\theta}}$



16. A body is slipping from an inclined plane of height h and length l. If the angle of inclination is θ, the time taken by the body to come from the top to the bottom of this inclined plane is

(a) $\sqrt{\frac{2h}{g}}$ (b) $\sqrt{\frac{2l}{g}}$

(c) $\frac{1}{\sin\theta}\sqrt{\frac{2h}{g}}$ (d) $\sin\theta\sqrt{\frac{2h}{g}}$

17. A particle is projected up with an initial velocity of $80\,ft/\sec$. The ball will be at a height of $96\,ft$ from the ground after

(a) 2.0 and 3.0 *sec* (b) Only at 3.0 *sec*

(c) Only at 2.0 *sec* (d) After 1 and 2 *sec*

18. A body falls from rest, its velocity at the end of first second is $(g = 32\,ft/\sec)$

(a) $16\,ft/\sec$ (b) $32\,ft/\sec$

(c) $64\,ft/\sec$ (d) $24\,ft/\sec$

19. A stone thrown upward with a speed u from the top of the tower reaches the ground with a velocity $3u$. The height of the tower is

(a) $3u^2/g$ (b) $4u^2/g$

(c) $6u^2/g$ (d) $9u^2/g$

20. Two stones of different masses are dropped simultaneously from the top of a building

(a) Smaller stone hit the ground earlier

(b) Larger stone hit the ground earlier

(c) Both stones reach the ground simultaneously

(d) Which of the stones reach the ground earlier depends on the composition of the stone

21. A body thrown with an initial speed of $96\,ft/\sec$ reaches the ground after $(g = 32\,ft/\sec^2)$

(a) 3 *sec* (b) 6 *sec*

(c) 12 *sec* (d) 8 *sec*

22. A stone is dropped from a certain height which can reach the ground in 5 *second*. If the stone is stopped after 3 *second* of its fall and then allowed to fall again, then the time taken by the stone to reach the ground for the remaining distance is

(a) 2 *sec* (b) 3 *sec*

(c) 4 *sec* (d) None of these

23. A man in a balloon rising vertically with an acceleration of $4.9\,m/\sec^2$ releases a ball 2 *sec* after the balloon is let go from the ground. The greatest height above the ground reached by the ball is $(g = 9.8\,m/\sec^2)$

(a) 14.7 *m* (b) 19.6 *m*

(c) 9.8 *m* (d) 24.5 *m*

24. A particle is dropped under gravity from rest from a height $h(g = 9.8\,m/\sec^2)$ and it travels a distance $9h/25$ in the last second, the height h is

(a) 100 *m* (b) 122.5 *m*

(c) 145 m (d) 167.5 m

25. A balloon is at a height of 81 m and is ascending upwards with a velocity of 12 m/s. A body of $2kg$ weight is dropped from it. If $g = 10\ m/s^2$, the body will reach the surface of the earth in

(a) 1.5 s (b) 4.025 s

(c) 5.4 s (d) 6.75 s

26. An aeroplane is moving with a velocity u. It drops a packet from a height h. The time t taken by the packet in reaching the ground will be

(a) $\sqrt{\left(\frac{2g}{h}\right)}$ (b) $\sqrt{\left(\frac{2u}{g}\right)}$

(c) $\sqrt{\left(\frac{h}{2g}\right)}$ (d) $\sqrt{\left(\frac{2h}{g}\right)}$

27. Water drops fall at regular intervals from a tap which is $5\ m$ above the ground. The third drop is leaving the tap at the instant the first drop touches the ground. How far above the ground is the second drop at that instant

(a) 2.50 m (b) 3.75 m

(c) 4.00 m (d) 1.25 m

28. A ball is thrown vertically upwards from the top of a tower at $4.9\ ms^{-1}$. It strikes the pond near the base of the tower after 3 *seconds*. The height of the tower is

(a) 73.5 m (b) 44.1 m

(c) 29.4 m (d) None of these

29. An aeroplane is moving with horizontal velocity u at height h. The velocity of a packet dropped from it on the earth's surface will be (g is acceleration due to gravity)

(a) $\sqrt{u^2 + 2gh}$ (b) $\sqrt{2gh}$

(c) $2gh$ (d) $\sqrt{u^2 - 2gh}$

30. A rocket is fired upward from the earth's surface such that it creates an acceleration of 19.6 m/sec^2. If after 5 *sec* its engine is switched off, the maximum height of the rocket from earth's surface would be

(a) 245 m (b) 490 m

(c) 980 m (d) 735 m

31. A bullet is fired with a speed of $1000\ m/\sec$ in order to hit a target 100 m away. If $g = 10\ m/s^2$, the gun should be aimed

(a) Directly towards the target

(b) 5 cm above the target

(c) 10 cm above the target

(d) 15 cm above the target

32. A body starts to fall freely under gravity. The distances covered by it in first, second and third *second* are in ratio

(a) $1:3:5$ (b) $1:2:3$

(c) $1:4:9$ (d) $1:5:6$

33. P, Q and R are three balloons ascending with velocities $U, 4U$ and $8U$ respectively. If stones of the same mass be dropped from each, when they are at the same height, then

(a) They reach the ground at the same time

(b) Stone from P reaches the ground first

(c) Stone from R reaches the ground first

(d) Stone from Q reaches the ground first

34. A body is projected up with a speed 'u' and the time taken by it is T to reach the maximum height H. Pick out the correct statement

(a) It reaches $H/2$ in $T/2$ *sec*

(b) It acquires velocity $u/2$ in $T/2\sec$

(c) Its velocity is $u/2$ at $H/2$

(d) Same velocity at $2T$

35. A body falling for 2 seconds covers a distance S equal to that covered in next second. Taking $g = 10\ m/s^2, S =$

(a) 30 m (b) 10 m

(c) 60 m (d) 20 m

36. A body dropped from a height h with an initial speed zero, strikes the ground with a velocity $3\ km/h$. Another body of same mass is dropped from the same height h with an initial speed $-u' = 4km/h$. Find the final velocity of second body with which it strikes the ground

(a) 3 *km/h* (b) 4 *km/h*

(c) 5 *km/h* (d) 12 *km/h*

37. A ball of mass m_1 and another ball of mass m_2 are dropped from equal height. If time taken by the balls are t_1 and t_2 respectively, then

(a) $t_1 = \frac{t_2}{2}$ (b) $t_1 = t_2$

(c) $t_1 = 4t_2$ (d) $t_1 = \frac{t_2}{4}$

38. With what velocity a ball be projected vertically so that the distance covered by it in 5^{th} second is twice the distance it covers in its 6^{th} second $(g = 10\, m/s^2)$

(a) 58.8 *m/s* (b) 49 *m/s*

(c) 65 *m/s* (d) 19.6 *m/s*

39. A body sliding on a smooth inclined plane requires 4 seconds to reach the bottom starting from rest at the top. How much time does it take to cover one-fourth distance starting from rest at the top

(a) 1 *s* (b) 2 *s*

(c) 4 *s* (d) 16 *s*

40. A ball is dropped downwards. After 1 second another ball is dropped downwards from the same point. What is the distance between them after 3 seconds

(a) 25 *m* (b) 20 *m*

(c) 50 *m* (d) 9.8 *m*

41. A stone is thrown with an initial speed of 4.9 *m/s* from a bridge in vertically upward direction. It falls down in water after 2 *sec*. The height of the bridge is

(a) 4.9 *m* (b) 9.8 *m*

(c) 19.8 *m* (d) 24.7 *m*

42. A stone is shot straight upward with a speed of 20 *m/sec* from a tower 200 *m* high. The speed with which it strikes the ground is approximately

(a) 60 *m/sec* (b) 65 *m/sec*

(c) 70 *m/sec* (d) 75 *m/sec*

43. A body freely falling from the rest has a velocity '*v*' after it falls through a height '*h*'. The distance it has to fall down for its velocity to become double, is

(a) $2h$ (b) $4h$

(c) $6h$ (d) $8h$

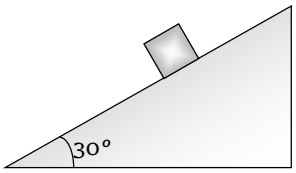
44. The time taken by a block of wood (initially at rest) to slide down a smooth inclined plane 9.8 *m* long (angle of inclination is 30^o) is

(a) $\frac{1}{2}$ sec

(b) 2 sec

(c) 4 sec

(d) 1 sec



45. Velocity of a body on reaching the point from which it was projected upwards, is

(a) $v = 0$ (b) $v = 2u$

(c) $v = 0.5u$ (d) $v = u$

46. A body projected vertically upwards with a velocity u returns to the starting point in 4 seconds. If $g = 10$ *m/sec*^{2}, the value of u is

(a) 5 *m/sec* (b) 10 *m/sec*

(c) 15 *m/sec* (d) 20 *m/sec*

47. Time taken by an object falling from rest to cover the height of h_1 and h_2 is respectively t_1 and t_2 then the ratio of t_1 to t_2 is

(a) $h_1 : h_2$ (b) $\sqrt{h_1} : \sqrt{h_2}$

(c) $h_1 : 2h_2$ (d) $2h_1 : h_2$

48. A body is thrown vertically up from the ground. It reaches a maximum height of 100*m* in 5*sec*. After what time it will reach the ground from the maximum height position

(a) 1.2 *sec* (b) 5 *sec*

(c) 10 *sec* (d) 25 *sec*

49. A body thrown vertically upwards with an initial velocity u reaches maximum height in 6 seconds. The ratio of the distances travelled by the body in the first second and the seventh second is

(a) 1 : 1 (b) 11 : 1

(c) 1 : 2 (d) 1 : 11

50. A particle is thrown vertically upwards. If its velocity at half of the maximum height is 10 *m/s*, then maximum height attained by it is (Take $g = 10$ *m/s*^{2})

(a) 8 *m* (b) 10 *m*

(c) 12 *m* (d) 16 *m*

51. A body, thrown upwards with some velocity, reaches the maximum height of 20*m*. Another body with double the mass thrown up, with double initial velocity will reach a maximum height of

(a) 200 *m* (b) 16 *m*

(c) 80 m (d) 40 m

52. A balloon starts rising from the ground with an acceleration of 1.25 m/s^2 after 8s, a stone is released from the balloon. The stone will ($g = 10\ m/s^2$)

(a) Reach the ground in 4 second

(b) Begin to move down after being released

(c) Have a displacement of 50 m

(d) Cover a distance of 40 m in reaching the ground

53. A body is thrown vertically upwards with a velocity u. Find the true statement from the following

(a) Both velocity and acceleration are zero at its highest point

(b) Velocity is maximum and acceleration is zero at the highest point

(c) Velocity is maximum and acceleration is g downwards at its highest point

(d) Velocity is zero at the highest point and maximum height reached is $u^2/2g$

54. A man throws a ball vertically upward and it rises through 20 m and returns to his hands. What was the initial velocity (u) of the ball and for how much time (T) it remained in the air $[g = 10m/s^2]$

(a) u = 10 m/s, T = 2s (b) u = 10 m/s, T = 4s

(c) u = 20 m/s, T = 2s (d) u = 20 m/s, T = 4s

55. A particle when thrown, moves such that it passes from same height at 2 and 10s, the height is

(a) g (b) $2g$

(c) $5g$ (d) $10g$

56. Three different objects of masses m_1, m_2 and 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) $m_1 : m_2 : m_3$ (b) $m_1 : 2m_2 : 3m_3$

(c) 1 : 1 : 1 (d) $\frac{1}{m_1} : \frac{1}{m_2} : \frac{1}{m_3}$

57. From the top of a tower, a particle is thrown vertically downwards with a velocity of 10 m/s. The ratio of the distances, covered by it in the 3rd and 2nd seconds of the motion is (Take $g = 10m/s^2$)

(a) 5 : 7 (b) 7 : 5

(c) 3 : 6 (d) 6 : 3

58. Two balls A and B of same masses are thrown from the top of the building. A, thrown upward with velocity V and B, thrown downward with velocity V, then

(a) Velocity of A is more than B at the ground

(b) Velocity of B is more than A at the ground

(c) Both A & B strike the ground with same velocity

(d) None of these

59. A ball is dropped from top of a tower of 100m height. Simultaneously another ball was thrown upward from bottom of the tower with a speed of 50 m/s ($g = 10m/s^2$) . They will cross each other after

(a) 1s (b) 2s

(c) 3s (d) 4s

60. A cricket ball is thrown up with a speed of 19.6 ms^{-1}. The maximum height it can reach is

(a) 9.8 m (b) 19.6 m

(c) 29.4 m (d) 39.2 m

61. A very large number of balls are thrown vertically upwards in quick succession in such a way that the next ball is thrown when the previous one is at the maximum height. If the maximum height is 5m, the number of ball thrown per minute is (take $g = 10\ ms^{-2}$)

(a) 120 (b) 80

(c) 60 (d) 40

62. A body falling from a high Minaret travels 40 meters in the last 2 seconds of its fall to ground. Height of Minaret in meters is (take $g = 10m/s^2$)

(a) 60 (b) 45

(c) 80 (d) 50

63. A body falls from a height $h = 200\,m$ (at New Delhi). The ratio of distance travelled in each 2 *sec* during t = 0 to $t = 6$ second of the journey is

(a) 1 : 4 : 9 (b) 1 : 2 : 4

(c) 1 : 3 : 5 (d) 1 : 2 : 3

64. A man drops a ball downside from the roof of a tower of height 400 meters. At the same time another ball is thrown upside with a velocity 50 *meter/sec*. from the surface of the tower, then they will meet at which height from the surface of the tower

(a) 100 meters (b) 320 meters

(c) 80 meters (d) 240 meters

65. Two balls are dropped from heights h and $2h$ respectively from the earth surface. The ratio of time of these balls to reach the earth is

(a) $1:\sqrt{2}$ (b) $\sqrt{2}$: 1

(c) 2 : 1 (d) 1 : 4

66. The acceleration due to gravity on the planet *A* is 9 times the acceleration due to gravity on planet *B*. A man jumps to a height of $2m$ on the surface of *A*. What is the height of jump by the same person on the planet *B*

(a) $18m$ (b) $6m$

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

67. A body falls from rest in the gravitational field of the earth. The distance travelled in the fifth second of its motion is $(g = 10m/s^2)$

(a) $25m$ (b) $45m$

(c) $90m$ (d) $125m$

68. If a body is thrown up with the velocity of 15 *m/s* then maximum height attained by the body is (g = 10 *m/s*^{2})

(a) 11.25 *m* (b) 16.2 *m*

(c) 24.5 *m* (d) 7.62 *m*

69. A balloon is rising vertically up with a velocity of 29 *ms*$^{-1}$. A stone is dropped from it and it reaches the ground in 10 seconds. The height of the balloon when the stone was dropped from it is (g = 9.8 *ms*$^{-2}$)

(a) 100 *m* (b) 200 *m*

(c) 400 *m* (d) 150 *m*

70. A ball is released from the top of a tower of height *h* meters. It takes *T* seconds to reach the ground. What is the position of the ball in *T*/3 seconds

(a) *h*/9 *meters* from the ground

(b) 7*h*/9 *meters* from the ground

(c) 8*h*/9 *meters* from the ground

(d) 17*h*/18 *meters* from the ground

71. Two balls of same size but the density of one is greater than that of the other are dropped from the same height, then which ball will reach the earth first (air resistance is negligible)

(a) Heavy ball

(b) Light ball

(c) Both simultaneously

(d) Will depend upon the density of the balls

72. A packet is dropped from a balloon which is going upwards with the velocity 12 *m/s*, the velocity of the packet after 2 seconds will be

(a) –12 *m/s* (b) 12 *m/s*

(c) –7.6 *m/s* (d) 7.6 *m/s*

73. If a freely falling body travels in the last second a distance equal to the distance travelled by it in the first three second, the time of the travel is

(a) 6 *sec* (b) 5 *sec*

(c) 4 *sec* (d) 3 *sec*

74. The effective acceleration of a body, when thrown upwards with acceleration *a* will be :

(a) $\sqrt{a-g^2}$ (b) $\sqrt{a^2+g^2}$

(c) $(a-g)$ (d) $(a+g)$

75. A body is thrown vertically upwards with velocity *u*. The distance travelled by it in the fifth and the sixth seconds are equal. The velocity *u* is given by (g = 9.8 *m/s*^{2})

(a) 24.5 *m/s* (b) 49.0 *m/s*

(c) 73.5 *m/s* (d) 98.0 *m/s*

76. A body, thrown upwards with some velocity reaches the maximum height of 50 *m*. Another body with double the mass thrown up with double the initial velocity will reach a maximum height of

(a) 100 *m* (b) 200 *m*

(c) 300 *m* (d) 400 *m*

77. A parachutist after bailing out falls 50 *m* without friction. When parachute opens, it decelerates at 2 *m/s*^{2}. He reaches the ground with a speed of 3 *m/s*. At what height, did he bail out ?

(a) 293 *m* (b) 111 *m*

(c) 91 *m* (d) 182 *m*

78. Three particles *A, B* and *C* are thrown from the top of a tower with the same

speed. *A* is thrown up, *B* is thrown down and *C* is horizontally. They hit the ground with speeds V_A, V_B and V_C respectively.

(a) $V_A = V_B = V_C$ (b) $V_A = V_B > V_C$

(c) $V_B > V_C > V_A$ (d) $V_A > V_B = V_C$

79. From the top of a tower two stones, whose masses are in the ratio 1 : 2 are thrown one straight up with an initial speed *u* and the second straight down with the same speed *u*. Then, neglecting air resistance

(a) The heavier stone hits the ground with a higher speed

(b) The lighter stone hits the ground with a higher speed

(c) Both the stones will have the same speed when they hit the ground.

(d) The speed can't be determined with the given data.

80. When a ball is thrown up vertically with velocity V_o, it reaches a maximum height of '*h*'. If one wishes to triple the maximum height then the ball should be thrown with velocity

(a) $\sqrt{3}V_o$ (b) $3V_o$

(c) $9V_o$ (d) $3/2V_o$

81. An object start sliding on a frictionless inclined plane and from same height another object start falling freely

(a) Both will reach with same speed

(b) Both will reach with same acceleration

(c) Both will reach in same time

(d) None of above