TOPIC : KINEMATICS (MOTION UNDER GRAVITY & GRAPHS)   **LECTURE-01**

1. A rocket is fired vertically from the ground. It moves upwards with a constant acceleration of 10 m/s^2. After 30 seconds the fuel is finished. After what time from the instant of firing the rocket will it attain the maximum height ? g = 10 m/s^2 :
   (1) 30 s   (2) 45 s
   (3) 60s   (4) 75 s

2. With what speed should a body be thrown upwards so that the distances traversed in 5th second and 6th second are equal ?
   (1) 58.4 m/s   (2) 49 m/s
   (3) $\sqrt{98}$ m/s   (4) 98 m/s

3. A particle is thrown vertically upward. Its velocity at half of the maximum height is 10m/s. The maximum height attained by it is (g=10 ms^{-2}) :–
   (1) 8m   (2) 20m
   (3) 10m   (4) 16m

4. A body is projected vertically upward with speed 40 m/s. The distance travelled by body in the last second of upward journey is [take g = 9.8 m/s^2 and neglect effect of air resistance] :-
   (1) 4.9 m   (2) 9.8 m   (3) 12.4 m (4) 19.6 m

5. A ball is thrown upward from edge of a cliff with an initial velocity of 6 m/s. How fast is it moving 1/2 s later ? (g = 10 m/s^2)

6. A body is projected vertically upwards from ground. If t_1 and t_2 be the times at which it is at height h above the projection while ascending and descending respectively, then h is :-

   (1) $\frac{1}{2}gt_1t_2$ (2) gt_1t_2

   (3) $2gt_1t_2$ (4) 2hg

7. A stone is thrown vertically upward. On its way up it passes point A with speed of v, and point B, 3m highter than A, with speed V/2 The maximum height reached by stone above point B is :-
   (1) 1 m   (2) 2 m
   (3) 3 m   (4) 5 m

8. A body is released from the top of a tower of height H metres . It takes t time to reach the ground. Where is the body $\frac{t}{2}$ time after the release :
   (1) At $\frac{H}{2}$ metres from ground
   (2) At $\frac{H}{4}$ metres from ground
   (3) At $\frac{3H}{4}$ metres from the ground
   (4) At $\frac{H}{6}$ metres from the ground

9. Two balls are dropped from different heights at different instants. Second ball is dropped 2 seconds after the first ball. If both balls reach the ground simultaneously after 5 seconds of dropping the first ball, then the difference between the initial heights of the two balls will be: (g=9.8m/s^2)
   (1) 58.8 m   (2) 78.4 m
   (3) 98.0 m   (4) 117.6 m

10. Water drops fall at regular intervals from a tap 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 ?
    (1) 1.25 m (2) 2.50 m (3) 3.75 m (4) 4.00 m

11. A stone is dropped from a certain height which can reach the ground in 5 seconds. It is stopped after 3 seconds of its fall and is again released. The total time taken by the stone to reach the ground will be :
    (1) 6 s   (2) 6.5 s   (3) 7 s   (4) 7.5 s

12. A body is projected vertically up at t = 0 with a velocity of 98 m/s. Another body is projected from the same point with same velocity after 4 seconds. Both bodies will meet at t =
    (1) 6 s   (2) 8 s
    (3) 10 s   (4) 12 s

13. A stone is dropped from a height h. It hits the ground with a certain momentum P. If the same stone is dropped from a height 100% more than the previous height, the momentum when it hits the ground will change by :-
    (1) 200 %   (2) 100 %
    (3) 68%   (4) 41%