41. (2) Speed of stone in a vertically upward direction is 4.9 m/s. So, for vertical downward motion we will consider $u = -4.9\ m/s$

$$h = ut + \frac{1}{2}gt^2 = -4.9 \times 2 + \frac{1}{2} \times 9.8 \times (2)^2 = 9.8\ m$$

42. (4) Time of flight,

$$T = \frac{2u}{g} = 4\ sec \Rightarrow u = 20\ m/s$$

43. (1) $H_{max} = \frac{u^2}{2g} \Rightarrow H_{max} \propto \frac{1}{g}$

On planet B value of g is $1/9$ times to that of A. So, value of H_{max} will become 9 times

i.e., $2 \times 9 = 18$ metre

44. (2)Let t be the total time

The distance travelled in last second.

$S_{Last} = u + \frac{g}{2}(2t-1) = \frac{1}{2} \times 9.8(2t-1) = 4.9(2t-1)$ and distance travelled in first three second,

$$S_{Three} = 0 + \frac{1}{2} \times 9.8 \times 9 = 44.1\ m$$

According to problem $S_{Last} = S_{Three} \Rightarrow 4.9(2t-1) = 44.1 \Rightarrow 2t-1 = 9 \Rightarrow t = 5$ sec

45. (1) $H_{max} \propto u^2 \therefore u \propto \sqrt{H_{max}}$

i.e., to triple the maximum height, ball should be thrown with velocity $\sqrt{3}\,u$.

46. (4) Let the car accelerate at rate α for time t_1 then maximum velocity attained,

$v = 0 + \alpha t_1 = \alpha t_1$

Now, the car decelerates at a rate β for time $(t - t_1)$ and finally comes to rest. Then,

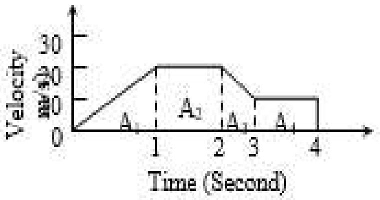
$$0 = v - \beta(t - t_1) \Rightarrow 0 = \alpha t_1 - \beta t + \beta t_1 \Rightarrow t_1 = \frac{\beta}{\alpha+\beta}t \therefore v = \frac{\alpha\beta}{\alpha+\beta}t$$

47. (1) The distance covered by the ball during the last t seconds of its upward motion
= Distance covered byit in first t seconds of its downward motion

From $h = ut + \frac{1}{2}gt^2$; $h = \frac{1}{2}gt^2$

[As u = 0 for it downward motion]

48. (2)

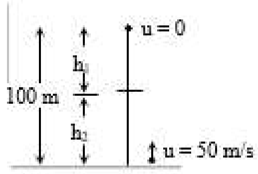


Distance = Area under v-t graph

$$= A_1 + A_2 + A_3 + A_4 = \frac{1}{2} \times 1 \times 20 + (20 \times 1) + \frac{1}{2}(20+10) \times 1 + (10 \times 1) = 10 + 20 + 15 + 10 = 55\ m$$

49. (1) For the given condition initial height $h = d$ and velocity of the ball is zero. When the ball moves downward its velocity increases and it will be maximum when the ball hits the ground and just after

the collision it becomes half and in opposite direction. As the ball moves upward its velocity again decreases and becomes zero at height $d/2$. This explanation match with graph (1).

50. (2) 

$h_1 = \frac{1}{2}gt^2$, $h_2 = 50t - \frac{1}{2}gt^2$

Given $h_1 + h_2 = 100m \Rightarrow 50t = 100 \Rightarrow t = 2\ sec$