CLASS IX (CBSE/GSEB) CT-3S Dt: 8/9/18

SOLUTIONS – PHYSICS

SECTION A

1. Yes, a body can have mass but no weight.
Mass of a body is constant and does not change from place to place.
However weight of a body is $W=mg$. Since the value of 'g' (acceleration due to gravity) changes from place to place, the weight of a body also changes from place to place. In interplanetary space, where $g=0$, the weight of a body becomes zero.

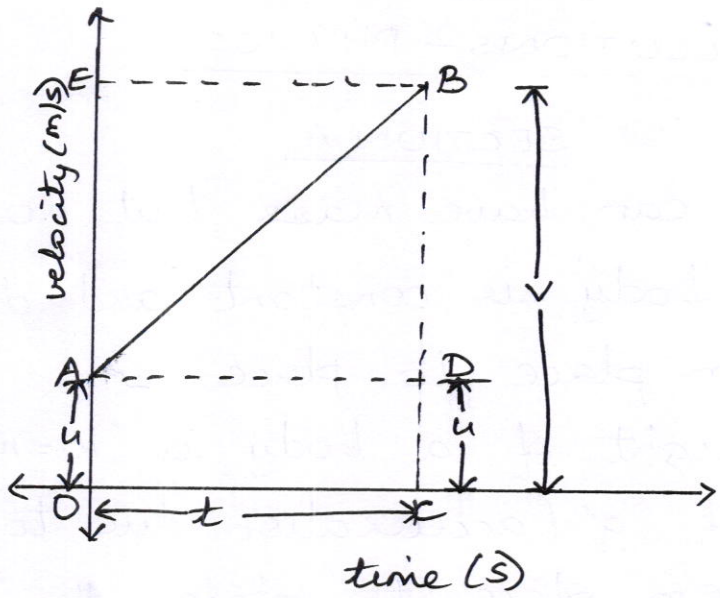
SECTION B

3. The wall will receive equal momentum from both the balls because both the balls have equal mass and equal velocity.
And momentum $p=mv$.

4. (a) The motion of a body under the influence of gravitational force of Earth alone, is called free fall.
(b) During a free fall, a heavier object will fall with the same acceleration, because the acceleration due to gravity of the Earth does not depend on their mass. So a heavier and a lighter object will both accelerate equally.

SECTION C

7. (a)



The equation for position-time relation is

$$s = ut + \frac{1}{2}at^2$$

Consider a body having initial velocity 'u'. Suppose it is subjected to a uniform acceleration 'a' so that after time 't' its final velocity becomes 'v'. The graph above shows — $OA = u$ $\quad BD = v - u$

$BC = v$

$OC = t$.

From the velocity–time graph above,

Distance travelled = area of trapezium OABC

$\therefore s$ = area of rectangle OADC + area of $\triangle$ ABD

$\therefore s = (OA \times OC) + \frac{1}{2}(AD \times BD)$

$\therefore s = (u \times t) + \frac{1}{2}(t) \times (v - u)$

$\therefore s = ut + \frac{1}{2}t \times at$ $\quad (\because v = u + at \Rightarrow v - u = at)$

$\therefore s = ut + \frac{1}{2}at^2$