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Solution 55

Distance travelled in half a rotation of a circular path is equal to the circumference of semi-circle, i.e.,

Distance travelled in half a rotation of a circular path is equal to the circumference of semi-circle, i.e., =πR.
Displacement= diameter of circle= 2R

Solution 56

(i) Distance travelled = 6 km

(ii) Displacement = zero(since final position is same as initial position)

Solution 57

(i) Total distance travelled= 3 + 4 + 9 = 16 km

(ii) The body travels a total distance of 12 km in east direction i.e. towards x-axis.

And it travels a distance of 4 km in North direction, i.e. towards y-axis. Hence, resultant displacement is

(i) Total distance travelled= 3 + 4 +9=16 km
(ii) The body travels a total distance of 12 km in east direction i.e. towards x-axis.
And it travels a distance of 4 km in North direction, i.e. towards y-axis.
Hence, resultant displacement is

$$= \sqrt{12^2+4^2} = \sqrt{144+16} = \sqrt{160} = 12.6km$$

Solution 58

(a) Total distance covered in going to the bookshop and coming back to the classroom = 20 + 20 = 40m

Total time taken= 25 + 25 = 50 sec

(a) Total distance covered in going to the bookshop and coming back to the classroom = 20 + 20 = 40m
Total time taken= 25 + 25 = 50 sec

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}} = \frac{40}{50} = 0.8\,m/s$$

$$\text{(b) Average velocity} = \frac{\text{Total displacement}}{\text{Total time}} = \frac{0}{50} = 0\,m/s$$

Solution 59

In the first case, car travels at a speed of 60 km/h for a distance of 100 km

In the second case, car travels at a speed of 40 km/h for a distance of 100 km

Total distance travelled = 200 km

In the first case, car travels at a speed of 60 km/h for a distance of 100 km

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

$$t_1 = \frac{100}{60}\text{h}$$

In the second case, car travels at a speed of 40 km/h for a distance of 100 km

$$t_2 = \frac{100}{40}\text{h}$$

Total distance travelled = 200 km

$$\text{Total time taken} = \frac{100}{60} + \frac{100}{40}$$

$$\text{Average speed} = \frac{\text{Total distance travelled}}{\text{Total time taken}}$$

$$= \frac{200}{\frac{100}{60} + \frac{100}{40}} = \frac{2}{\frac{1}{60} + \frac{1}{40}}$$

$$= \frac{240}{5} = 48\text{km/h}$$

Solution 60

Initial velocity, u=6m/s

Final velocity ,v=-4.4m/s(the ball rebounds in opposite direction)

Time, t = 0.040 s

Initial velocity, u=6m/s

Final velocity ,v=-4.4m/s (the ball rebounds in opposite direction)

Time, t = 0.040 s

$$\text{Acceleration velocity} = \frac{u-v}{t} = \frac{-4.4-6}{0.040} = -260\,\text{m/s}^2$$

********** END **********