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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.,

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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

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

Solution 58

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

Total time taken=  $25 + 25 = 50$  sec

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Total time taken=  $25 + 25 = 50$  sec

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

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

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

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

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

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

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

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

$$\begin{aligned} \text{Average speed} &= \frac{\text{Total distance travelled}}{\text{Total time taken}} \\ &= \frac{200}{\frac{100}{60} + \frac{100}{40}} = \frac{2}{\frac{1}{60} + \frac{1}{40}} \\ &= \frac{240}{5} = 48 \text{ km/h} \end{aligned}$$

Solution 60

Initial velocity,  $u=6\text{m/s}$

Final velocity,  $v=-4.4\text{m/s}$  (the ball rebounds in opposite direction)

Time,  $t = 0.040 \text{ s}$

Initial velocity,  $u=6\text{m/s}$

Final velocity,  $v=-4.4\text{m/s}$  (the ball rebounds in opposite direction)

Time,  $t = 0.040 \text{ s}$

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

\*\*\*\*\* END \*\*\*\*\*