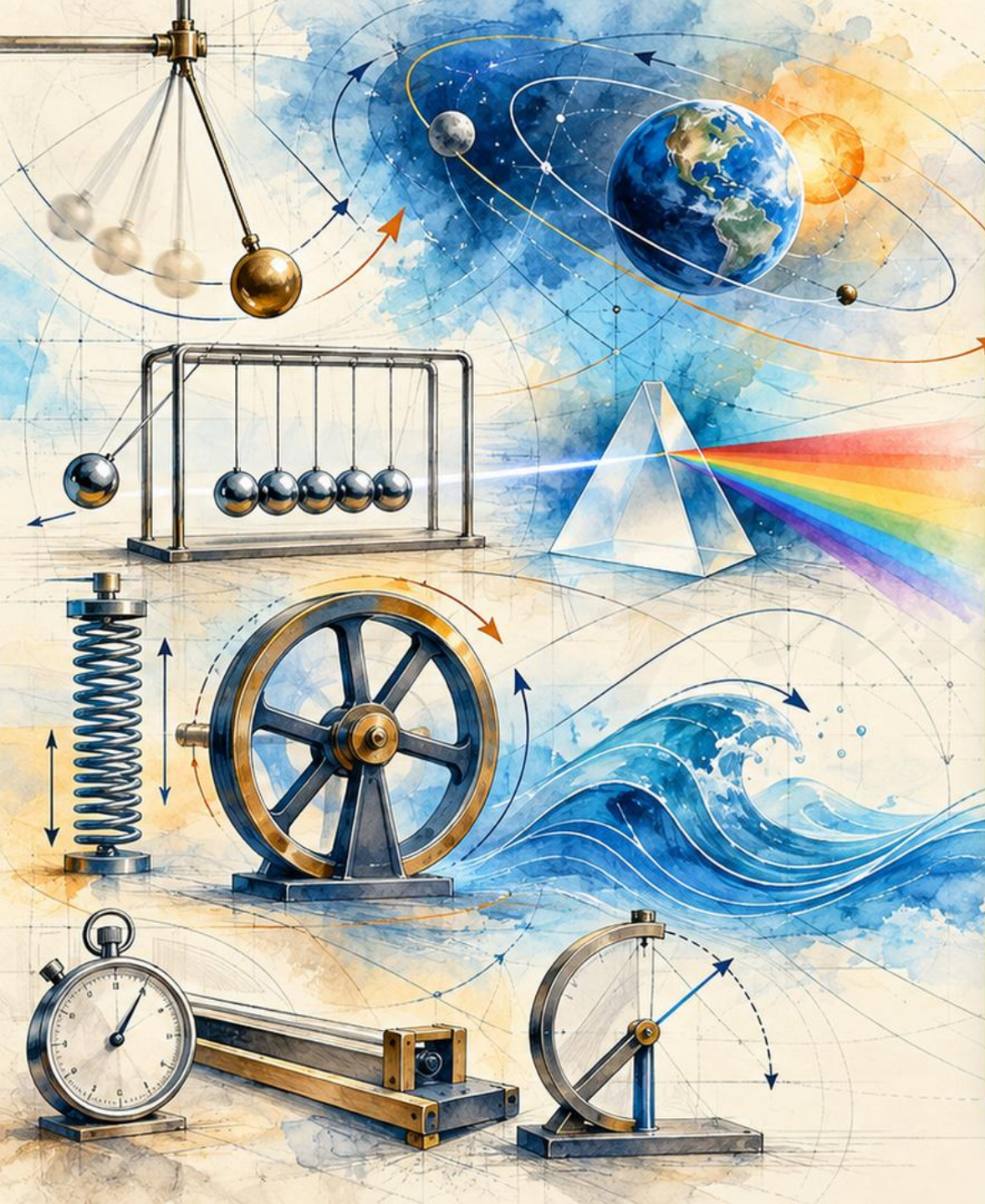




PHYSICS • CLASS 11

2

CHAPTER

Motion in a Straight Line

NCERT SOLUTIONS

EXERCISE SOLUTION: QUESTION 2.1

In which motions can the body be treated approximately as a point object?

(a) A railway carriage moving without jerks between two stations.

Answer: Yes, when its size is small compared with the distance between stations.

(b) A monkey sitting on a man cycling smoothly on a circular track.

Answer: Yes if the monkey's size is small compared with the track's radius.
Its overall motion can be followed by one point.

(c) A spinning cricket ball turning sharply after hitting the ground.

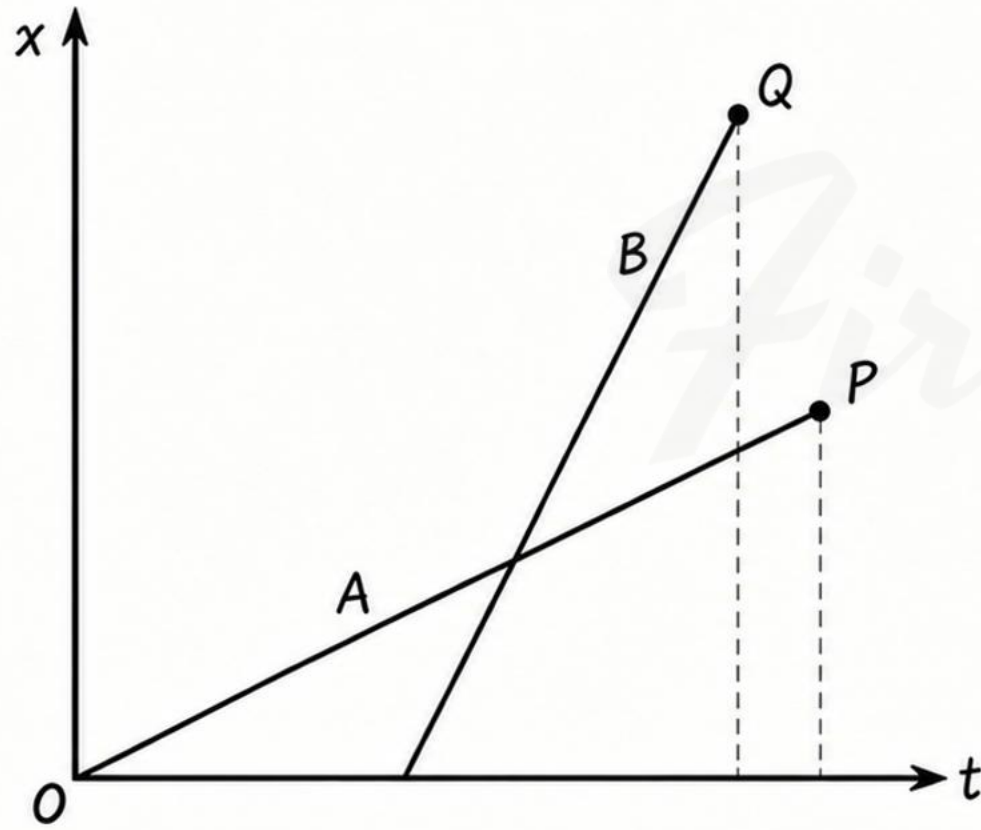
Answer: No Its spin and contact with the ground matter, so its size cannot be ignored.

(d) A tumbling beaker that slips off a table.

Answer: No To describe its tumbling, its size and changing orientation matter.

EXERCISE SOLUTION: QUESTION 2.2

Question 2.2: The position-time graphs show children A and B returning from school O to homes P and Q. Compare their homes, starting times, speeds, arrival times and overtaking.



(schematic)

Answer:

- (a) A lives closer to school than B:
P has the smaller position.
- (b) A starts earlier than B.
- (c) B walks faster: its line is steeper.
- (d) From the supplied plot: different arrival times, with B first.
- (e) B overtakes A once, at the intersection.

Print/key mismatch: NCERT's answer key says "same time", but the endpoints in this PDF are not aligned in time.

EXERCISE SOLUTION: QUESTION 2.3

Q. 2.3 : A woman leaves home at 9:00 am, walks 2.5 km to her office at 5 km h^{-1} , stays until 5:00 pm, then returns by auto at 25 km h^{-1} . Plot her position-time graph.

Solution: Take home as the origin; time is measured from the morning departure.

Time to reach office (outward journey):

$$t_{\text{out}} = \frac{2.5}{5} = 0.5 \text{ h} = 30 \text{ min}$$

Arrival at office = 9:30 am

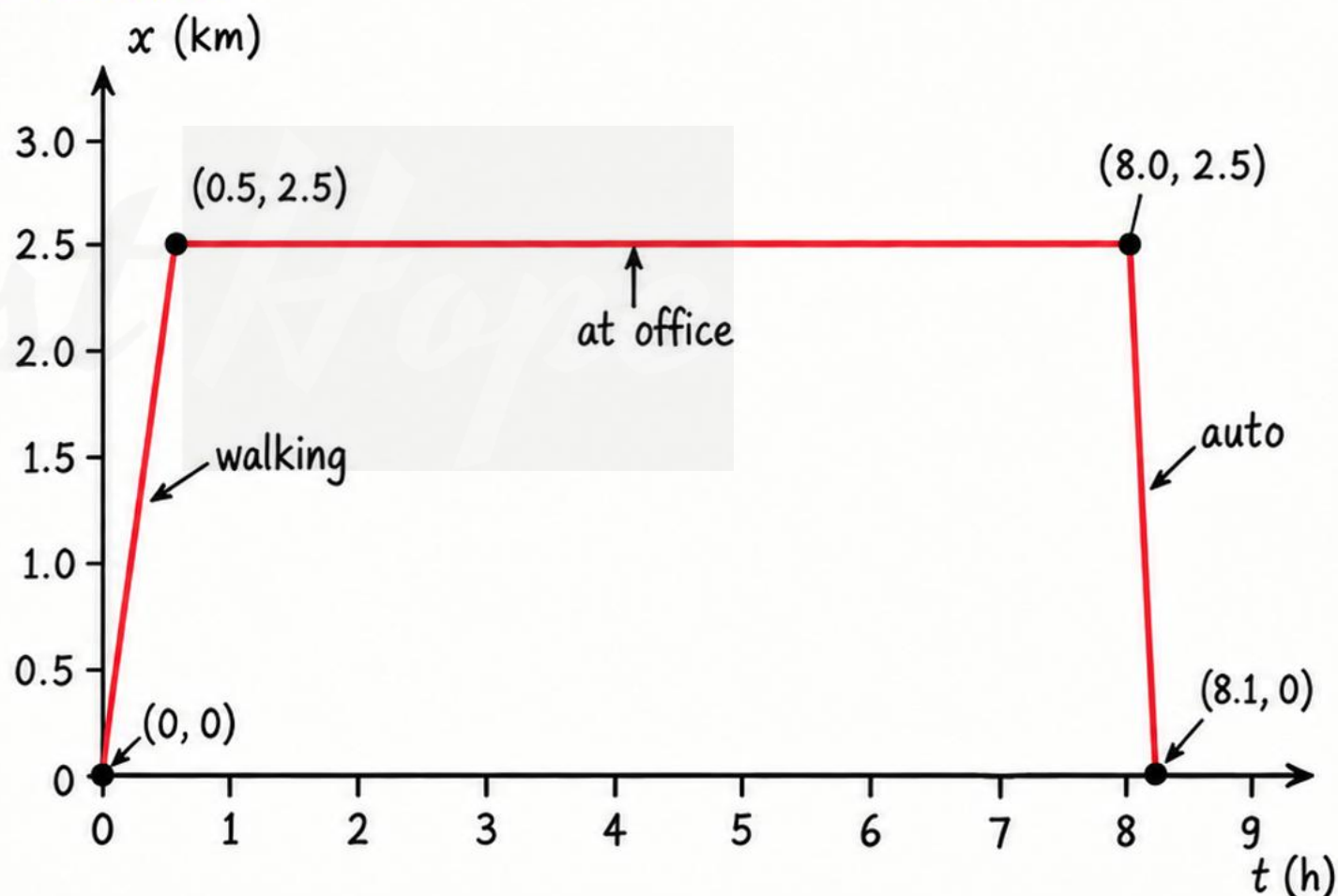
Time to return home (by auto):

$$t_{\text{back}} = \frac{2.5}{25} = 0.1 \text{ h} = 6 \text{ min}$$

Home again = 5:06 pm

Position-time data:

$t \text{ (h)}$	$x \text{ (km)}$
0	0
0.5	2.5
8.0	2.5
8.1	0



EXERCISE SOLUTION: QUESTION 2.4

Question: A man repeatedly takes 5 steps forward and 3 backward. Each step is 1 m and takes 1 s. Plot x against t and find when he reaches a pit 13 m from the start.

Solution:

One cycle takes $5 + 3 = 8$ s.

Net advance per cycle = $5 - 3 = 2$ m.

After four cycles:

$$t = 4 \times 8 = 32 \text{ s}$$

$$x = 4 \times 2 = 8 \text{ m}$$

He reaches the pit during the next forward walk, before any backward steps.

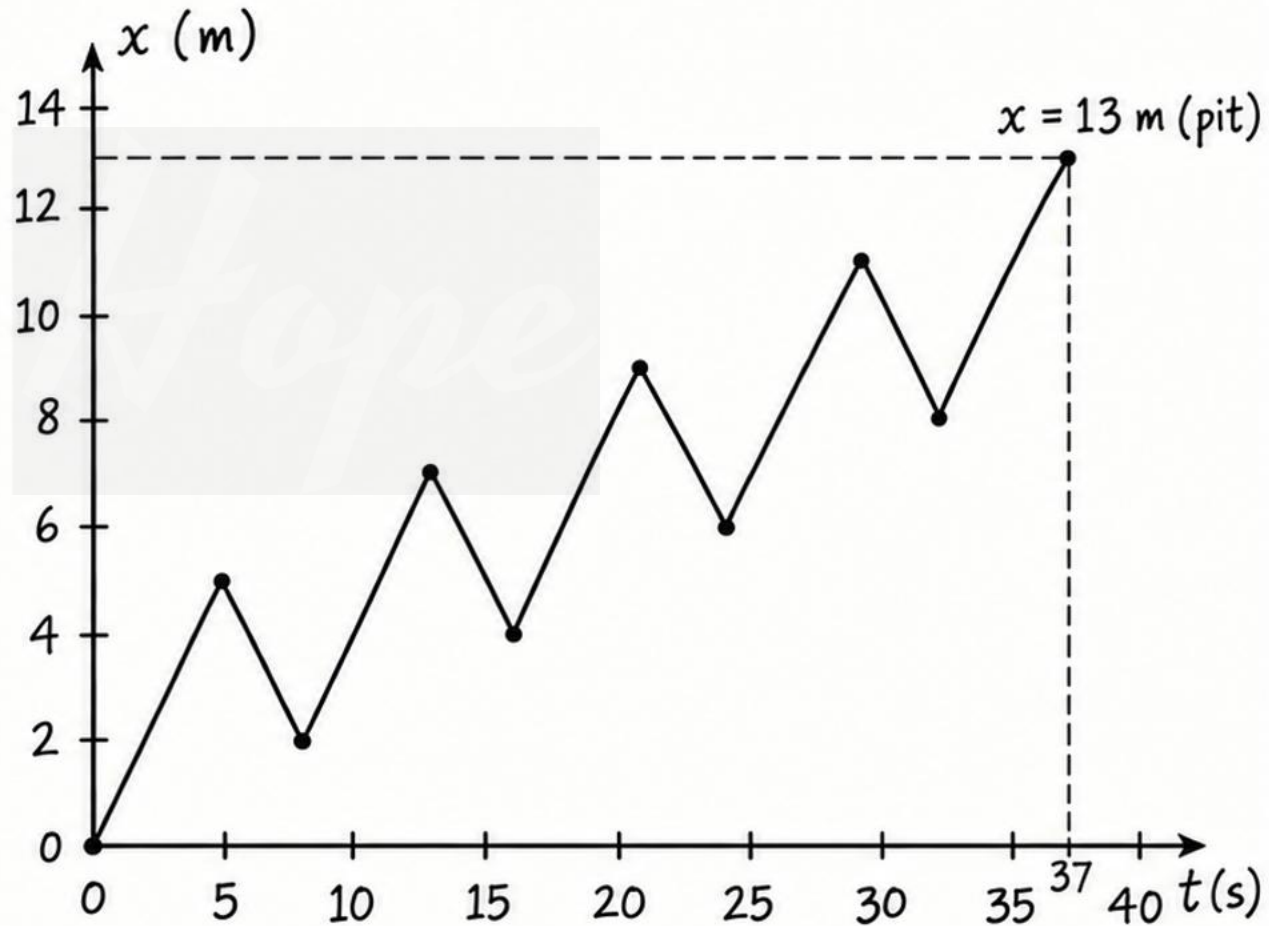
Distance to be covered = $13 - 8 = 5$ m

Time taken = 5 s

Hence, the total time to reach the pit is

$$t = 32 + 5 = 37 \text{ s}$$

Final answer: 37 s





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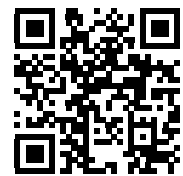


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