Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

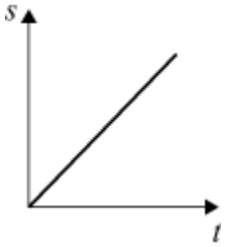
2 Kinematics in one dimension

Exercise A, Question 3

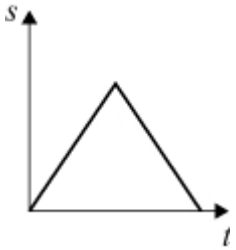
Question:

Discuss the motion represented by each of the displacement-time graphs shown here.

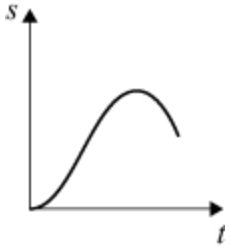
(a)



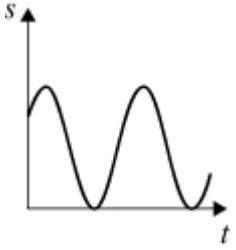
(b)



(c)



(d)



Solution:

(a) Motion with constant positive velocity;

(b) Motion with constant positive velocity, (perfectly elastic collision occurs?), then motion in opposite direction with the same speed but with the direction reversed;

(c) The body starts with positive velocity which increases until it reaches a maximum. The velocity then

decreases until the body is at rest instantaneously at the highest point on the graph before returning in the direction from which it came with increasing speed;

(d) The body starts with positive velocity which decreases until it is at an instantaneous rest at the highest point on the graph. The body then speeds up in the opposite direction until it reaches a maximum velocity before slowing to an instantaneous rest at the lowest point of the curve. It then returns in its original direction, speeding up to a maximum velocity before again decelerating to an instantaneous rest at the next highest point of the graph. The motion continues cyclically.