# 4. Dynamics

**4.1 Newton’s laws of motion**

**4.2 Linear momentum and its conservation**

*(a*) state each of Newton’s laws of motion

I

II

III

*(b)* show an understanding that mass is the property of a body that resists change in motion

*(c)* describe and use the concept of weight as the effect of a gravitational field on a mass

*(d)* define linear momentum as the product of mass and velocity

*(e)* define force as rate of change of momentum

*(f)* recall and solve problems using the relationship *F = ma*, appreciating that acceleration and force are always in the same direction

*(g)* state the principle of conservation of momentum

*(h)* apply the principle of conservation of momentum to solve simple problems including elastic and inelastic interactions between two bodies in one dimension (knowledge of the concept of coefficient of restitution is not required)

*(i)* recognise that, for a perfectly elastic collision, the relative speed of approach is equal to the relative speed of separation

*(j)* show an understanding that, while momentum of a system is always conserved in interactions between bodies, some change in kinetic energy usually takes place.

1



2



3



4



5



6



7



8



9



10



PART 2

1





2 A ball falls from rest onto a flat horizontal surface. Fig. 3.1 shows the variation with time *t* of the velocity *v* of the ball as it approaches and rebounds from the surface.





3





4





