Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

2.1

progressive overload: gradually increasing the training load so the body keeps adapting; reversibility: fitness gains are lost when training stops or is reduced

2.2

$\mathrm{HR}_{\max} = 220 - 18 = 202$; $(202 - 60) \times 0.70 + 60 \approx \mathbf{159}$ beats min^{-1}

3.1

(a) the heart muscle (left ventricle) gets larger and stronger, so stroke volume rises; the same resting cardiac output is reached with fewer beats

(b) any two: more capillaries; more mitochondria; more myoglobin; higher $\dot{V}\mathrm{O}_2\mathrm{max}$; higher lactate threshold; more blood plasma and haemoglobin

3.2

(a) training volume is reduced before a main competition while intensity is kept; so the body recovers fully and performance peaks on the day

(b) it plans hard and easy periods, so load rises gradually; recovery weeks and a transition phase allow adaptation (supercompensation); load can be monitored and adjusted, so fatigue does not build up over many weeks