Solutions

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

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

2.1

systolic pressure rises; diastolic pressure stays about the same (or falls slightly)

2.2

arterioles supplying working muscles dilate (vasodilation); arterioles supplying the gut and kidneys constrict (vasoconstriction); so a much larger share of a larger cardiac output goes to the muscles, up to about 80%

3.1

(a) heart rate rises slightly before the start (anticipatory rise); it rises quickly in the first minutes; then it levels off at a steady state

(b) it falls quickly at first and then more slowly back towards resting level

3.2

(a) rest: $20 - 15 = \mathbf{5}$ ml per 100 ml; exercise: $20 - 5 = \mathbf{15}$ ml per 100 ml

(b) working muscles use more oxygen, so the oxygen level in the muscle falls and the gradient rises; higher temperature, CO_2 and acidity make haemoglobin release more oxygen (Bohr shift); more capillaries open, giving more surface area and slower flow past the fibres