B3.3 Summary questions

1 | **Body is hot** | **Body is cold**
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body hairs | lie flat | stand up
sweat glands | do produce sweat | do not produce sweat
blood vessels supplying the skin capillaries | widen | narrow
blood flow through the capillaries | increases | decreases

2 Sweat production stops: water does not evaporate, preventing heat being transferred to the environment
Decreased blood flow through skin capillaries: less heat transfer by radiation
Body hairs raised: traps a layer of air around the body, insulating the body
Shivering: muscle cells respire more quickly, transferring extra energy by heating

3 a Person eats a meal.
Blood glucose levels rise.
Pancreas releases insulin.
Glucose is converted into glycogen and stored in the liver.
Blood glucose levels fall.
Blood glucose levels return to normal.

b When blood glucose levels are too low the liver is stimulated to convert glycogen to glucose, returning blood glucose back to normal levels.

4 a Blood glucose levels rise.
b 310 mg/l ±5 mg/l
c 70–125 mg/l (accept in range 65–130 mg/l)
d Accept value within range 135–165%.
e Any two from:
Onset – type 1: normally in childhood, type 2: normally in adulthood.
Treatment – type 1: insulin, type 2: diet (sometimes supplemented with insulin).
Cause – type 1: insulin not produced, type 2: cells do not produce enough insulin or body cells do not respond to insulin.
B3.3 Maintaining internal environments

5 a A – glomerulus, B – collecting duct, C – loop of Henlé, D – capillaries

b i During filtration small substances from the blood are filtered into the nephron such as glucose, water and urea. Large molecules such as red blood cells stay in the blood. During selective reabsorption some molecules are taken back into the blood including all the glucose and some of the water.

ii Filtration – one from e.g. water, urea, glucose; reabsorption – one from e.g. glucose, water.

c If the blood water potential is too low, more ADH is produced. This results in more water being reabsorbed from the nephron into the bloodstream. Less water is lost from the body in urine (so urine is concentrated).

d If the blood water potential is too high, less ADH is produced. This results in less water being reabsorbed from the nephron into the bloodstream. More water is lost from the body in urine (so a large volume of dilute urine is produced).