

Solutions

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

2.1

- the CNS is the **brain** and the **spinal cord**

2.2

- a motor neurone carries impulses from the CNS to an **effector**

2.3

- in order: **sensory, relay, motor**

2.4

- neurotransmitter is released from **one side** only
- receptors are on the **other** side, so the impulse cannot reverse

2.5

- an effector is a **muscle or a gland** that carries out the response
- e.g. the **biceps**, or a hormone-secreting gland

3.1 B

- order: **receptor** → **sensory** → **relay** → **motor** → **effector**
- A, C and D scramble the chain

3.2

(a)

- vesicles release **neurotransmitter** into the gap
- it **diffuses across**
- it binds receptors on the next neurone, starting a **new impulse**

(b)

- only the first neurone **releases** neurotransmitter; only the second has **receptors**

3.3

(a)

- sensory** → **relay** → **motor**

(b)

- the effector is a **leg muscle**
- it **contracts** and lifts the foot away

(c)

- the reflex is completed in the **spinal cord**, not the conscious brain

- that path is shorter, so the response happens **before pain is felt**

(d)

- the impulse arrives at the end of the first neurone
- neurotransmitter** is released into the gap
- it **diffuses** across the synapse
- it binds receptors and starts a **new impulse**

(e)

- reflexes are **fast and automatic**
- the body is protected **before conscious thought** could act