Higher Combined version — Higher Tier (★) included; Separate-only (◆) removed.

Q1. Describe the pathway of a reflex arc from stimulus to response when touching a sharp pin.

[4 marks]

Q2. Explain why signals can only travel in one direction across a synapse.

[2 marks]

★ HIGHER TIER

Q3. ★ Explain the structure of a synapse and how a signal crosses it.

[3 marks]

Total: 9 marks

ystem and Reflex Arc (B3a)

Q1 (4 marks)

Describe the pathway of a reflex arc from stimulus to response when touching a sharp pin.

- Pain detected by receptors in skin [1]
- Sensory neurone carries impulse to spinal cord [1]
- Relay neurone across spinal cord [1]
- Motor neurone to effector muscle → hand moves away [1]

Q2 (2 marks)

Explain why signals can only travel in one direction across a synapse.

- Neurotransmitters only released from pre-synaptic membrane [1]
- Receptors only on post-synaptic membrane — signal can only travel one way [1]

Q3 (3 marks) [★ HT]

★ *Explain the structure of a synapse and how a signal crosses it.*

- Pre-synaptic terminal contains vesicles filled with neurotransmitters [1]
- Impulse → neurotransmitter release → diffuses across synaptic cleft [1]
- Binds to specific receptors on post-synaptic membrane → new impulse generated [1]