**Section Three: Extended answer [from WATP Sem I exam, 2017]**

Responses could include clearly labelled diagrams with explanatory notes; lists of points with linking sentences; clearly labelled tables and graphs; and annotated flow diagrams with introductory notes.

38. **(14 marks)**

(a) The neurotransmitter dopamine stimulates target neurones in the same manner as an amine hormone would affect a target cell. It can have an excitatory or inhibitory effect on the action potential of the target neuron, depending on whether it has D1 or D2 receptors. If the neuron has D1 receptors, sodium ion (Na+) channels are stimulated to be opened and if the neuron has D2 receptors, potassium ion (K+) channels are stimulated to open.

1. Using a labelled diagram, describe how dopamine would move from the presynaptic

neuron, across the synapse, to enter and activate a specific target neuron. (5 marks)

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(ii) State whether the D2 receptors would cause an excitatory or inhibitory effect on the action potential of the target neuron and describe why this response would occur. (5 marks)

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(b) Cocaine prevents the reabsorption of dopamine and noradrenaline (norepinephrine) into the axon of the presynaptic neuron. This action has its greatest effect on those neurones with D1 receptors.

(i) State whether the constant supply of dopamine would stimulate the presynaptic

neuron to be depolarised or remain polarised and describe why this would occur.

(4 marks)

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