Exercise walk-through

Overview of the Nervous System ▪ 1.2

eXercise

You must be able to

- divide the nervous system into **central** 中枢 and **peripheral** 外周 parts
- distinguish the **somatic** 躯体 from the **autonomic** 自主 nervous system
- contrast **sympathetic** 交感 and **parasympathetic** 副交感 activation
- explain how the **endocrine system** differs from neural signalling

Method — The two main divisions

The **central nervous system** is the brain and spinal cord. The **peripheral nervous system** is everything else — the nerves carrying signals to and from the body.

Method — Somatic and autonomic

The **somatic** division carries sensory information in and controls voluntary skeletal muscle. The **autonomic** division controls involuntary processes: heart rate, digestion, breathing rate.

Method — Sympathetic against parasympathetic

The **sympathetic** branch mobilises the body — heart rate up, pupils dilated, digestion suppressed. The **parasympathetic** branch restores it — heart rate down, digestion resumed. They oppose each other, and a healthy body moves between them.

Method — Hormones against neurotransmitters

Neural signals are fast and targeted: milliseconds, along a specific pathway. **Hormones** travel in the bloodstream, reach every tissue, act more slowly, and last longer.

Practice 2.1 ▪ 2 marks

Name the two structures that make up the central nervous system.

Solution 2.1

Method: The two main divisions

Worked steps

the brain B1; the spinal cord B1.

Practice 2.2 ▪ 2 marks

State one function of the somatic nervous system and one of the autonomic.

Solution 2.2

Worked steps

somatic: carries sensory information and controls voluntary skeletal muscle B1;
autonomic: controls involuntary processes such as heart rate or digestion B1.

Practice 2.3 ▪ 1 mark

A student is startled by a loud noise.
(a) State which autonomic branch is activated.
(b) State two bodily changes that branch produces.

Solution 2.3

Worked steps

(a) the sympathetic branch B1. (b) any two of: heart rate rises; pupils dilate; digestion is suppressed; breathing quickens B2.

Exam-style 3.1 ▪ 1 mark

Slowing of the heart after a stressful event is produced mainly by the

A sympathetic nervous system

B parasympathetic nervous system

C somatic nervous system

D central nervous system

Solution 3.1

A sympathetic nervous system

B parasympathetic nervous system ✅

C somatic nervous system

D central nervous system

Worked steps

B. the parasympathetic branch restores the body after arousal.

Exam-style 3.2 ▪ 1 mark

Compared with neural signalling, endocrine signalling is

A faster and more targeted

B slower and more widespread

C identical in speed

D confined to the brain

Solution 3.2

A faster and more targeted

B slower and more widespread ✓

C identical in speed

D confined to the brain

Worked steps

B. hormones travel in the bloodstream to every tissue and act over a longer period.

Exam-style 3.3 ▪ 1 mark

A person's hand jerks back from a hot surface before they feel pain.
(a) State which division carries the motor command to the muscle.
(b) Explain why the movement can occur before the brain registers pain.

Solution 3.3

Method: Somatic and autonomic

Worked steps

(a) the somatic nervous system B1. (b) a reflex arc is completed in the spinal cord B1, so the motor command is issued before the signal reaches the brain for conscious processing B1.