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**Section:** CS-A

**Date of Submission:** 21st May, 2020

**Peripheral Nervous System and Tests**

**Case**

Jason, a 55-year-old diabetic, has just faced severe trauma when he lost his wife of 30 years to a car accident. Jason had lived a happy life with his wife and 3 children. He had lived a healthy life, taking care of his diet and exercising to keep his diabetes in check. Jason was driving him and his wife to church when they had the unfortunate accident that took her life. Jason, on the other hand, was able to make a full recovery.

Ever since that day, Jason has gone down a dark path, digging up his past demons with countless new ones. He blames himself for her death and thinks it should have been him instead of her who died. Jason found solace from all the grief and regret in alcohol and has been a severe alcoholic for a long time now.

Not long after his lapse to bad diet and alcoholism, Jason noticed a weird tingling and numbness in his feet. He discarded it as being nothing serious. Soon afterwards, he lost control of his toes and had trouble walking: feeling pain in his feet whenever he stood up and often losing coordination and falling. Furthermore, sometimes when Jason would lie down to rest, he would feel severe burning pain in his feet. Moreover, Jason always felt constipated and was always sweating profusely even when the temperature was comfortable.

One day, one of Jason’s children found him screaming from the pain and called an ambulance. When taken to the hospital, the doctors performed many tests on Jason including blood tests, Electromyography and an MRI scan. Jason was finally diagnosed with **Peripheral Neuropathy,** which is damage to the nerves outside of the brain and spinal cord.

**Questions**

**Question 1:** As the name suggests, peripheral neuropathy is damage to the Peripheral Nervous System (PNS). What is the Peripheral Nervous System?

**Question 2:** The PNS can be divided into two parts. What are the two parts? Name and define them.

**Question 3:** Damage to which part of the PNS (from the two in the previous question) is responsible for Jason’s constipation and excessive sweating?

**Question 4:** Peripheral Neuropathy is very common among diabetics if they don’t regulate their blood sugar level. Besides his bad diet, what other part of Jason’s new lifestyle led him to Neuropathy and why?

**Question 5:** The doctors did many tests on Jason including Electromyography (EMG). What is EMG? And why did the doctors order it?

**Rubric**

**Answer 1:** The peripheral nervous system (PNS) is the division of the nervous system containing all the nerves that lie outside of the central nervous system (Brain and spinal cord). The primary role of the PNS is to connect the CNS to the organs, limbs and skin. These nerves extend from the CNS to the outermost areas of the body.

**Answer 2:** The two parts are **The Somatic Nervous System** and **The Autonomic Nervous System**.

**Somatic Nervous System:** The somatic system is the part of the PNS responsible for carrying sensory and motor information to and from the CNS. It is responsible for transmitting sensory information and for voluntary movement.

**Autonomic Nervous System:** The autonomic system is the part of the peripheral nervous system that's responsible for regulating involuntary body functions, such as blood flow, heartbeat, digestion, and breathing.

**Answer 3:** Digestion and temperature regulation are controlled automatically in our body by the **Autonomic Nervous System**. Therefore, damage to the **Autonomic Nerves** of the **Autonomic Nervous System** is responsible for Jason’s constipation and profuse sweating.

**Answer 4:** Jason’s Alcoholism played a major part in leading him towards Neuropathy too because excessive alcohol is toxic to the nerve tissue. Furthermore, alcoholism causes malnutrition and vitamin B deficiency which is vital for proper nerve function. Therefore, alcoholism can damage the peripheral nerves and cause Neuropathy.

**Answer 5:** Electromyography (EMG) records electrical activity in your muscles to detect nerve damage. A thin needle (electrode) is inserted into the muscle to measure electrical activity as you contract the muscle. Furthermore, Flat electrodes are placed on the skin and a low electric current stimulates the nerves. The doctor records nerves' responses to the electric current.

The doctors ordered this test to assess the nerve damage in Jason’s feet.