PSYCHOLOGY ENTRANCE EXAMINATIONS

Useful for CUET-PG Psychology, GATE & Other M.A/ M.Sc Psychology Entrances

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Chapter 13 Biopsychology

Explanations

1. d) in all parts of the nervous system.
Nerves are found throughout the body, connecting the brain and spinal cord to various organs, muscles, and sensory receptors. They transmit signals in the form of electrical impulses, facilitating communication within the nervous system and between the nervous system and other parts of the body. Thus, nerves are present not only in the peripheral nervous system but also within the brain and spinal cord, collectively comprising the central nervous system. Nerves are primarily bundles of axons, which are long, slender fibers that transmit electrical signals from neurons (nerve cells) in the CNS to various parts of the body. These axons are bundled together with other supporting cells and connective tissue to form nerves.

2. d) all of the above.
Explanation: The central nervous system (CNS), which includes the brain and spinal cord, performs multiple functions:
a) To receive, process, and interpret incoming information: The CNS processes sensory input from the environment and the body, integrating this information to generate appropriate responses.
b) To send out messages to muscles: The CNS sends motor signals to muscles, enabling voluntary movements and controlling involuntary processes like reflexes.
c) To send out messages to glands and organs: The CNS regulates autonomic functions, such as heart rate, digestion, and hormone secretion, by sending signals to glands and organs.

3. d) ions.
Explanation: Electrically charged particles are called ions. These ions play crucial roles in various physiological processes, including nerve impulse transmission, muscle contraction, and maintenance of fluid balance in the body. Neurotransmitters, on the other hand, are chemical messengers that transmit signals across synapses in the nervous system. Inhibitors are substances that decrease the activity of enzymes or other biological processes.

4. b) the myelin sheaths.
Explanation: Myelin sheaths are the fatty layers that cover the axons of certain neurons. They serve as insulators, speeding up the transmission of neural impulses along the axon. This insulation allows the electrical signals to jump from one node of Ranvier to the next, a process known as saltatory conduction. Dopamine, acetylcholine, and endorphins are neurotransmitters, chemicals that transmit signals across synapses in the nervous system.

5. b) axon.
Explanation: A myelin sheath is a fatty layer that covers the axon of a neuron. This wrapping of myelin around the axon acts as an insulator, allowing for faster transmission of electrical signals. Myelination is crucial for efficient neural communication. While dendrites receive signals from other neurons, the myelin sheath primarily surrounds the axon, facilitating the rapid transmission of signals away from the cell body. The cell body (soma) contains the nucleus and other organelles necessary for the neuron's functioning but is not typically wrapped in myelin.

6. b) handles the central nervous system's input and output.
Explanation: The peripheral nervous system (PNS) consists of all the nerves and ganglia outside of the brain and spinal cord. It serves as a communication relay between the central nervous system (CNS), which includes the brain and spinal cord, and the rest of the body. The PNS handles both input and output to and from the CNS, conveying sensory information from the body to the brain and transmitting motor commands from the brain to the muscles and glands. It comprises both sensory neurons, which carry information towards the CNS, and motor neurons, which carry information away from the CNS.

7. b) absolute refractory period.
Explanation: After a neuron fires an action potential, there is a brief period during which it cannot generate another action potential, regardless of the strength of the stimulus. This period is known as the absolute refractory period. During this time, the sodium channels in the neuron's membrane are temporarily inactivated, preventing the generation of another action potential. Option (a), the relative refractory period, refers to a subsequent period during which it is possible for the neuron to fire again but requires a stronger stimulus than usual. Option (c), neural action potential, refers to the rapid change in the neuron's membrane potential that occurs during an action potential. Option (d), ionization state, does not accurately describe the refractory periods.

8. c) number of times the neuron fires.

Explanation: According to the information provided in the search results, a strong stimulus can increase the number of times a neuron fires, but it does not affect the intensity or speed of the individual action potentials.
The all-or-none law states that once a neuron reaches the threshold for firing an action potential, the resulting action potential is always the same size and intensity, regardless of the strength of the stimulus. The action potential is an all-or-nothing response - it either occurs fully or not at all. The intensity of the stimulus does not change the strength of the individual action potential.

9. b) brainstem.
Explanation: The medulla, pons, and midbrain are all integral components of the brainstem, which plays a crucial role in connecting the brain to the spinal cord. The medulla controls vital autonomic functions such as heartbeat and breathing. The pons acts as a bridge between different parts of the brain, coordinating movements and facilitating sleep. The midbrain is involved in sensory processing, motor control, and the regulation of arousal levels. Together, these structures regulate numerous essential functions, making the brainstem a critical part of the central nervous system.

10. a) dendrites, cell body, and axon.
Explanation: Dendrites are the branched extensions of a neuron that receive signals from other neurons.
The cell body (or soma) contains the nucleus and other organelles and integrates incoming signals from dendrites.
The axon is a long, slender projection of the neuron that transmits electrical impulses (action potentials) away from the cell body to other neurons, muscles, or glands.

11. b) polarization.
Explanation: When the electrical charge inside a neuron is negative relative to the outside, it indicates that there is an electrical potential across the neuron's membrane. This difference in charge is maintained by the unequal distribution of ions inside and outside the neuron. This polarized state is essential for the neuron to respond to stimuli and generate electrical impulses. Depolarization (option a) refers to the reversal of this charge, leading to an action potential, while equilibrium (option c) denotes a balanced state without a net flow of ions. "Shock" (option d) is not a term used to describe the electrical state of neurons.

12. d) perceptual tasks.
Explanation: The right hemisphere of the brain is generally associated with tasks involving

spatial abilities, visual imagery, face recognition, and emotional processing. Perceptual tasks such as recognizing faces, spatial orientation, and interpreting emotions are primarily controlled by the right hemisphere. Language (option a) is typically associated with the left hemisphere, while learned voluntary movements (option b) and arithmetic reasoning (option c) are often associated with both hemispheres, with the left hemisphere playing a dominant role in language-related functions and the right hemisphere being more involved in spatial tasks and emotional processing.

13. a) basal ganglia.
Explanation: Parkinson's disease (PD) is a neurodegenerative disorder characterized by motor symptoms such as tremors, rigidity, and difficulty initiating and stopping movements. The primary cause of PD is the progressive degeneration of dopaminergic neurons in specific brain regions. These dopaminergic neurons play a crucial role in controlling movement and are primarily located in the basal ganglia. The basal ganglia are a group of interconnected nuclei deep within the brain, involved in motor control, cognition, and emotion. Specifically, the substantia nigra, a part of the basal ganglia, contains dopaminergic neurons that project to the striatum (another basal ganglia structure).

14. d) neurotransmitters.
Explanation: Serotonin, dopamine, acetylcholine, and norepinephrine are neurotransmitters, which are chemicals that transmit signals across synapses (gaps) between neurons or from neurons to other cells (such as muscles or glands). These neurotransmitters play crucial roles in various functions of the nervous system, including mood regulation, motor control, cognition, and arousal. They are synthesized within neurons and released into synapses in response to neural impulses, where they bind to receptors on the receiving neurons, influencing the transmission of signals.

15. a) synapse.
Explanation: The synapse is the junction between two neurons or between a neuron and an effector cell, such as a muscle or gland. It consists of the presynaptic terminal (axon terminal) of one neuron, the synaptic space (synaptic cleft), and the postsynaptic membrane (usually the dendrite) of the next neuron. Neurotransmitters are released from synaptic vesicles in the axon terminal into the synaptic space, where they bind to receptors on the postsynaptic membrane, initiating a response in the receiving neuron. This process allows for communication between neurons in the nervous system.

16. d) increase in the amount of association area.
Explanation: Association areas are regions of the cerebral cortex that integrate information from various sensory and motor inputs. As animals' behavior becomes more complex, there is a corresponding increase in the amount and complexity of information processing required. This increased complexity is supported by the expansion and specialization of association areas within the brain. The frontal lobes, which are responsible for higher cognitive functions such as decision-making, planning, and social behavior, also tend to increase in size relative to other brain regions as behavioral complexity increases, but the association areas, which are found throughout the cortex, play a critical role in integrating sensory, motor, and cognitive information.

17. d) doing all of the above.
Explanation: The hypothalamus plays a crucial role in regulating the body's internal environment by influencing various physiological processes. It does so by:
a) Influencing the autonomic nervous system: The hypothalamus helps regulate involuntary bodily functions such as heart rate, blood pressure, digestion, and body temperature by sending signals to the autonomic nervous system.
b) Controlling the release of some hormones: The hypothalamus produces and releases several important hormones that regulate the function of the pituitary gland, which in turn controls the release of hormones from other endocrine glands throughout the body.
c) Affecting drive states such as hunger and thirst: The hypothalamus contains specialized nuclei that are involved in regulating basic physiological needs and behaviors, including hunger, thirst, sleep, and sexual behavior.

18. b) serotonin
Explanation: Serotonin is a neurotransmitter crucial for various bodily functions. It influences mood by contributing to feelings of well-being and happiness. It regulates sleep by affecting sleep patterns and the circadian rhythm. Appetite is controlled by serotonin, which can impact hunger and satiety signals. It also modulates pain perception by altering the way pain signals are processed in the brain. Sensory perception, including how we experience touch and pain, is influenced by serotonin. Additionally, it plays a role in temperature regulation, helping to maintain body temperature. While dopamine and endorphins also affect mood and pain, serotonin has a broader range of influence in these areas.

19. d) Endorphin.
Explanation: Endorphins are chemicals produced naturally by the body that act as

neurotransmitters. They are involved in the reduction of pain and are often referred to as the body's natural painkillers. When released, endorphins bind to opioid receptors in the brain and spinal cord, blocking pain signals and producing feelings of euphoria and well-being. This pain-relieving effect is similar to that of opioid drugs such as morphine and codeine, but endorphins are produced by the body in response to various stimuli, such as exercise, stress, or certain foods.

20. b) somatic nervous system.
Explanation: The somatic nervous system controls voluntary movements and sensory perception. It consists of motor neurons that transmit signals from the central nervous system to skeletal muscles, enabling voluntary actions like writing with a pencil. This system also carries sensory information from the body's sensory receptors to the brain, allowing us to perceive sensations such as touch, pressure, and temperature. Unlike the autonomic nervous system, which regulates involuntary functions like heartbeat and digestion, the somatic nervous system governs conscious movements and sensations.

21. b) central nervous system.
Explanation: The central nervous system (CNS) consists of the brain and spinal cord. It serves as the main control center for the entire nervous system, processing incoming sensory information, initiating responses, and coordinating various bodily functions. The brain is responsible for higher cognitive functions, such as thinking, memory, and emotion, while the spinal cord serves as a pathway for nerve signals traveling between the brain and the rest of the body. The CNS plays a crucial role in regulating and integrating all bodily activities, ensuring homeostasis and responding to changes in the external and internal environment.

22. a) sex hormones.
Explanation: Androgen, estrogen, and progesterone are hormones that play key roles in the development and regulation of the reproductive system and secondary sexual characteristics in both males and females. Androgens, such as testosterone, are primarily associated with male sexual development and function, while estrogens, like estradiol, are mainly involved in female sexual development and reproductive function. Progesterone is another hormone important in the female reproductive system, particularly during the menstrual cycle and pregnancy. These hormones are produced in the gonads (testes in males and ovaries in females) as well as in other tissues, and they exert various effects on the body's physiology and behavior.

23. b) thyroxin.
Explanation: Thyroxin, also known as thyroxine, is a hormone produced by the thyroid gland. It plays a crucial role in regulating metabolism, which is the process by which the body converts food into energy. Thyroxin influences the rate at which cells use energy, affecting various physiological processes such as heart rate, body temperature, and digestion. Insulin, on the other hand, is a hormone produced by the pancreas that regulates blood sugar levels, while glycogen is a form of stored glucose used for energy. Estrogen is a sex hormone primarily associated with female reproductive development and function.

24. c) hormones.
Explanation: Hormones are chemical messengers produced by endocrine glands in the body. These glands release hormones into the bloodstream, where they travel to target organs or tissues to regulate various physiological processes and maintain homeostasis. Hormones play crucial roles in controlling growth and development, metabolism, reproduction, mood, and many other functions in the body. Agonists are substances that bind to and activate receptors, neurotransmitters are chemical messengers that transmit signals between neurons, and enzymes are proteins that catalyze biochemical reactions.

25. a) muscle cells.
Explanation: Curare is a drug that acts as a neuromuscular blocking agent by blocking the receptor sites for acetylcholine on muscle cells. Acetylcholine is a neurotransmitter that normally binds to receptors on muscle cells, leading to muscle contraction. By blocking these receptors, curare prevents acetylcholine from exerting its effects, resulting in paralysis of the muscles. This mechanism of action makes curare useful for medical purposes such as during surgery to relax muscles or in some cases of poisoning by certain toxins.

26. a) occipital, parietal, temporal, and frontal lobes.
Explanation: The cortex, or cerebral cortex, is the outer layer of the brain responsible for higher brain functions such as perception, voluntary movement, and learning. It is divided into four distinct lobes:
Occipital lobe: Located at the back of the brain, the occipital lobe is primarily involved in visual processing and perception.
Parietal lobe: Positioned behind the frontal lobe, the parietal lobe processes sensory information from the body, including touch, temperature, and pain perception.
Temporal lobe: Found on the sides of the brain, the temporal lobe is involved in auditory processing, language comprehension, and memory formation.
Frontal lobe: Located at the front of the brain, the frontal lobe is responsible for higher

cognitive functions such as decision-making, planning, reasoning, and voluntary movement.

27. c) Twin.
Explanation: Twin studies are used to examine the relative influence of heredity and the environment on behavior. By comparing the similarities and differences between identical (monozygotic) twins, who share 100% of their genetic material, and fraternal (dizygotic) twins, who share approximately 50% of their genetic material on average, researchers can estimate the genetic and environmental contributions to various traits and behaviors. Twin studies help researchers understand the interplay between genetics and environmental factors in shaping human characteristics and behaviors.

28. c) reflexes.
Explanation: Reflexes are governed by the simplest neural pathways. These pathways involve a direct connection between sensory neurons and motor neurons, allowing for rapid and automatic responses to specific stimuli without conscious processing in the brain. Examples of reflexes include the knee-jerk reflex and the withdrawal reflex. Reflexes serve as protective mechanisms and help organisms respond quickly to potentially harmful stimuli in their environment. While emotions, physiological drives (such as hunger), and movements (such as walking) also involve neural pathways, they are typically more complex and involve higher levels of neural processing in the brain.

29. c) steroids.
Explanation: Steroid hormones, such as cortisol, estrogen, and testosterone, are able to pass through cell membranes because they are lipid-soluble molecules. Once inside the cell, they bind to specific receptors in the cytoplasm or nucleus, forming hormone-receptor complexes. These complexes can then activate or inhibit the expression of specific genes by binding to DNA and influencing transcription. This process allows steroid hormones to regulate various physiological processes at the level of gene expression. Neurohormones are hormones released by neurons, peptides are short chains of amino acids that act as hormones, and releasing factors are substances that stimulate the release of other hormones from endocrine glands.

30. d) testosterone.
Explanation: Testosterone is the primary male sex hormone, produced primarily in the testes. It plays a key role in the development of male reproductive tissues and secondary sexual characteristics, such as increased muscle mass, body hair growth, and deepening

of the voice. Oxytocin is a hormone involved in social bonding and childbirth, thyroxin is a thyroid hormone involved in regulating metabolism, and progesterone is a female sex hormone primarily involved in regulating the menstrual cycle and pregnancy.

31. b) sympathetic.
Explanation: In an emergency, the sympathetic nervous system is activated. This system triggers the body's fight-or-flight response, preparing it to react to threats or stressors. Activation of the sympathetic nervous system results in increased heart rate, dilated pupils, and heightened alertness, facilitating a rapid response to the emergency situation. The sympathetic nervous system mobilizes energy resources and redirects blood flow to critical organs, enabling the body to effectively deal with the perceived threat or danger.

32. d) thalamus.
Explanation: The thalamus serves as a major sensory relay station in the brain, receiving sensory information from various sensory systems throughout the body (except for smell) and relaying it to the corresponding areas of the cerebral cortex for further processing. It plays a crucial role in sensory perception, including vision, hearing, touch, and taste. Additionally, the thalamus is involved in regulating consciousness, sleep, and alertness.

33. d) Physiological processes underlie all behavior.
Explanation: The main assumption of biological psychology is that physiological processes in the brain and nervous system underlie all behavior. This field of psychology focuses on understanding how biological factors, such as genetics, brain structure, neurotransmitters, and hormones, influence behavior, cognition, and emotions. Biological psychologists study how these biological mechanisms interact with environmental factors to shape human behavior and mental processes.

34. c) Cognitive psychology.
Explanation: Biological psychology is also known as biopsychology, behavioral neuroscience, and behavioral biology. These alternate names reflect the interdisciplinary nature of the field, which integrates principles from biology, neuroscience, and psychology to study the biological bases of behavior and mental processes. Cognitive psychology, on the other hand, is a separate subfield of psychology that focuses on mental processes such as perception, memory, language, and problem-solving, rather than exclusively on the biological underpinnings of behavior.

35. b) Hippocrates.

Explanation: Hippocrates, often regarded as the "Father of Medicine," proposed the idea that the brain was involved in behavior around 400 BC. He observed patients with head injuries and noted changes in their behavior, suggesting a connection between brain function and behavior. This early insight laid the groundwork for understanding the brain's role in controlling behavior and cognition, influencing the development of neuroscience and psychology.

36. c) The soul and body were completely separate.
Explanation: Descartes' theory of dualism proposed that the soul (or mind) and body were two distinct substances that interacted with each other. He argued that while the body was physical and subject to mechanical laws, the mind (or soul) was non-physical and immortal. This view suggested a separation between mental and physical phenomena, with the mind controlling mental activity independently of the body.

37. b) William James.
Explanation: William James, an influential American psychologist and philosopher, emphasized the importance of understanding human behavior through the study of the nervous system. He contributed significantly to the development of psychology as a scientific discipline, advocating for the exploration of the brain and nervous system to comprehend mental processes and behavior. James believed that investigating the physiological basis of behavior would provide valuable insights into human nature, paving the way for biological psychology and neuroscience.

38. c) (A) is true, but (R) is false.
Explanation: Assertion (A) is true. Biological psychology does indeed study the biology of the brain and behavior, focusing on how brain processes and other biological systems affect behavior.
Reason (R) is false. Biological psychology is not based on the assumption that psychological processes alone underlie all behavior. Instead, it integrates biological processes, such as brain function and neurotransmitters, with psychological processes to understand behavior.

39. b) Both (A) and (R) are true, but (R) is not the correct explanation of (A).
Explanation: Assertion (A): Aristotle believed that the heart controlled mental activity.
Reason (R): The concept of the brain's involvement in behavior was not introduced until Hippocrates' time.

Both Assertion (A) and Reason (R) are true based on historical beliefs. Aristotle did indeed believe that the heart controlled mental activity, and it is true that the concept of the brain's involvement in behavior was not introduced until Hippocrates' time. However, while both statements are true, the reason provided does not directly explain why Aristotle believed the heart controlled mental activity. The two statements are related to historical perspectives on the control of mental functions but do not form a cause-and-effect relationship.

40. c) (A) is true, but (R) is false.
Explanation: Assertion (A) is true. Descartes did indeed propose the theory of dualism, suggesting a separation between the mind (as a non-physical substance) and the body (as a physical substance). This was a radical departure from the prevailing view that the mind and body were inseparable.

However, Reason (R) is false. Modern biological psychologists do not accept or support Descartes' notion of the pineal gland as the link between the mind and body. Descartes believed the pineal gland was the "seat of the soul" where the mind and body interacted, but this idea has been thoroughly rejected by modern science

41. d) The autonomic nervous system.
Explanation: The autonomic nervous system controls involuntary bodily functions, including heart rate, digestion, respiratory rate, and pupil dilation. It consists of the sympathetic and parasympathetic divisions. During emergencies or stressful situations, the sympathetic division is activated, initiating the "fight or flight" response, which prepares the body for action. This rapid response to emergencies earns the autonomic nervous system the description of "the high flyer" as it swiftly coordinates physiological changes to adapt to the situation.

42. b) Response to stress and physical growth
Explanation: Hormones are chemical messengers produced by glands in the endocrine system. They travel through the bloodstream to target organs and tissues, where they regulate various physiological processes. This includes managing responses to stress, such as the release of adrenaline during a fight-or-flight response, and controlling physical growth and development through hormones like growth hormone.

43. b) sodium ions rush in, causing the neuron to depolarize.
Explanation: When an axon fires an electrochemical signal, sodium ions rush in, causing

the neuron to depolarize. During an action potential, there is a rapid influx of sodium ions into the neuron, which depolarizes the cell membrane and creates a positive charge inside the neuron. This depolarization allows the electrical signal to propagate down the length of the axon. The influx of sodium ions is followed by the efflux of potassium ions, which helps restore the neuron to its resting state after the action potential.

44. c) To relay messages between neurons.
Explanation: Neurotransmitters are chemical messengers that transmit signals across a synapse from one neuron to another. When an action potential reaches the end of an axon, it triggers the release of neurotransmitters from synaptic vesicles. These neurotransmitters then cross the synaptic cleft and bind to receptor sites on the dendrites or cell body of the receiving neuron. This binding can initiate or inhibit an action potential in the receiving neuron, thus relaying the message.

45. c) Thyroid.
Explanation: The thyroid gland plays a crucial role in regulating the body's metabolic rate. It produces hormones such as thyroxine (T4) and triiodothyronine (T3), which are essential for maintaining metabolism. These hormones control the speed at which the body converts food into energy, influencing various bodily functions such as heart rate, digestion, muscle control, brain development, and bone maintenance. Proper thyroid function is vital for overall health, as an imbalance can lead to conditions like hypothyroidism (slowed metabolism) or hyperthyroidism (accelerated metabolism), impacting energy levels and bodily processes.

46. a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation:
Both assertion (A) and reason (R) are true statements. The central nervous system (CNS) indeed plays a more direct and immediate role in regulating human behavior compared to the endocrine system. The CNS is responsible for processing sensory information, initiating responses, and coordinating various bodily functions. While the endocrine system influences behavior through hormonal regulation, its effects are often more gradual and indirect compared to the rapid signaling of the CNS. Therefore, the reason provided in statement (R) correctly explains why the endocrine system is considered to play a less important role in human behavior compared to the central nervous system.

47. c) (A) is true, but (R) is false.
Explanation:

Assertion (A) states that hormones are primarily responsible for rapid communication between neurons, which is false. Hormones are not directly involved in the rapid communication between neurons; rather, neurotransmitters fulfill this role by transmitting signals across synapses. Hormones are involved in slower, long-lasting forms of communication and regulation in the body.
Reason (R) correctly states that hormones can affect cells with receptors that recognize specific hormones. This is true; hormones exert their effects by binding to specific receptors on target cells, triggering cellular responses.
Therefore, while reason (R) is true, assertion (A) is false, making option c) the correct choice.

48. c) Hormones
Explanation: The endocrine system primarily communicates through the release of hormones. Hormones are chemical messengers that are secreted into the bloodstream by endocrine glands. These hormones travel to various tissues and organs, where they regulate a wide range of physiological processes, including metabolism, growth, and mood. Unlike neurotransmitters, which act quickly and locally, hormones often have longer-lasting effects and can influence multiple systems throughout the body.

49. b) Pituitary Gland
Explanation: The pituitary gland plays a crucial role in controlling growth, the thyroid, reproductive functions, and water and salt balance. It is often referred to as the “master gland” because it releases hormones that regulate many other endocrine glands and various physiological processes. For example, it secretes growth hormone (GH) for growth, thyroid-stimulating hormone (TSH) for thyroid function, and antidiuretic hormone (ADH) for water balance.

50. c) Slower and longer-lasting than neural communication
Explanation: Hormonal communication is typically characterized by being slower and longer-lasting than neural communication. Hormones are released into the bloodstream by endocrine glands and travel to target organs or tissues, where they exert their effects over a more extended period compared to the rapid and short-lived effects of neurotransmitters in neural communication. This allows hormones to regulate various bodily functions such as growth, metabolism, and reproduction in a sustained manner.

51. d) Controlling the metabolic rate
Explanation: The primary role of the thyroid gland is to control the metabolic rate. The

thyroid gland produces key hormones, such as thyroxine (T4) and triiodothyronine (T3), which are crucial in regulating the body's metabolism. These hormones affect how the body's cells convert nutrients into energy, thus influencing overall energy levels, growth, development, and various metabolic processes. By managing the rate at which the body uses energy, the thyroid gland ensures that all bodily functions operate efficiently, maintaining homeostasis and supporting essential physiological activities.

52. a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: Both Assertion (A) and Reason (R) are true. Hormonal communication is indeed slower and longer-lasting than neural communication. Hormones are released into the bloodstream and travel throughout the body, which takes more time compared to the rapid transmission of electrical signals along neurons. Additionally, hormonal effects can persist for longer periods, as hormones can remain active in the body for extended durations, influencing physiological processes over time.

Reason (R) provides an explanation for Assertion (A) by highlighting that hormones are secreted in short bursts and are influenced by various biological and environmental factors. These factors can affect hormone levels, secretion patterns, and the duration of hormonal effects, contributing to the slower and longer-lasting nature of hormonal communication.

53. a) Both (A) and (R) are true and (R) is the correct explanation of (A).
Explanation: Assertion (A) is true. The hypothalamus, a region of the brain, controls the pituitary gland by releasing hormones that stimulate or inhibit the secretion of hormones from the pituitary gland. This control mechanism allows the hypothalamus to regulate various physiological processes by influencing hormone secretion from the pituitary gland.

Reason (R) is also true. The pituitary gland, often referred to as the "master gland," regulates the activity of other endocrine glands in the body, including the adrenal cortex and the pancreas. It does so by releasing hormones that stimulate or inhibit hormone production and secretion from these glands. Therefore, the pituitary gland plays a crucial role in coordinating and controlling the activity of multiple endocrine organs, ensuring proper hormonal balance and physiological functioning.

54. c) (A) is true, but (R) is false.
Explanation: Assertion (A) is true. Hormonal over-stimulation of the thyroid, typically due to conditions like hyperthyroidism, can indeed lead to cretinism. Cretinism is a condition characterized by severe developmental and intellectual disabilities caused by insufficient

thyroid hormone production during fetal development or early infancy.

Reason (R) is false. Cretinism does not typically lead to obesity, hypertension, and memory deficits. Instead, it primarily results in developmental delays, intellectual disabilities, stunted growth, and physical deformities. Therefore, while the assertion is true, the reason is not.

55. b) Facilitating uterine contractions and milk production
Explanation: Oxytocin is primarily responsible for stimulating uterine contractions during childbirth and facilitating milk ejection during breastfeeding. It plays a crucial role in maternal bonding, social behavior, and lactation. While it has various effects on social behavior and physiological processes, its most well-known functions involve reproductive processes such as labor and lactation.

56. c) Hypothalamus
Explanation: The hypothalamus, located at the base of the brain, serves as a crucial link between the nervous system and the endocrine system. It produces various hormones that control the release of hormones from the pituitary gland, which in turn regulates many physiological processes such as growth, metabolism, stress response, and reproduction. Therefore, the hypothalamus is primarily responsible for influencing the endocrine system.

57. c) Aggression
Explanation: Dabbs & Morris's study (1990) found a significant correlation between high levels of testosterone and aggressive behavior in males. Testosterone, a hormone primarily associated with male development and reproductive functions, has been linked to various behaviors, including aggression and dominance. The study suggested that males with the highest testosterone levels were more likely to have a history of aggressive behavior. This finding supports the broader body of research indicating that testosterone can influence behaviors associated with competition, assertiveness, and aggression.

58. c) Both humans and animals
Explanation: Research supports the theory that testosterone masculinizes the brain and influences aggressive behavior in both humans and animals. Studies in various animal models, such as rodents and primates, have demonstrated that higher levels of testosterone are associated with increased aggressive behaviors. Similarly, human studies have found correlations between testosterone levels and aggression, supporting the idea that testosterone plays a significant role in shaping behavior. This convergence of evidence

from both animal and human research underscores the influence of testosterone on aggression and related behaviors across species.

59. c) Testosterone
Explanation: Testosterone is often associated with aggressive behavior, particularly in men. It is a male sex hormone (androgen) that is present in much higher levels in men than in women. Research has shown that higher levels of testosterone are linked to increased aggression and dominance behaviors. This hormone influences areas of the brain responsible for regulating emotions and behavior, contributing to more assertive and potentially aggressive actions. While aggression is a complex behavior influenced by multiple factors, testosterone plays a significant role in modulating it.

60. b) The hypothalamus
Explanation: Aggressive behavior in lower species is often linked to the hypothalamus, particularly its role in regulating basic survival functions such as aggression, feeding, and reproduction. The hypothalamus plays a crucial role in coordinating the body's response to threatening or challenging situations, including the activation of the fight-or-flight response. This primitive brain structure is involved in the release of hormones and neurotransmitters that modulate aggression and other behaviors essential for survival.

61. c) Controlling water reabsorption by the kidneys
Explanation: Antidiuretic hormone (ADH), also known as vasopressin, primarily regulates water balance in the body by controlling the reabsorption of water in the kidneys. When ADH levels are high, water reabsorption increases, leading to decreased urine production and the conservation of water in the body. This mechanism helps maintain proper hydration levels and regulate blood osmolarity. ADH is released in response to changes in blood osmolarity detected by specialized cells in the hypothalamus, allowing the body to adjust water balance accordingly.

62. c) Medulla oblongata
Explanation: The medulla oblongata, located at the base of the brainstem, is primarily responsible for regulating essential autonomic functions such as breathing, heart rate, blood pressure, and body temperature. It serves as a vital relay center between the spinal cord and higher brain regions, coordinating involuntary actions necessary for survival. While the hippocampus and amygdala are involved in memory and emotional processing, respectively, and the prefrontal cortex plays a role in decision-making and executive functions, the medulla oblongata is crucial for maintaining basic physiological homeostasis.

63. c) Action potential
Explanation: The temporary change in the potential of the axon is known as an action potential. It is a sudden, fast, and propagating alteration in the resting membrane potential of a neuron. Action potentials allow neurons to transmit signals along their processes and communicate with target tissues. These electrical impulses are generated when a stimulus changes the membrane potential to the threshold potential, typically around -50 to -55 mV. Remember that action potentials follow the all-or-none law, meaning they either occur fully or not at all.

64. b) To re-polarize the axon membrane
Explanation: The refractory period in neuronal firing serves to re-polarize the axon membrane after an action potential has been generated. During the refractory period, the neuron is temporarily unable to generate another action potential because the axon membrane is restoring its resting membrane potential by actively pumping ions. This period ensures that action potentials travel in one direction along the axon and prevents the neuron from firing continuously, allowing for distinct and regulated neural signaling.

65. b) The presence of myelin
Explanation: Myelination, the process of wrapping axons in a fatty insulating sheath, significantly increases the speed of action potential propagation. Myelin acts as an insulator, allowing action potentials to “hop” from one node of Ranvier to the next along the axon, a process known as saltatory conduction. This enables faster transmission of electrical impulses compared to unmyelinated axons, where action potentials must propagate continuously along the entire length of the axon. Therefore, the presence of myelin is the primary factor that affects the speed of an action potential.

66. c) Sensory neurons
Explanation: Sensory neurons, responsible for transmitting sensory information from the body to the central nervous system (CNS), are often fast-acting myelinated cells. These neurons need to quickly convey sensory signals, such as touch, temperature, and pain, from peripheral receptors to the CNS for processing. Myelination allows for rapid transmission of these signals along sensory pathways, enabling swift responses to stimuli. Therefore, sensory neurons are most likely to be fast-acting myelinated cells compared to other types of neurons like motor neurons, interneurons, or pyramidal neurons.

67. c) 1,000 per second
Explanation: The maximum estimated rate at which a neuron can send action potentials,

also known as the firing rate or spike rate, via the axon is approximately 1,000 per second. This limit is determined by factors such as the refractory period, which is the brief period after an action potential during which the neuron cannot generate another action potential, and the speed of repolarization and recovery of ion channels along the axon. While some neurons can achieve high firing rates close to this maximum, the actual firing rate varies depending on the neuron's type, location, and physiological conditions.

68. c) Axon
Explanation: The axon is responsible for generating action potentials. Action potentials, or nerve impulses, are electrical signals that travel along the axon of a neuron. This process allows for communication between neurons and the transmission of information throughout the nervous system. The axon carries the action potential away from the cell body towards the axon terminals, where it can then communicate with other neurons or target cells.

69. a) Corpus callosum
Explanation: The corpus callosum is responsible for enabling communication between the two hemispheres of the brain. It is a thick band of nerve fibers that connects the left and right hemispheres, allowing them to share information and coordinate activities. This structure plays a crucial role in various cognitive functions, including language processing, perception, and motor coordination. Damage to the corpus callosum can lead to disruptions in communication between the hemispheres and result in cognitive deficits.

70. c) (A) is true, but (R) is false.
Explanation: Assertion (A): The refractory period occurs during the opening of sodium gates. This is true. The refractory period, specifically the absolute refractory period, begins when the sodium channels open and continues until they reset, during which time no new action potential can be initiated.

Reason (R): Neurons can fire repeatedly without any rest periods during the refractory period. This is false. During the absolute refractory period, neurons cannot fire again because the sodium channels are either open or inactivated. The neuron needs to return to its resting potential before it can fire another action potential. The relative refractory period follows the absolute refractory period, during which a neuron can fire another action potential, but it requires a stronger stimulus than usual.

71. c) The biological approach

Explanation: The biological approach posits that an individual's behavior and characteristics are largely determined by biological factors, including genetic inheritance and hormonal makeup. This perspective emphasizes the role of the brain, neurotransmitters, and genetics in influencing behavior. It suggests that many aspects of human behavior can be understood by examining biological processes and mechanisms, and it often involves studying the biological bases of behavior through various methods such as brain imaging, genetic analysis, and the study of hormonal influences.

72. b) Excessive thirst and urination
Explanation: A deficiency of antidiuretic hormone (ADH), also known as vasopressin, leads to a condition known as diabetes insipidus. ADH is responsible for regulating water balance in the body by controlling the amount of water reabsorbed by the kidneys. When ADH levels are low, the kidneys do not reabsorb enough water, leading to excessive water loss through urine. This results in symptoms of excessive thirst (polydipsia) and increased urination (polyuria). The body's inability to retain water causes frequent urination and a constant feeling of thirst as the body tries to maintain hydration. This condition differs from diabetes mellitus, which involves blood sugar regulation.

73. b) Oxytocin
Explanation: Oxytocin is a hormone produced by the hypothalamus and released by the posterior pituitary gland. It plays a crucial role in facilitating uterine contractions during childbirth and promoting milk ejection during breastfeeding.
Uterine Contractions: During labor, oxytocin stimulates the muscles of the uterus to contract, which helps in the delivery of the baby. It is often administered medically to induce labor or strengthen contractions.
Milk Production: Oxytocin also acts on the mammary glands, causing the milk ducts to contract and release milk, a process known as the "let-down" reflex. This hormone is essential for the efficient feeding of the newborn.

74. c) Both produce and store their chemicals for release.
Explanation: Neurons and hormone glands share a similarity in that both produce and store chemicals for release. Neurons produce neurotransmitters, which are stored in vesicles and released into the synaptic cleft to transmit signals to other neurons, muscles, or glands. Similarly, hormone glands produce hormones, which are stored and then released into the bloodstream to target specific organs or tissues. This shared mechanism of producing, storing, and releasing chemical messengers is a fundamental aspect of how both systems communicate and regulate various functions in the body.

75. b) Fixed action patterns
Explanation: According to instinct theory, human behavior is primarily explained by fixed action patterns. Instinct theory posits that behaviors are innate and biologically programmed. These fixed action patterns are automatic, unlearned responses triggered by specific stimuli, and they occur in all members of a species. This perspective suggests that much of human behavior can be understood as instinctual, driven by inborn tendencies and natural predispositions.

76. d) Incentive theory
Explanation: The incentive theory of motivation considers humans to be like machines that require external ingredients to function properly. This theory posits that behavior is motivated by external rewards and stimuli, which act as incentives that drive individuals to act in certain ways. Unlike instinct theory, which focuses on innate drives, and drive reduction theory, which centers on the need to reduce internal states of tension, incentive theory emphasizes the role of external goals and rewards in shaping behavior.

77. a) Physiological motivations
Explanation: Homeostatic drive theory focuses on physiological motivations. It posits that behavior is driven by the body's need to maintain a stable internal environment, or homeostasis. This theory suggests that when there is a deviation from a physiological set point, such as a drop in body temperature or a deficiency in nutrients, it creates a drive to engage in behaviors that will restore balance. For example, hunger motivates eating to restore energy levels, and thirst motivates drinking to maintain hydration.

78. d) Drive reduction theory
Explanation: Drive reduction theory acknowledges the influence of learning on motivation. This theory, proposed by Clark Hull, suggests that drives are internal states of tension that motivate an organism to engage in behaviors that reduce this tension. While it primarily focuses on physiological needs, it also considers how learned behaviors and habits can influence motivation, as organisms learn which actions reduce their drives.

79. d) Self-actualization.
Explanation: Self-actualization is the need at the top of Maslow's Hierarchy of Needs. It represents the fulfillment of one's potential, the pursuit of personal growth, and the realization of one's unique talents and abilities. Maslow proposed that once lower-level needs such as physiological, safety, love and belonging, and esteem needs are satisfied, individuals strive for self-actualization, seeking personal fulfillment and peak experiences.

This need encompasses the desire for creativity, problem-solving, morality, and achieving one's purpose in life.

80. a) Ventromedial hypothalamus.
Explanation: Early research indicated that the feeling of satiety, or fullness, is primarily controlled by the ventromedial hypothalamus. This brain region plays a crucial role in regulating hunger and satiety signals. When this area is stimulated, it can suppress appetite and induce feelings of fullness, leading to reduced food intake. Conversely, damage to the ventromedial hypothalamus can disrupt these signals, resulting in overeating and obesity. Thus, the ventromedial hypothalamus is essential in maintaining a balance between hunger and satiety, contributing to overall energy homeostasis.

81. c) Glucose.
Explanation: Neuron cells in the brain primarily rely on glucose as their primary source of fuel. Glucose is a simple sugar that is readily absorbed from the bloodstream and transported into brain cells, where it undergoes cellular respiration to produce energy in the form of ATP (adenosine triphosphate). This energy is essential for maintaining various neuronal functions, including neurotransmitter synthesis, signal transmission, and overall brain activity. While neurons can utilize other energy sources such as fatty acids and ketone bodies during times of fasting or low glucose availability, glucose remains the preferred and most efficient fuel for the brain under normal physiological conditions.

82. b) Leptin.
Explanation: Leptin is a hormone primarily produced by adipose (fat) tissue and plays a key role in regulating energy balance and appetite. It acts on the hypothalamus in the brain to suppress appetite and increase energy expenditure, thereby promoting satiety and reducing food intake. When fat stores increase, leptin levels rise, signaling to the brain that the body has sufficient energy reserves and reducing hunger. On the other hand, when fat stores decrease, leptin levels drop, signaling hunger and promoting food intake to replenish energy stores. Therefore, leptin is essential for maintaining body weight and regulating food intake, making it a crucial hormone involved in the sensation of satiety.

83. c) High sodium chloride (salt) levels in the blood
Explanation: When there's an excess of sodium chloride (salt) in the bloodstream, the total concentration of solutes (dissolved particles) increases. To maintain a balance in osmolarity (concentration) across cell membranes, water moves out of cells and into the bloodstream to dilute the solutes. This outflow of water from cells leads to cellular

dehydration. The body attempts to compensate for this dehydration by triggering thirst and increasing water intake. However, if the high sodium levels persist, it can lead to significant cellular dehydration and electrolyte imbalance.

84. c) Lateral preoptic area of the hypothalamus.
Explanation: Osmoreceptors, which are specialized neurons responsible for detecting changes in the osmotic pressure of the blood and cellular dehydration, are primarily located in the lateral preoptic area of the hypothalamus. These osmoreceptors play a crucial role in regulating fluid balance and osmotic pressure by triggering appropriate responses, such as the release of antidiuretic hormone (ADH), to maintain homeostasis within the body.

85. c) The kidneys.
Explanation: The kidneys play a central role in regulating sodium and water balance in the body. They achieve this through processes such as filtration, reabsorption, and secretion. Specifically, the kidneys regulate sodium balance by adjusting the reabsorption of sodium ions along the renal tubules, which influences the retention or excretion of water to maintain proper hydration levels. This regulatory mechanism helps stabilize blood volume, blood pressure, and electrolyte concentrations, ensuring overall homeostasis in the body. While the hypothalamus plays a role in regulating fluid balance through the release of antidiuretic hormone (ADH), it primarily responds to signals from osmoreceptors and does not directly control sodium and water balance.

86. b) Exhibiting withdrawal symptoms upon cessation.
Explanation: Physiological dependence on a substance refers to the body's adaptation to the presence of the substance, leading to the development of withdrawal symptoms when the substance is discontinued or significantly reduced. These withdrawal symptoms can vary depending on the substance but may include physical discomfort, cravings, mood changes, and other physiological reactions. This dependence often arises from prolonged exposure to the substance, leading to changes in neurochemistry and the body's functioning. Tolerance (increased resistance to the substance's effects) and withdrawal symptoms are key indicators of physiological dependence, distinguishing it from mere experimentation or psychological aversion to the substance.

87. d) To recognize pleasure and activate the reward system.
Explanation: The mesolimbic dopamine system is a neural pathway in the brain involved in the processing of reward and reinforcement. It includes dopaminergic neurons that

project from the ventral tegmental area (VTA) to the nucleus accumbens and other limbic structures, such as the amygdala and prefrontal cortex. This system plays a crucial role in mediating feelings of pleasure, motivation, and reinforcement associated with various rewarding stimuli, including food, sex, drugs, and social interactions. Dysregulation of the mesolimbic dopamine system has been implicated in addiction, mood disorders, and other psychiatric conditions.

88. c) Increased consumption of the drug is likely.
Explanation: When the reward systems in the brain become harder to activate with regular drug use, a phenomenon known as tolerance develops. This means that the individual requires larger doses of the drug to achieve the same level of reward or pleasure as before. As a result, they may increase their consumption of the drug to compensate for the reduced effects, leading to higher levels of drug intake. This can contribute to the development of addiction and escalate the risk of adverse consequences associated with substance abuse.

89. d) (A) is false, but (R) is true.
Explanation: Assertion (A) is false because intrapsychic coping (relying on defense mechanisms like denial or repression) is generally not considered a more effective long-term strategy for dealing with stress. While it may provide temporary relief, it can prevent individuals from addressing the root causes of stress.
Reason (R) is true because intrapsychic coping does indeed rely on psychological defense mechanisms to alleviate stress. However, these mechanisms are not always helpful for long-term stress management.

90. c) (A) is true, but (R) is false.
Explanation: Assertion (A): Turning to Others is more commonly used by Type A personalities to cope with stress.
True. Type A personalities are often characterized by their competitive, ambitious, and time-conscious behavior. They tend to be more extroverted and social, which means they are likely to seek social support when dealing with stress.
Reason (R): Turning to Others is an effective strategy to reduce stress in the long term.

False. While seeking social support can be helpful for coping with stress, its effectiveness depends on various factors. Some people find comfort in sharing their feelings with others, while others may prefer solitude or other coping mechanisms. Additionally, the effectiveness of turning to others may vary depending on the quality of the social support received.

91. d) Direct Action Response.
Explanation: Direct Action Response coping strategy involves taking direct steps to confront or minimize a stressor. This can include problem-solving, taking assertive action, or changing the circumstances contributing to the stress. Unlike some other coping strategies listed: Information Seeking focuses on gathering information about the stressor. Inhibition of Action involves avoiding or suppressing actions in response to stress. Turning to Others involves seeking social support or assistance from others.

92. c) Information Seeking.
Explanation: Information Seeking coping strategy involves actively seeking out information about the stressful situation, understanding it, and then devising cognitive strategies to avoid or mitigate similar situations in the future. This may include gathering relevant facts, seeking advice from others, or researching solutions. By understanding the stressor better, individuals can develop more effective coping mechanisms and make informed decisions to prevent or minimize future stressors. This strategy empowers individuals to take control of their circumstances and build resilience against future stressors.

93. a) Learned Helplessness
Explanation: Inhibition of Action coping strategy can lead to the long-term detrimental condition known as Learned Helplessness. Learned Helplessness occurs when individuals consistently perceive that they have no control over their situation, even when opportunities for control are present. This perception can develop when individuals repeatedly face stressful situations but feel powerless to change or escape them. Over time, they may become passive and resigned to their circumstances, leading to decreased motivation, feelings of hopelessness, and impaired problem-solving skills. Learned Helplessness can have significant negative effects on mental health and overall well-being.

94. d) (A) is false, but (R) is true.
Explanations: Assertion (A) is false because brain size does not correlate with intellectual capability, and there is no scientific evidence supporting the claim that women are intellectually inferior to men based on brain size.
Reason (R) is true in the sense that James (1994) may have conducted research supporting the notion of men being more intelligent, but this research has been criticized and refuted by modern studies. Current understanding emphasizes that intelligence is not determined by brain size or gender but by a variety of factors, including environment and education.

95. d) (A) is false, but (R) is true.

Explanation: Assertion (A) is false because while there may be some biological influences on spatial ability, differences in spatial ability between boys and girls are not primarily due to biology. Research shows that environmental factors, such as the types of toys and activities children engage in, play a significant role in developing spatial skills.
Reason (R) is true because toys and activities given to children, such as puzzles, building blocks, and video games, significantly impact their spatial development. Contrary to the reason given, these environmental factors do contribute to spatial ability.

96. c) (A) is true, but (R) is false.

97. b) Embarrassment, fear, anxiety, depression, excitement, and frustration
Explanation: Stress emotions are those commonly associated with experiencing stress. These include embarrassment, fear, anxiety, depression, excitement, and frustration. These emotions arise in response to challenging or threatening situations and can significantly impact an individual's psychological and physiological state. Understanding these emotions is crucial in managing and mitigating the effects of stress.

98. c) They play a vital role in shaping human behavior.
Explanation: Neural and hormonal communication systems are integral to human behavior. Neurons communicate via electrical and chemical signals, facilitating rapid responses to stimuli and enabling complex processes like thought, emotion, and movement. Hormones, released by endocrine glands, regulate long-term bodily functions such as growth, metabolism, and mood. Both systems interact closely; for instance, stress triggers neural responses that prompt hormonal release, affecting behavior. Thus, these systems are crucial in shaping human behavior through their coordinated regulation of physiological and psychological processes.

99. b) Biological factors fully determine one's destiny.
Explanation: Early theorists who asserted that "biology is destiny" believed that biological factors, such as genetics and physiological characteristics, fully determine an individual's traits, behaviors, and potential life outcomes. This perspective suggested that one's biological makeup predestines them to certain paths and limitations, implying that social, environmental, and personal efforts have little to no effect in altering these predetermined outcomes. This deterministic view has since been challenged and nuanced by acknowledging the significant roles of environment, experience, and personal agency in shaping one's life.

100. a) Men and women are innately different based on biology.
Explanation: The "mamawaw theory," often associated with the work of researchers like John Money and Anke Ehrhardt, proposed that men and women are innately different based on biological factors. This theory emphasized the idea that biological differences between genders lead to inherent differences in behavior and cognitive abilities.

101. d) Adopt problem-focused coping strategies and have high self-esteem.
Explanation: Johnson & Sarason (1978) found that individuals classified as "internals" tend to believe that they have control over their lives and outcomes. This belief leads to higher self-esteem because they feel capable of managing and influencing their circumstances. As a result, internals are more likely to adopt problem-focused coping strategies, which involve taking active steps to solve problems and reduce stress. These strategies are effective for managing stress because they directly address the source of stress, unlike emotion-focused strategies which aim to manage the emotional response.

102. b) Serotonin
Explanation: Serotonin is a neurotransmitter that plays a crucial role in regulating mood, sleep, and appetite. It is often referred to as the "feel-good" neurotransmitter because of its significant impact on mood stabilization and overall feelings of well-being. Low levels of serotonin are commonly associated with mood disorders such as depression and anxiety. In addition to its effects on mood, serotonin also helps regulate sleep patterns and appetite, making it a key player in maintaining various physiological and psychological functions.

103. c) Neurogenesis
Explanation: Neurogenesis is the process by which new neurons are generated in the adult brain. This phenomenon, once thought to occur only during prenatal development, has been observed in certain areas of the adult brain, such as the hippocampus. Neurogenesis plays a crucial role in brain plasticity, allowing for the formation of new neural connections, which can contribute to learning, memory, and the brain's ability to adapt to new experiences or recover from injuries. The discovery of adult neurogenesis has significant implications for understanding brain function and potential treatments for neurological diseases.

104. b) Cerebellum
Explanation: The cerebellum, located at the back of the brain beneath the cerebral hemispheres, is primarily responsible for the coordination of voluntary movements,

balance, and posture. While the cerebral cortex plays a role in higher cognitive functions such as perception, thought, and decision-making, the cerebellum focuses more on motor control and coordination. It receives input from sensory systems and other parts of the brain, integrating this information to fine-tune movements and ensure smooth coordination. Damage to the cerebellum can result in deficits in motor coordination, leading to symptoms such as ataxia (loss of coordination) and tremors.

105. c) Parasympathetic Nervous System
Explanation: The parasympathetic nervous system is responsible for the "rest and digest" response, which promotes relaxation and conservation of energy. It works in opposition to the sympathetic nervous system, which is responsible for the "fight or flight" response. When activated, the parasympathetic nervous system slows heart rate, increases gastrointestinal activity, and promotes relaxation of muscles, allowing the body to rest and recover. This system helps maintain homeostasis by counterbalancing the physiological responses triggered by the sympathetic nervous system during times of stress or danger.

106. b) The percentage of the trait's variability in a population that is due to genetic factors.
Explanation: The heritability of a trait refers to the extent to which individual differences in that trait within a population can be attributed to genetic factors. It represents the proportion of the total variance in a trait across individuals that is due to genetic variation. Heritability estimates range from 0 to 1, where 0 indicates no genetic contribution to individual differences in the trait, and 1 indicates that all variability is due to genetic factors. This measure helps quantify the relative importance of genetic versus environmental influences on a particular trait or characteristic.

107. d) Functional Magnetic Resonance Imaging (fMRI)
Explanation: Functional Magnetic Resonance Imaging (fMRI) is a brain imaging technique that measures changes in blood flow, oxygenation, and metabolic activity in the brain. It is commonly used to study brain activity during various tasks and can provide information about which areas of the brain are involved in specific cognitive processes or behaviors. Unlike structural MRI, which provides detailed images of brain anatomy, fMRI allows researchers to investigate the functional organization of the brain by detecting changes in blood flow associated with neuronal activity.

108. b) Myelin
Explanation: Myelin is the correct answer. It's a fatty substance that forms a protective sheath around axons in the nervous system. This insulation enhances the speed and

efficiency of neural transmission by allowing electrical impulses to travel more rapidly along the axon. Without myelin, signals would dissipate and lose strength as they move along the axon, resulting in slower and less efficient communication between neurons.