

MCAT Practice Questions

Biological and Biochemical Foundations of Living Systems

Question: Which of the following amino acids has a side chain that can form disulfide bonds?

Answer: Cysteine

Question: In which phase of the cell cycle does DNA replication occur?

Answer: S phase

Question: What is the primary function of the rough endoplasmic reticulum?

Answer: Protein synthesis

Question: Which enzyme is responsible for unwinding the DNA double helix during replication?

Answer: Helicase

Question: What is the role of tRNA during protein synthesis?

Answer: Translating mRNA into a polypeptide sequence

Question: Which of the following processes produces the most ATP during cellular respiration?

Answer: Oxidative Phosphorylation

Question: Which type of cell junction allows ions and small molecules to pass directly from one cell to another?

Answer: Gap junctions

Question: In the lac operon, what is the function of the repressor protein?

Answer: To inhibit the transcription of the lac genes

Question: What is the primary purpose of fermentation in cells?

Answer: To regenerate NAD⁺ from NADH

Question: Which of the following is an example of an allosteric enzyme?

Answer: Phosphofructokinase

Question: Which of the following is a primary function of the Golgi apparatus?

Answer: Sorting and modifying proteins

Question: What type of bond links amino acids together in a protein?

Answer: Peptide bond

Question: Which molecule is primarily responsible for carrying electrons in the electron transport chain?

Answer: NADH

Question: In eukaryotic cells, where does the citric acid cycle occur?

Answer: Mitochondrial matrix

Question: Which of the following best describes the quaternary structure of a protein?

Answer: The interaction and arrangement of multiple polypeptide chains

Question: Which enzyme is crucial for transcribing DNA into RNA?

Answer: RNA polymerase

Question: Which of the following organelles is involved in the degradation of cellular waste?

Answer: Lysosome

Question: In which cellular location does glycolysis take place?

Answer: Cytoplasm

Question: Which of the following components is part of a nucleotide?

Answer: Phosphate group

Question: Which hormone is primarily responsible for reducing blood glucose levels?

Answer: Insulin

Question: Which of the following structures is involved in protein synthesis?

Answer: Ribosome

Question: What is the main purpose of the Calvin cycle in photosynthesis?

Answer: To fix carbon into glucose

Question: Which of the following types of RNA is involved in splicing introns from pre-messenger RNA?

Answer: snRNA

Question: What is the role of the enzyme telomerase in eukaryotic cells?

Answer: It lengthens telomeres

Question: Which structure within the cell serves as the site of oxidative phosphorylation?

Answer: Mitochondrial inner membrane

Question: What is the function of a restriction enzyme in molecular biology?

Answer: Cutting DNA at specific sequences

Question: Which of the following is not a component of the cell membrane?

Answer: Nucleic acids

Question: What process is characterized by the movement of water across a selectively permeable membrane?

Answer: Osmosis

Question: Which of the following best describes a codon?

Answer: A three-nucleotide sequence on mRNA that codes for an amino acid

Question: Which metabolic pathway is shared by both aerobic respiration and fermentation?

Answer: Glycolysis

Question: Which of the following molecules serves as the final electron acceptor in the electron transport chain?

Answer: Oxygen

Question: Which of the following is true about enzymes?

Answer: They are specific to the substrates they bind

Question: What is the primary function of the myelin sheath?

Answer: To insulate axons and increase the speed of signal transmission

Question: Which of the following processes occurs in the thylakoid membrane of chloroplasts?

Answer: Light-dependent reactions

Question: Which hormone is secreted by the adrenal medulla in response to stress?

Answer: Epinephrine

Question: What is the primary function of the large intestine?

Answer: Water absorption and feces formation

Question: Which of the following is a characteristic of prokaryotic cells but not eukaryotic cells?

Answer: Circular DNA

Question: Which of the following proteins is primarily involved in muscle contraction?

Answer: Actin

Question: Which of the following processes is responsible for the production of ATP in the absence of oxygen?

Answer: Fermentation

Question: What is the primary function of hemoglobin in the human body?

Answer: To transport oxygen in the blood

Question: Which organelle is responsible for the synthesis of lipids and detoxification of drugs?

Answer: Smooth endoplasmic reticulum

Question: What is the role of chlorophyll in photosynthesis?

Answer: To capture light energy

Question: Which process during cellular respiration results in the formation of acetyl-CoA?

Answer: Pyruvate decarboxylation

Question: Which of the following is a polysaccharide that stores energy in plants?

Answer: Starch

Question: In which part of the nephron is the majority of water reabsorbed?

Answer: Proximal convoluted tubule

Question: Which of the following molecules is a carrier of chemical energy in cells?

Answer: ATP

Question: What is the function of microtubules in a cell?

Answer: To facilitate chromosomal movement during cell division

Question: Which of the following best describes the role of the enzyme DNA polymerase?

Answer: To synthesize new DNA strands

Question: Which of the following components of the cytoskeleton is primarily involved in muscle contraction?

Answer: Actin filaments

Question: Which nucleotide base pairs with adenine in DNA?

Answer: Thymine

Question: What is the function of topoisomerase during DNA replication?

Answer: To attach the Okazaki fragments together

Question: Which phase of mitosis is characterized by the alignment of chromosomes in the middle of the cell?

Answer: Metaphase

Question: Which molecule acts as the main structural component of the cell membrane?

Answer: Phospholipids

Question: What is the primary purpose of mRNA in the cell?

Answer: To carry the genetic code from DNA to the ribosome

Question: Which of the following is a characteristic of the lysosome?

Answer: Digestion of macromolecules

Question: What is the role of the sarcoplasmic reticulum in muscle cells?

Answer: To store and release calcium ions

Question: Which metabolic process results in the production of lactic acid in muscle cells under anaerobic conditions?

Answer: Fermentation

Question: Which of the following enzymes is involved in the transcription of mRNA from a DNA template?

Answer: RNA polymerase

Question: Which process converts glucose into pyruvate, producing ATP and NADH in the absence of oxygen?

Answer: Glycolysis

Question: Which organelle is the site of ribosome assembly in eukaryotic cells?

Answer: Nucleolus

Question: During which stage of cellular respiration is the majority of carbon dioxide produced?

Answer: Citric Acid Cycle

Question: Which type of bond is primarily responsible for the secondary structure of proteins, such as alpha helices and beta sheets?

Answer: Hydrogen bonds

Question: Which molecule is a primary carrier of electrons in cellular respiration and photosynthesis?

Answer: NADH

Question: Which organelle is primarily involved in protein sorting and modification?

Answer: Golgi Apparatus

Question: Which of the following is true about the genetic code?

Answer: It is redundant

Question: Which cellular structure is responsible for the movement of chromosomes during cell division?

Answer: Microtubules

Question: Which of the following best describes the function of pepsin in the stomach?

Answer: To digest proteins

Question: Which of the following is true about RNA splicing?

Answer: It is essential for producing mature mRNA

Question: Which of the following molecules is considered the main energy currency of the cell?

Answer: ATP

Question: Which enzyme is responsible for converting ATP to cAMP in response to a signaling molecule?

Answer: Adenylate cyclase

Question: What is the role of ribozymes in the cell?

Answer: To catalyze RNA splicing reactions

Question: What is a major function of macrophages in the immune system?

Answer: Phagocytosis of pathogens

Question: What is the function of acetylcholinesterase at a neuronal synapse?

Answer: Breakdown of acetylcholine

Question: Which molecule is responsible for carrying amino acids to the ribosome for protein synthesis?

Answer: tRNA

Question: Which cellular process is directly driven by the hydrolysis of ATP?

Answer: Primary active transport

Question: Which of the following hormones is primarily involved in the regulation of blood calcium levels?

Answer: Parathyroid hormone

Question: What is the major function of the nucleolus within the nucleus of a cell?

Answer: Ribosome production

Question: Which cell cycle checkpoint ensures that all chromosomes are properly aligned before the cell proceeds to anaphase?

Answer: M checkpoint

Question: Which enzyme is responsible for synthesizing the RNA primers needed to start DNA replication?

Answer: Primase

Question: What is the main function of the peroxisome in eukaryotic cells?

Answer: Lipid metabolism and detoxification of hydrogen peroxide

Question: Which phase of the cell cycle is primarily associated with cell growth and preparation for DNA replication?

Answer: G1 phase

Question: In which part of the chloroplast does the Calvin cycle take place?

Answer: Stroma

Question: Which of the following proteins is associated with the process of apoptosis?

Answer: Cytochrome c

Question: Which of the following processes occurs in the matrix of the mitochondria?

Answer: Citric acid cycle

Question: Which type of enzyme inhibition can be overcome by increasing the concentration of substrate?

Answer: Competitive inhibition

Question: Which of the following structures is part of the endomembrane system?

Answer: Rough endoplasmic reticulum

Question: What is the main functional role of microfilaments in eukaryotic cells?

Answer: Facilitating cell movement and division

Question: Which biomolecule forms the structure of the double helix in DNA?

Answer: Nucleotides

Question: Which of the following enzymes is involved in the elongation phase of DNA replication?

Answer: DNA polymerase III

Question: Which macromolecule is primarily responsible for storing genetic information in cells?

Answer: Nucleic acids

Question: Which cell organelle is involved in modifying, sorting, and packaging of proteins for secretion?

Answer: Golgi apparatus

Question: What is the final electron acceptor in the electron transport chain of cellular respiration?

Answer: Oxygen

Question: In what part of the cell does glycolysis occur?

Answer: Cytoplasm

Question: Which of the following statements is true about competitive inhibitors?

Answer: They increase the K_m of the enzyme for the substrate

Question: Which structure serves as the site of translation?

Answer: Ribosome

Question: Which biological molecule is the primary component of cell membranes?

Answer: Phospholipids

Question: Which of the following is NOT a function of the smooth endoplasmic reticulum?

Answer: Protein synthesis

Question: What type of cell signaling involves the release of hormones into the bloodstream to affect distant target cells?

Answer: Endocrine signaling

Question: Which of the following is the main function of mitochondria?

Answer: ATP production

Question: Which biochemical pathway produces the most ATP per molecule of glucose metabolized?

Answer: Electron Transport Chain

Question: Which of the following processes is associated with the synthesis of RNA from a DNA template?

Answer: Transcription

Question: Which of the following best describes a lysosome?

Answer: A vesicle containing hydrolytic enzymes

Question: What is the main function of the enzyme ribonuclease?

Answer: To degrade RNA

Question: Which of the following best describes an operon?

Answer: A cluster of genes under the control of a single promoter

Question: What is the role of tRNA in protein synthesis?

Answer: To carry amino acids to the ribosome

Question: Which molecule is not a product of the light-dependent reactions of photosynthesis?

Answer: Glucose

Question: Which structure regulates the movement of materials into and out of the cell?

Answer: Plasma membrane

Question: Which of the following processes occurs during meiosis but not mitosis?

Answer: Synapsis and crossing over

Question: Which of the following is the primary structure of proteins?

Answer: Amino acid sequence

Question: What is the primary role of NADPH in photosynthesis?

Answer: To provide reducing power for the Calvin cycle

Question: Which of the following structures is responsible for the production and maturation of sperm cells?

Answer: Epididymis

Question: During muscle contraction, which ion is released from the sarcoplasmic reticulum to initiate the process?

Answer: Calcium

Question: What is the primary function of bile produced by the liver?

Answer: To emulsify fats

Question: Which of the following processes involves the removal of introns from pre-mRNA?

Answer: RNA splicing

Question: Which hormone is primarily responsible for stimulating the production of red blood cells?

Answer: Erythropoietin

Question: Which molecule serves as the template for the synthesis of complementary RNA during transcription?

Answer: DNA

Question: What is the role of the medulla oblongata in the human body?

Answer: Regulation of heart rate and respiration

Question: Which of the following is a characteristic of facilitated diffusion?

Answer: Requires a membrane protein

Question: Which of the following enzymes is involved in the process of transcription?

Answer: RNA polymerase

Question: Which structure in the cell is responsible for producing ribosomes?

Answer: Nucleolus

Question: Which of the following best describes the fluid mosaic model of the plasma membrane?

Answer: A dynamic structure with proteins and lipids that move freely

Question: Which of the following vitamins is fat-soluble?

Answer: Vitamin D

Question: Which of the following structures is involved in the modification and packaging of proteins?

Answer: Golgi apparatus

Question: Which cellular organelle is primarily involved in the production of ATP through oxidative phosphorylation?

Answer: Mitochondria

Question: Which of the following macromolecules are primarily responsible for catalyzing biochemical reactions?

Answer: Proteins

Question: Which phase follows metaphase during mitosis?

Answer: Anaphase

Question: What is the primary function of the small intestine?

Answer: Nutrient absorption

Question: Which blood cells are primarily involved in the body's immune response?

Answer: Leukocytes

Question: Which enzyme is responsible for breaking down lactose into glucose and galactose?

Answer: Lactase

Question: Which of the following best describes the role of the smooth endoplasmic reticulum?

Answer: Lipid synthesis and detoxification

Question: What is the primary role of the hormone insulin?

Answer: To decrease blood glucose levels

Question: Which of the following processes generates the most ATP during cellular respiration?

Answer: Electron Transport Chain

Question: During translation, which site on the ribosome does the tRNA first bind to?

Answer: A site

Question: Which molecule acts as the final electron acceptor in the electron transport chain?

Answer: Oxygen

Question: Which of the following is not a component of an amino acid?

Answer: Phosphate group

Question: What is the function of cholesterol in the plasma membrane?

Answer: To provide structural fluidity and stability

Question: Which of the following molecules is involved in the storage of genetic information?

Answer: DNA

Question: What process converts RNA sequences into protein sequences?

Answer: Translation

Question: Which structure within the cell is responsible for producing ATP through oxidative phosphorylation?

Answer: Mitochondria

Question: What is the primary function of hemoglobin in red blood cells?

Answer: Transporting oxygen

Question: Which process is responsible for the synthesis of glucose from non-carbohydrate precursors?

Answer: Gluconeogenesis

Question: Which enzyme is responsible for catalyzing the formation of a peptide bond in protein synthesis?

Answer: Peptidyl transferase

Question: Which phase of meiosis involves the separation of homologous chromosomes?

Answer: Anaphase I

Question: What is the role of the enzyme amylase?

Answer: To break down carbohydrates

Question: Which of the following molecules is primarily involved in energy storage?

Answer: Triglycerides

Question: Which type of RNA carries amino acids to the ribosome during translation?

Answer: tRNA

Question: In which organelle does the Calvin cycle take place?

Answer: Chloroplast

Question: Which of the following structures is found in plant cells but not in animal cells?

Answer: Chloroplast

Psychological, Social, and Biological Foundations of Behavior

Question: Which of the following concepts refers to the ability of the brain to adapt and reorganize itself?

Answer: Neuroplasticity

Question: What term describes the phenomenon where individuals are more likely to remember the first and last items in a series?

Answer: Serial position effect

Question: Which neurotransmitter is primarily involved in mood regulation and is often linked to depression when in low levels?

Answer: Serotonin

Question: What type of memory is used for the temporary storage and manipulation of information?

Answer: Working memory

Question: Which stage of Erikson's psychosocial development involves establishing a sense of self and personal identity?

Answer: Identity vs. Role Confusion

Question: In classical conditioning, what is the term for the learned response to the previously neutral stimulus?

Answer: Conditioned response

Question: What is the primary function of the amygdala in the brain?

Answer: Processing of emotions

Question: Which theory suggests that people are motivated by a desire to reach their full potential and become the best version of themselves?

Answer: Maslow's hierarchy of needs

Question: What is the term for a sense of discomfort or distress that occurs when a person's behavior is inconsistent with their attitudes or beliefs?

Answer: Cognitive dissonance

Question: Which type of research design involves observing subjects in their natural environment without intervention?

Answer: Naturalistic observation

Question: Which of the following is a key component of Albert Bandura's social learning theory?

Answer: Observational learning

Question: What term describes the mental shortcuts or 'rules of thumb' that people use to make decisions quickly?

Answer: Heuristics

Question: Which part of the brain is primarily responsible for coordinating voluntary movements and maintaining balance?

Answer: Cerebellum

Question: Which psychologist is best known for his theory of cognitive development in children?

Answer: Jean Piaget

Question: What concept refers to the process of deliberately focusing on a specific piece of information to encode it into memory?

Answer: Selective attention

Question: Which psychological approach focuses on how our unconscious thoughts and early childhood experiences shape our behaviors?

Answer: Psychoanalytic theory

Question: What is the term for the instinctual, biological drive that Freud believed was the primary motivator of human behavior?

Answer: Libido

Question: Which principle suggests that individuals are motivated to maintain a certain level of physiological arousal?

Answer: Arousal theory

Question: Which term describes the phenomenon where the presence of others improves performance on simple tasks but hinders it on complex tasks?

Answer: Social facilitation

Question: Which term refers to the shared beliefs, behaviors, and norms within a community or society?

Answer: Culture

Question: Which of the following best describes the function of mirror neurons?

Answer: They enable observational learning and empathy.

Question: What concept refers to the diminishing of a conditioned response when the unconditioned stimulus no longer follows the conditioned stimulus?

Answer: Extinction

Question: Which psychological concept involves the tendency to group similar objects together in our perceptions?

Answer: Similarity

Question: What term refers to the emotional bond that typically forms between infant and caregiver?

Answer: Attachment

Question: Which component of working memory is responsible for coordinating and integrating information from different sources?

Answer: Central executive

Question: What term is used to describe the lessening of responsibility felt by individuals as the number of bystanders increases?

Answer: Diffusion of responsibility

Question: Which theory of emotion states that physiological arousal and the experience of emotion occur simultaneously, yet independently?

Answer: Cannon-Bard theory

Question: What term describes the discomfort that arises when there is inconsistency between beliefs or behaviors?

Answer: Cognitive dissonance

Question: Which of the following is an example of a secondary reinforcer?

Answer: Money

Question: In which type of research design do researchers manipulate one variable to determine if changes in one variable cause changes in another variable?

Answer: Experimental study

Question: Which term refers to the process by which a person interprets new information in terms of existing schemas according to Piaget?

Answer: Assimilation

Question: What concept involves decreasing the strength of a response when a stimulus is repeatedly presented without reinforcement?

Answer: Extinction

Question: Which term describes the belief that others are paying more attention to our appearance and behavior than they actually are?

Answer: Spotlight effect

Question: Which term is used to describe an individual's characteristic pattern of thinking, feeling, and acting?

Answer: Personality

Question: What term refers to the inability to retrieve information from one's past?

Answer: Retrograde amnesia

Question: Which of the following brain structures is most closely associated with the formation of new memories?

Answer: Hippocampus

Question: What concept refers to the shared expectations within a group or society regarding the proper way to think, feel, and behave?

Answer: Norms

Question: Which phenomenon involves a decrease in response to a stimulus after repeated presentations?

Answer: Habituation

Question: Which of the following is considered a primary drive in motivation theory?

Answer: Thirst

Question: Which term describes the cognitive bias where people overestimate the degree to which others share their beliefs, attitudes, and behaviors?

Answer: False consensus effect

Question: Which theory of emotion posits that emotions arise from physiological arousal followed by a cognitive label?

Answer: Schachter-Singer theory

Question: Which developmental stage in Erikson's theory involves assessing one's life and developing a sense of integrity or despair?

Answer: Ego Integrity vs. Despair

Question: What is the term for the visual phenomenon where exposure to one stimulus influences a response to another stimulus, usually without conscious guidance?

Answer: Priming

Question: Which of the following best describes the concept of 'learned helplessness'?

Answer: A sense of powerlessness after repeated failure

Question: What is the primary focus of humanistic theories of personality?

Answer: Self-actualization

Question: Which term is used to describe the culturally bound phenomenon of considering one's own culture as superior to others?

Answer: Ethnocentrism

Question: Which research methodology involves intensive examination of individual cases to explore unique qualities or phenomena?

Answer: Case study

Question: Which memory process involves transforming information into a form that can be stored in memory?

Answer: Consolidation

Question: Which part of the brain is crucial for regulating vital functions such as heartbeat and breathing?

Answer: Medulla oblongata

Question: What psychological concept explains why consistent reinforcement schedules are more effective for learning than inconsistent ones?

Answer: Law of effect

Question: Which of the following brain structures is involved in the regulation of the sleep-wake cycle?

Answer: Pineal gland

Question: What does the term 'groupthink' refer to?

Answer: The harmony-driven process in decision-making that overrides realistic appraisal of alternatives

Question: Which type of learning occurs when behavior increases or decreases due to the consequences that follow it?

Answer: Operant conditioning

Question: Which theory of personality suggests that behavior is largely determined by the interaction between people's traits and their social context?

Answer: Social-cognitive theory

Question: What concept describes a state of reduced self-awareness and decreased feeling of responsibility, often experienced in groups?

Answer: Deindividuation

Question: Which neurotransmitter is associated with the 'fight or flight' response?

Answer: Epinephrine

Question: Which stage in Piaget's theory of cognitive development involves mastering the concept of conservation?

Answer: Concrete operational stage

Question: What term describes the statistical technique that summarizes the results of multiple studies?

Answer: Meta-analysis

Question: Which part of the brain is primarily responsible for executive functions such as planning and decision-making?

Answer: Frontal lobe

Question: What is the term for the phenomenon whereby people tend to recall information better when they are in the same context in which they learned it?

Answer: Context-dependent memory

Question: Which cognitive bias involves the tendency to focus on information that confirms one's preconceptions?

Answer: Confirmation bias

Question: In Maslow's hierarchy of needs, which category is at the base of the pyramid?

Answer: Physiological needs

Question: Which research method involves the in-depth study of a single individual or small group?

Answer: Case study

Question: Which psychological concept refers to the discomfort experienced when holding two or more conflicting cognitions?

Answer: Cognitive dissonance

Question: Which part of the autonomic nervous system is responsible for the 'rest and digest' activities?

Answer: Parasympathetic nervous system

Question: What term refers to the reinforcement of closer and closer approximations of a desired response?

Answer: Shaping

Question: Which psychological phenomenon occurs when individuals adjust their behavior or thinking to coincide with a group standard?

Answer: Conformity

Question: Which term describes the phenomenon where repeated exposure to a stimulus increases the likelihood of a favorable response to it?

Answer: Mere exposure effect

Question: Which area of the brain is most associated with processing visual information?

Answer: Occipital lobe

Question: Which term refers to attributing one's own unacceptable thoughts and feelings to others?

Answer: Projection

Question: Which type of research design follows the same subjects over a period of time to observe changes?

Answer: Longitudinal study

Question: What term describes a negative attitude toward a group and its members, often involving stereotyped beliefs?

Answer: Prejudice

Question: Which psychological perspective focuses on understanding the adaptive value of mental processes and behavior?

Answer: Evolutionary perspective

Question: What is the main neurotransmitter involved in the transmission of pain signals?

Answer: Substance P

Question: In operant conditioning, which reinforcement schedule leads to the highest rate of responding?

Answer: Variable ratio

Question: Which term refers to a phenomenon where the presence of others improves performance on easy tasks but hinders performance on difficult tasks?

Answer: Social facilitation

Question: Which part of the brain is most closely linked with the formation of long-term memories?

Answer: Hippocampus

Question: Which psychological concept refers to the belief in one's own ability to succeed in specific situations?

Answer: Self-efficacy

Question: What term is used to describe the diminishing effect of a drug after repeated use, leading to the need for larger doses to achieve the same effect?

Answer: Tolerance

Question: Which developmental psychologist is best known for his theory of moral development, which includes stages such as pre-conventional, conventional, and post-conventional?

Answer: Lawrence Kohlberg

Question: What term describes the phenomenon when an individual's performance improves due to the presence of others?

Answer: Social facilitation

Question: Which concept refers to the decrease in responsiveness to a stimulus after repeated presentations?

Answer: Habituation

Question: Which psychologist developed the stages of psychosocial development that span from infancy to adulthood?

Answer: Erik Erikson

Question: What is the primary function of the hypothalamus in the brain?

Answer: Regulation of endocrine functions and homeostasis

Question: Which term refers to the influence of a group's majority opinion on individual judgments?

Answer: Conformity

Question: In operant conditioning, what is a primary reinforcer?

Answer: Food

Question: Which type of memory has a virtually limitless capacity and can store information over long periods?

Answer: Long-term memory

Question: What term describes the alignment of an individual's beliefs and attitudes with a group's beliefs and attitudes?

Answer: Conformity

Question: Which cognitive bias involves attributing others' behaviors to their character while attributing our own behaviors to our circumstances?

Answer: Actor-observer bias

Question: What is the primary focus of cognitive-behavioral therapy (CBT)?

Answer: Changing maladaptive thinking patterns and behaviors

Question: Which term describes the process by which a person learns the values, norms, and behaviors appropriate or necessary in their culture?

Answer: Socialization

Question: What concept refers to the extent to which a test measures what it claims to measure?

Answer: Validity

Question: Which part of the brain is primarily involved in the regulation of emotion and memory, particularly fear responses?

Answer: Amygdala

Question: According to Maslow's hierarchy of needs, which of the following needs must be met first?

Answer: Physiological needs

Question: In classical conditioning, what is the term for a stimulus that naturally and automatically triggers a response?

Answer: Unconditioned stimulus

Question: Which psychological concept refers to the belief in personal capability to organize and execute the courses of action required to manage prospective situations?

Answer: Self-efficacy

Question: Which of the following theories is most associated with the idea that physiological arousal precedes the emotional experience?

Answer: James-Lange theory

Question: What concept describes the tendency for people to perform better on tasks in the mere presence of others?

Answer: Social facilitation

Question: Which term best describes an organized cluster of knowledge about an object or event?

Answer: Schema

Question: What is the term for the process of transferring information from short-term memory to long-term memory?

Answer: Consolidation

Question: Which term refers to the tendency to overestimate the extent to which others share our beliefs and behaviors?

Answer: False consensus effect

Question: Which of the following is an example of a secondary reinforcer?

Answer: Money

Question: According to Piaget, during which stage do children begin to understand the concept of object permanence?

Answer: Sensorimotor

Question: What term describes the decrease in ability to retrieve memories over time, especially those that are not frequently accessed?

Answer: Decay theory

Question: Which theory suggests that our experience of emotion is our awareness of physiological responses to emotion-arousing stimuli?

Answer: James-Lange theory

Question: Which type of social influence involves a change in behavior to fit in with a group?

Answer: Conformity

Question: Which part of the nervous system is responsible for the 'fight or flight' response?

Answer: Sympathetic nervous system

Question: What term refers to a mental shortcut that helps people make decisions quickly but can often lead to errors?

Answer: Heuristic

Question: Which of the following is an example of an absolute threshold?

Answer: Seeing a candle flame 30 miles away on a dark night

Question: Which term describes the process by which sensory information is transformed into neural activity?

Answer: Transduction

Question: Which neurotransmitter is primarily involved in the regulation of mood, sleep, and appetite?

Answer: Serotonin

Question: What term refers to the mental framework that helps individuals organize and interpret information?

Answer: Schema

Question: Which part of the brain is crucial for emotional regulation and decision-making?

Answer: Prefrontal cortex

Question: What is the term for the phenomenon where people attribute their successes to internal factors and their failures to external factors?

Answer: Self-serving bias

Question: Which theory of intelligence proposes that there are eight distinct types of intelligence?

Answer: Gardner's multiple intelligences

Question: Which developmental stage is marked by the struggle to establish a coherent sense of self, according to Erikson?

Answer: Identity vs. Role Confusion

Question: What term describes the phenomenon of reduced effort by individuals when they work in a group compared to when they work alone?

Answer: Social loafing

Question: Which learning theory emphasizes the role of reinforcement and punishment in shaping behavior?

Answer: Operant conditioning

Question: Which term refers to the inability to perceive a stimulus because attention is directed elsewhere?

Answer: Inattentional blindness

Question: Which type of schizophrenia is characterized by periods of immobility or excessive, purposeless movement?

Answer: Catatonic schizophrenia

Question: Which term refers to the mental and emotional discomfort a person experiences when having contradictory beliefs or behaviors?

Answer: Cognitive dissonance

Question: Which psychological disorder is characterized by persistent feelings of sadness and loss of interest in activities?

Answer: Major depressive disorder

Question: Which term describes the process of learning by watching others?

Answer: Observational learning

Question: What is the role of the corpus callosum in the brain?

Answer: Connecting the two hemispheres

Question: Which stage of sleep is most closely associated with vivid dreams?

Answer: REM sleep

Question: Which theory states that emotion is the result of physiological arousal and cognitive labeling?

Answer: Schachter-Singer theory

Question: Which part of the brain is responsible for processing auditory information?

Answer: Temporal lobe

Question: Which term refers to the tendency to attribute one's successes to internal factors and failures to external factors?

Answer: Self-serving bias

Question: Which neurotransmitter is primarily involved in the reward pathway and is often linked to addiction?

Answer: Dopamine

Question: Which psychological approach focuses on the unconscious mind and early childhood experiences?

Answer: Psychoanalytic

Question: Which term describes the diminished sensitivity to an unchanging stimulus over time?

Answer: Sensory adaptation

Question: Which term refers to the part of the autonomic nervous system responsible for the 'rest and digest' response?

Answer: Parasympathetic nervous system

Question: Which concept in psychology explains how individuals explain the causes of behavior and events?

Answer: Attribution theory

Question: Which Piagetian stage is characterized by the ability to think logically about abstract propositions and test hypotheses systematically?

Answer: Formal operational stage

Question: Which term refers to the reinforcement of a response after varying, unpredictable time intervals?

Answer: Variable-interval schedule

Question: Which type of attachment in Ainsworth's 'Strange Situation' is characterized by children who are distressed when their caregiver leaves but are ambivalent when they return?

Answer: Insecure-resistant attachment

Question: Which personality trait is characterized by emotional stability and resilience?

Answer: Neuroticism

Question: What term refers to the mental ability to create, invent, discover, explore, imagine, and suppose?

Answer: Divergent thinking

Question: Which psychological disorder is characterized by extreme mood swings, including manic and depressive episodes?

Answer: Bipolar disorder

Question: Which term refers to a consistent pattern of behavior, thoughts, and emotions that remain stable over time and across situations?

Answer: Personality

Question: Which theory suggests that behavior is motivated by the desire to reduce internal tension caused by unmet biological needs?

Answer: Drive reduction theory

Question: Which term is used to describe the culturally influenced process of learning rules and behavior patterns appropriate for one's society?

Answer: Socialization

Question: In the context of classical conditioning, what is the term for the learned response to the previously neutral stimulus?

Answer: Conditioned response

Question: Which researcher is best known for his study on obedience involving electric shocks?

Answer: Stanley Milgram

Question: What term describes the tendency for individuals to increase their liking for something they have worked hard to attain?

Answer: Effort justification

Question: Which of the following brain structures is primarily involved in maintaining homeostasis, including temperature regulation, hunger, and thirst?

Answer: Hypothalamus

Question: Which term describes a psychological state where a person feels disconnected from their body or surroundings?

Answer: Dissociation

Question: Which cognitive bias involves the tendency to focus on information that confirms one's existing beliefs?

Answer: Confirmation bias

Question: Which stage of sleep is characterized by rapid eye movements and vivid dreams?

Answer: REM sleep

Question: What term describes the process by which sensory information is organized and interpreted to form a meaningful experience?

Answer: Perception

Chemical and Physical Foundations of Biological Systems

Question: Which of the following atoms has the smallest atomic radius?

Answer: Chlorine (Cl)

Question: What is the main function of ribosomes in a cell?

Answer: Protein synthesis

Question: The pH of a solution is 4. What is the hydrogen ion concentration?

Answer: 1×10^{-4} M

Question: Which of the following is an example of an amphipathic molecule found in biological membranes?

Answer: Phospholipid

Question: What type of bond is primarily responsible for the secondary structure of proteins?

Answer: Hydrogen bonds

Question: How many electrons are in a double bond?

Answer: 4

Question: In an electrochemical cell, which electrode undergoes reduction?

Answer: Cathode

Question: Which of the following best describes a covalent bond?

Answer: Sharing a pair of electrons

Question: Which phase change is an example of sublimation?

Answer: Solid to gas

Question: What is the main product of glycolysis in cellular respiration?

Answer: Pyruvate

Question: Which of the following represents the strongest type of intermolecular force?

Answer: Hydrogen bonding

Question: Which of the following processes increases the entropy of a system?

Answer: Dissolution of sugar in water

Question: What is the principal function of the mitochondria in eukaryotic cells?

Answer: ATP production

Question: Which element is the most electronegative?

Answer: Fluorine (F)

Question: In a chemical reaction, what does the term 'activation energy' refer to?

Answer: The energy needed to start the reaction

Question: What type of interaction stabilizes the alpha-helix and beta-sheet structures in proteins?

Answer: Hydrogen bonds

Question: Which molecule is known as the 'universal solvent'?

Answer: Water

Question: What type of reaction is characterized by the loss of electrons?

Answer: Oxidation

Question: Which of the following compounds is an example of an ester?

Answer: Ethyl acetate

Question: What is the common name for the disaccharide made up of glucose and fructose?

Answer: Sucrose

Question: Which of the following types of radiation has the highest energy?

Answer: Gamma rays

Question: What is the role of a catalyst in a chemical reaction?

Answer: Lower the activation energy

Question: Which of the following best describes an ionic bond?

Answer: Transfer of electrons from one atom to another

Question: Which amino acid contains a sulfur atom?

Answer: Cysteine

Question: How many covalent bonds can carbon form?

Answer: 4

Question: Which law relates pressure and volume of a gas at constant temperature?

Answer: Boyle's Law

Question: What is the main component of the lipid bilayer in cell membranes?

Answer: Phospholipids

Question: Which of the following is a reducing sugar?

Answer: Glucose

Question: What is the oxidation state of sulfur in sulfur dioxide (SO₂)?

Answer: +4

Question: What is the primary structure of a protein?

Answer: The sequence of amino acids

Question: Which of the following particles is found in the nucleus of an atom?

Answer: Both proton and neutron

Question: Which equation represents the ideal gas law?

Answer: $PV = nRT$

Question: What is the maximum number of electrons that can occupy a single p orbital?

Answer: 2

Question: Which type of enzyme inhibition can be overcome by increasing substrate concentration?

Answer: Competitive inhibition

Question: Which type of bond is formed between the oxygen and hydrogen atoms within a water molecule?

Answer: Covalent bond

Question: In beta decay, a neutron is converted into which of the following particles?

Answer: Proton, electron, and antineutrino

Question: Which of the following functional groups is present in all amino acids?

Answer: Both carboxyl and amine groups

Question: Which organelle is responsible for protein modification and packaging in a cell?

Answer: Golgi apparatus

Question: Which of the following statements about enzymes is true?

Answer: Enzymes are specific to substrates

Question: Which of the following compounds has the highest boiling point?

Answer: Water (H₂O)

Question: Which functional group is characterized by a carbon atom double-bonded to an oxygen atom?

Answer: Carbonyl group

Question: What is the main role of the enzyme DNA polymerase?

Answer: Adding nucleotides to a growing DNA strand

Question: Which of the following is a property of nonmetals?

Answer: Poor electrical conductivity

Question: What is the molecular geometry of methane (CH₄)?

Answer: Tetrahedral

Question: Which substance is most likely to have hydrogen bonding as the strongest intermolecular force?

Answer: NH₃

Question: Which reagent is commonly used to test for the presence of reducing sugars?

Answer: Benedict's solution

Question: What is the main purpose of buffers in biological systems?

Answer: To maintain a stable pH

Question: In the electromagnetic spectrum, which type of radiation has wavelengths just shorter than visible light?

Answer: Ultraviolet radiation

Question: What happens to the rate of an enzyme-catalyzed reaction if the temperature is increased slightly?

Answer: The rate increases

Question: Which of the following describes an exothermic reaction?

Answer: Energy is released

Question: Which of the following processes is primarily responsible for the synthesis of ATP in the mitochondria?

Answer: Oxidative phosphorylation

Question: In which form is most of the carbon dioxide transported in the blood?

Answer: Bicarbonate ion

Question: Which functional group is present in all fatty acids?

Answer: Carboxyl group

Question: What is the hybridization of the central carbon in ethylene (C₂H₄)?

Answer: sp²

Question: Which element has the highest first ionization energy?

Answer: Neon

Question: Which vitamin is essential for the synthesis of coenzyme A?

Answer: Vitamin B5

Question: Which molecule has a bent molecular geometry?

Answer: H₂O

Question: Which theory explains the behavior of ideal gases?

Answer: Kinetic molecular theory

Question: What is the oxidation state of phosphorus in phosphoric acid (H₃PO₄)?

Answer: +5

Question: Which of the following elements is a halogen?

Answer: Fluorine

Question: Which of the following best describes the primary function of the smooth endoplasmic reticulum?

Answer: Detoxification and lipid synthesis

Question: The weakest intermolecular forces are known as:

Answer: London dispersion forces

Question: In terms of acid dissociation constant (K_a), what does a higher K_a value indicate?

Answer: A stronger acid

Question: Which of the following best describes an enzyme's active site?

Answer: The site where substrates bind

Question: Which molecule acts as the final electron acceptor in the electron transport chain of cellular respiration?

Answer: Oxygen

Question: Which of the following elements is an alkaline earth metal?

Answer: Magnesium

Question: Which type of cell junction allows for direct communication between adjoining animal cells?

Answer: Gap junctions

Question: What term is used to describe the minimum energy required to start a chemical reaction?

Answer: Activation energy

Question: What is the boiling point of water at standard atmospheric pressure?

Answer: 100°C

Question: Which linear relationship is described by Charles's Law?

Answer: Volume and temperature at constant pressure

Question: Which element is essential for the formation of thyroid hormones?

Answer: Iodine

Question: What is the major product when 2-butene undergoes catalytic hydrogenation?

Answer: Butane

Question: Which type of radiation is most penetrating?

Answer: Gamma rays

Question: Which organelle is primarily involved in the modification and packaging of proteins for secretion?

Answer: Golgi apparatus

Question: What is the primary structure of nucleic acids?

Answer: The sequence of nucleotides

Question: Which law states that the total pressure of a mixture of gases is equal to the sum of the partial pressures of individual gases?

Answer: Dalton's Law

Question: In a redox reaction, what happens to the substance that gets oxidized?

Answer: It loses electrons

Question: Which of the following is a carbohydrate polymer?

Answer: Cellulose

Question: Which of the following measures the acidity or basicity of a solution?

Answer: pH

Question: Which type of bond is characterized by the sharing of four electrons between two atoms?

Answer: Double bond

Question: Which equation represents the relationship between pressure and volume in an ideal gas at constant temperature?

Answer: $PV = k$

Question: What type of macromolecule is an enzyme?

Answer: Protein

Question: Which one of the following amino acids is nonpolar?

Answer: Leucine

Question: What is the common name for the process of breaking down glucose to form pyruvate?

Answer: Glycolysis

Question: Which of the following factors affects the rate of a chemical reaction?

Answer: All of the above

Question: Which of the following describes an amphipathic molecule?

Answer: A molecule with both hydrophilic and hydrophobic regions

Question: What is the primary structure of RNA?

Answer: Single strand

Question: Which gas law states that the volume of a gas is proportional to its temperature at constant pressure?

Answer: Charles's Law

Question: What is the oxidation state of chromium in the compound potassium dichromate ($K_2Cr_2O_7$)?

Answer: +6

Question: What type of biomolecule is ATP, and what is its primary function?

Answer: Nucleotide; provides energy

Question: Which of the following best describes the role of myosin in muscle contraction?

Answer: Binds to actin to produce contractile force

Question: Which type of intermolecular force is primarily responsible for the high boiling point of water?

Answer: Hydrogen bonding

Question: What is the role of hemoglobin in the body?

Answer: Transport of oxygen

Question: Which of the following describes the Bohr model of the atom?

Answer: Electrons orbit the nucleus in specific paths

Question: Which phase change is endothermic?

Answer: Sublimation

Question: What is the product of an acid reacting with a base in a neutralization reaction?

Answer: Salt and water

Question: Which of the following is the primary function of NAD^+ in cellular respiration?

Answer: To transport electrons to the electron transport chain

Question: Which of the following is not a characteristic of metals?

Answer: High ionization energy

Question: Which functional group is present in aldehydes?

Answer: -CHO

Question: During photosynthesis, which molecule is the primary electron donor in the light reactions?

Answer: Water

Question: Which of the following best describes the primary structure of a nucleic acid?

Answer: The sequence of nucleotides

Question: What is the main function of chloroplasts in plant cells?

Answer: Photosynthesis

Question: What does Avogadro's number represent?

Answer: The number of atoms per mole

Question: Which of the following is the most electronegative element?

Answer: Fluorine

Question: What is the function of the rough endoplasmic reticulum in a cell?

Answer: Protein synthesis

Question: Which of the following compounds is most likely to be soluble in water?

Answer: C₆H₁₂O₆

Question: What is the primary product of the Calvin cycle in photosynthesis?

Answer: Glucose

Question: Which bond angle is found in a molecule with tetrahedral geometry?

Answer: 109.5°

Question: What role do ribosomes play in a cell?

Answer: Protein synthesis

Question: Which of the following describes the result of an increase in entropy?

Answer: Less organized system

Question: Which macromolecule serves as the primary source of energy for cellular processes?

Answer: Carbohydrates

Question: What is the effect of a catalyst on a chemical reaction?

Answer: It lowers the activation energy

Question: What is the main function of the large intestine in the digestive system?

Answer: Absorption of water and electrolytes

Question: Which type of interaction is primarily responsible for the tertiary structure of proteins?

Answer: Hydrophobic interactions

Question: Which of the following ions is most likely to form a precipitate with chloride ions (Cl⁻)?

Answer: Ag⁺

Question: Which component of the cell membrane is primarily responsible for its structural integrity?

Answer: Phospholipids

Question: What is the process by which RNA is synthesized from a DNA template?

Answer: Transcription

Question: Which of the following states that energy cannot be created or destroyed, only transformed?

Answer: First Law of Thermodynamics

Question: Which type of nuclear radiation consists of 2 protons and 2 neutrons?

Answer: Alpha radiation

Question: Which type of bond involves the sharing of electron pairs between atoms?

Answer: Covalent bond

Question: What is the molecular formula of benzene?

Answer: C₆H₆

Question: Which of the following best describes a beta-sheet in protein structure?

Answer: Secondary structure

Question: Which element is the primary component of organic molecules?

Answer: Carbon

Question: What is another name for vitamin C?

Answer: Ascorbic acid

Question: In the context of acids and bases, which definition describes an acid as a proton donor?

Answer: Brønsted-Lowry

Question: What is the term for the measure of the disorder or randomness in a system?

Answer: Entropy

Question: Which type of muscle tissue is under voluntary control?

Answer: Skeletal muscle

Question: What is the end product of the urea cycle?

Answer: Urea

Question: Which component of the nervous system is responsible for the fight-or-flight response?

Answer: Sympathetic nervous system

Question: Which molecule is primarily responsible for carrying oxygen in the blood?

Answer: Hemoglobin

Question: What is the common name for the sugar with the formula $C_6H_{12}O_6$?

Answer: Glucose

Question: What process describes the movement of water across a semi-permeable membrane?

Answer: Osmosis

Question: Which of the following is a characteristic of a strong acid?

Answer: Complete ionization in water

Question: In protein synthesis, which molecule serves as the template for the sequence of amino acids?

Answer: mRNA

Question: Which type of bond is formed between two cysteine amino acids in a protein?

Answer: Disulfide bond

Question: What is the function of the enzyme carbonic anhydrase?

Answer: Converts carbon dioxide to bicarbonate

Question: Which of the following is not a characteristic of enzymes?

Answer: They are consumed in the reaction

Question: In the periodic table, elements in the same group typically have:

Answer: Similar chemical properties

Question: What is the main function of the ribosome?

Answer: Protein synthesis

Question: Which of the following best describes a nucleophile?

Answer: A molecule that donates an electron pair

Question: What type of bond is formed when atoms share three pairs of electrons?

Answer: Triple bond

Question: Which of the following is the primary function of DNA helicase?

Answer: Unwinds the DNA double helix

Question: In glycolysis, glucose is converted into what molecule?

Answer: Pyruvate

Question: Which type of intermolecular force occurs between nonpolar molecules?

Answer: London dispersion forces

Question: Which organelle is responsible for the production of ribosomes?

Answer: Nucleolus

Question: What is the name of the bond formed between the phosphate group of one nucleotide and the hydroxyl group of another in DNA?

Answer: Phosphodiester bond

Question: Which enzyme is responsible for linking fragments of DNA on the lagging strand during DNA replication?

Answer: DNA ligase

Question: Which of the following molecules is a ketone body?

Answer: Acetone

Question: Which phase of mitosis is characterized by the alignment of chromosomes along the metaphase plate?

Answer: Metaphase