

NUMS 2024 QUESTION PAPER WITH KEYS

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According to Students Responses, NUMS 2024 was little bit Tough +
Pattern Change + Out of Syllabus MCQs.

This Question Paper is not Official - MCQs arranged
with the help of NUMS Students who appeared in the Test

NOTE: It is first Copy - Not Final - errors are Expected

BIOLOGY

Q.1: COVID-19 epidemic can be controlled by using hand sanitizer and cleaning liquids because COVID-19 has:

Options:

- A. pH sensitivity
- B. Heat sensitivity
- C. Hypotonicity

Answer key: A

Explanation: COVID-19, like many viruses, is sensitive to changes in pH levels. Hand sanitizers and cleaning agents often contain substances that alter the pH, thereby inactivating the virus and preventing its spread.

Q.2: What is the major component of blood plasma?

Options:

- A. Electrolytes and ions
- B. Electrolytes and large proteins
- C. RBCs and large proteins

Answer key: B

Explanation: Blood plasma is mainly composed of water, electrolytes, and large proteins such as albumin, which play critical roles in maintaining osmotic pressure and transporting substances throughout the body.

Q.3: Organisms having double-stranded DNA genome?

Options:

- A. Influenza
- B. Rubella
- C. HIV
- D. Smallpox

Answer key: D

Explanation: Smallpox virus, caused by the Variola virus, is known to have a double-stranded DNA genome. This differentiates it from many other viruses, like HIV, which have RNA genomes.

Q.4: Sucrose is less reactive due to which property?

Options:

- A. 1,2 glycosidic bond
- B. Unavailability of functional group
- C. Soluble in water

Answer key: A

Explanation: Sucrose is less reactive due to the presence of a 1,2 glycosidic bond, which links glucose and fructose units in a way that prevents the free aldehyde or ketone group from reacting, making it a non-reducing sugar.

Q.5: Sucrose is used as a transport sugar in plants instead of glucose due to:

Options:

- A. It is non-reducing
- B. It does not change the osmotic pressure of water
- C. It is highly soluble in water
- D. No availability of functional group

Answer key: A

Explanation: Sucrose is used for transport in plants because it is a non-reducing sugar, which makes it more stable and less likely to participate in unwanted chemical reactions during transport.

Q.6: Which part of the brain is actively used by a mathematician trying to formulate a new equation?

Options:

- A. Hippocampus
- B. Cerebrum
- C. Amygdala
- D. Pons

Answer key: B

Explanation: The cerebrum is responsible for higher cognitive functions such as problem-solving, reasoning, and mathematical calculations. It is the primary area of the brain used when formulating new equations or complex thought processes.

Q.7: What is relevant to nucleoproteins?

Options:

- A. RNA
- B. Lipids
- C. Carbohydrates
- D. None of the above

Answer key: A

Explanation: Nucleoproteins are complexes of proteins with nucleic acids, primarily RNA or DNA. They play critical roles in processes such as replication, transcription, and packaging of genetic material.

Q.8: Rebonding is a process of hair straightening. Which bond of proteins is broken during this process?

Options:

- A. Peptide bond
- B. Disulfide bridge
- C. Hydrogen bond

Answer key: C

Explanation: Hair rebonding primarily targets hydrogen bonds within the keratin proteins of hair. These bonds are relatively weak and can be broken and reformed to achieve the desired straightening effect.

Q.9: What is the function of the tertiary structure of proteins?

Answer key: Options not Known

Q.10: In plants, the enzyme catalase protects plants by:

Options:

- A. Dehydration
- B. Protein loss
- C. Protecting from alcohol toxicity

Answer key: C

Explanation: Catalase is an enzyme that helps in breaking down hydrogen peroxide, a byproduct of metabolism, into water and oxygen. This activity is crucial for protecting plant cells from oxidative damage and the toxic effects of alcohols produced during metabolic processes.

Q.11: The pathway of pepsinogen secreted by zymogen cells is:

Options:

- A. SER → Mitochondria → Golgi Complex → Secretory Vesicles
- B. SER → RER → Golgi Complex → Secretory Vesicles
- C. Golgi Complex → SER → Secretory Vesicles
- D. RER → SER → Golgi Complex → Secretory Vesicles

Answer key: D

Explanation: Pepsinogen is synthesized in the rough endoplasmic reticulum (RER), then transported to the smooth endoplasmic reticulum (SER), where it is packaged and sent to the Golgi complex. Finally, it is transported in secretory vesicles to be released into the stomach, where it is converted to active pepsin.

Q.12: A mason's son is unable to inherit strong skeletal muscles that are present in his father's arms. This is due to:

Options:

- A. Not inheriting acquired characteristics
- B. Use and disuse of organ
- C. Overproduction
- D. Survival of the fittest

Answer key: A

Explanation: The principle of inheritance states that acquired characteristics, such as muscle strength developed from labor, are not passed down genetically to offspring. Genetic inheritance only involves traits encoded in the DNA.

Q.13: If the mother is a hemophilic carrier and the father is affected, what will be the probability of hemophilia in sons?

Options:

- A. 50%
- B. 25%
- C. 75%
- D. 100%

Answer key: B

Explanation: In a cross between a hemophilic carrier mother (XHXh) and an affected father (XhY), there is a 50% chance for sons to inherit the Xh allele from either parent. However, the probability of inheriting the disease, considering all offspring, is 25%, as only one combination results in a son with hemophilia.

Q.14: What will be the probability of terminal purple flowers when a true-breeding terminal purple flower is crossbred with an axial white flower?

Options:

- A. 9/16
- B. 3/16
- C. 1/2
- D. 1/16

Answer key: B

Explanation: The probability of a particular phenotype in the offspring of a genetic cross can be calculated using Mendelian genetics principles. Given that purple is dominant and true-breeding, and axial is recessive, the likelihood of observing terminal purple flowers in the F2 generation is 3/16.

Q.15: A person who has removed their gallbladder faces difficulty in fat metabolism due to:

Options:

- A. Absence of bile
- B. Absence of bile pigments

Answer key: A

Explanation: The gallbladder stores bile, which is essential for the emulsification and digestion of fats. After gallbladder removal, bile is still produced by the liver but is not stored in concentrated amounts, leading to difficulties in fat metabolism.

Q.16: Where does reduction division occur?

Options:

- A. Primary oocyte
- B. Primary spermatocyte
- C. Secondary oocyte
- D. Oogonium

Answer key: C

Explanation: Reduction division, or meiosis, occurs in the secondary oocyte during oogenesis. This process reduces the chromosome number by half, preparing the cell for fertilization. The secondary oocyte is the stage at which the first meiotic division is completed.

Q.17: In mathematicians, which part of the brain is highly developed?

Options:

- A. Amygdala
- B. Cerebrum
- C. Hypothalamus
- D. Pons

Answer key: B

Explanation: The cerebrum is responsible for higher cognitive functions, including logic, reasoning, problem-solving, and mathematical thinking. In mathematicians, the cerebrum is highly developed, particularly the regions involved in analytical and abstract thinking.

Q.18: Which enzyme does not require a regulatory molecule?

Options:

- A. Erypsin
- B. Pepsinogen

Answer key: B

Explanation: Pepsinogen is an inactive zymogen that is converted into the active enzyme pepsin in the acidic environment of the stomach. This conversion is an automatic process that does not require a regulatory molecule. In contrast, other enzymes may require specific molecules to either activate or inhibit their function.

Q.18: Which of the following about veins is correct?

Options	Values	Wall	Diameter
A.	absent	Thicker	7–9 μm
B.	absent	Thinner	40–50 μm
C.	Present	Thicker	40–50 μm
D.	Present	Thinner	40–50 μm

Answer key: D

Q.19: During complex activity of flight, birds require the coordination of many skeletal muscles. Which part of their brain has to be well developed?

Options:

- A. Amygdala
- B. Cerebrum
- C. Cerebellum
- D. Thalamus

Answer key: C

Explanation: The cerebellum is responsible for coordinating voluntary movements and maintaining balance and posture. In birds, which require precise control of their flight muscles, the cerebellum is highly developed to ensure smooth and coordinated movements during flight.

Q.20: Which is the characteristic of an electrical synapse?

Options:

- A. Involves neurotransmitters
- B. Does not involve neurotransmitters
- C. Involves synaptic cleft
- D. Uses chemical signals

Answer key: B

Explanation: Electrical synapses allow direct passage of ions and other small molecules between adjacent cells through gap junctions. This direct communication does not involve neurotransmitters, which are characteristic of chemical synapses. As a result, electrical synapses enable faster transmission of signals.

Q.21: What is the fate of neurotransmitters after the transmission of a nerve impulse?

Options:

- A. Remain in the synaptic cleft
- B. Degraded by enzymes
- C. Reabsorbed by the presynaptic neuron
- D. Diffuse away from the synapse

Answer key: B

Explanation: After a nerve impulse is transmitted, neurotransmitters are typically degraded by enzymes in the synaptic cleft. This breakdown prevents continuous stimulation of the postsynaptic neuron and allows the synapse to reset for the next impulse.

Q.22: During glycolysis, what isomers are formed?

Options:

- A. Glucose and Fructose
- B. Dihydroxyacetone phosphate and Glyceraldehyde-3-phosphate
- C. Pyruvate and Lactate
- D. Glucose and Galactose

Answer key: B

Explanation: During glycolysis, the molecule fructose-1,6-bisphosphate is split into two 3-carbon isomers: dihydroxyacetone phosphate (DHAP) and glyceraldehyde-3-phosphate (G3P). These isomers play a crucial role in the continuation of the glycolytic pathway.

Q.23: A lizard detaches its tail when attacked by a predator. This is an example of?

Options:

- A. Autophagy
- B. Autolysis
- C. Phagocytosis
- D. Intracellular digestion

Answer key: B

Explanation: The detachment of a lizard's tail is an example of autolysis, where cells in the tail self-destruct to allow the tail to break off easily, a survival mechanism known as autotomy. This process involves the breakdown of cells by their own enzymes.

Q.24: A plant growing in saline soil faces the problem of dehydration due to?

Options:

- A. Ψ_w of soil $>$ Ψ_w of root
- B. Ψ_s of soil $<$ Ψ_s of root
- C. Ψ_w of root $>$ Ψ_w of soil
- D. Ψ_w of root $=$ Ψ_w of soil

Answer key: B

Explanation: In saline soils, the solute potential (Ψ_s) of the soil is lower than that of

the root, which causes water to move out of the plant roots, leading to dehydration. This condition is a major challenge for plants growing in high-salt environments.

Q.25: What is not a function of the plasma membrane?

Options:

- A. Recognition of self-surface markers
- B. Maintaining cell membrane flexibility
- C. Controlling metabolic reactions across cell membranes
- D. Binding ligands for intracellular response

Answer key: C

Explanation: While the plasma membrane is involved in many crucial functions like recognition of surface markers, maintaining flexibility, and binding ligands, it does not directly control metabolic reactions across cell membranes; this function is typically associated with intracellular organelles.

Q.26: During the conduction of a nerve impulse, hyperpolarization would not occur if:

Options:

- A. Sodium gates didn't close in time
- B. Potassium gates were not so leaky
- C. Sodium-potassium pump stopped working
- D. Calcium gates open instantly

Answer key: B

Explanation: Hyperpolarization occurs when potassium ions continue to leave the neuron after the action potential, making the inside of the cell more negative than usual. If the potassium gates were not so leaky, this excessive outflow would not occur, and hyperpolarization would be prevented.

Q.27: Which option given below characterizes the refractory period?

Options:

- A. Reversal of charges across the neural membrane
- B. Change in the type of ions across the membrane
- C. Next impulse can be conducted
- D. Membrane potential +50mV

Answer key: B

Explanation: The refractory period is characterized by a change in the distribution of ions across the neural membrane, which temporarily prevents another action potential from occurring. This ensures that nerve impulses travel in one direction.

Q.28: A desert mammal faces severe dehydration on a hot sunny day. Which internal condition would lead to the secretion of ADH?

Options:

- A. High osmotic pressure of blood
- B. High blood pressure

- C. Low osmotic pressure of blood
- D. Low solute potential of blood

Answer key: A

Explanation: High osmotic pressure of the blood, caused by dehydration, triggers the release of antidiuretic hormone (ADH). ADH helps the body conserve water by reducing urine output and increasing water reabsorption in the kidneys.

Q.29: Which disorder would be diagnosed by a doctor on seeing a patient with thick and dry skin, puffy eyes, and low metabolic rate?

Options:

- A. Cretinism
- B. Cushing disease
- C. Myxedema
- D. Addison's disease

Answer key: C

Explanation: Myxedema is a severe form of hypothyroidism that presents with symptoms such as thick, dry skin, puffy eyes, and a low metabolic rate. It requires prompt medical treatment to manage.

Q.30: Choose the one related to hypoparathyroidism:

Options:

- A. Kidney stones
- B. Hypercalcemia
- C. Weakness of muscles
- D. Tetany

Answer key: D

Explanation: Hypoparathyroidism leads to low levels of calcium in the blood, which can result in tetany, a condition characterized by muscle cramps, spasms, and involuntary contractions.

Q.31: Choose the mismatched pair:

Options:

- A. Graffian follicle - progesterone
- B. ICSH - interstitial cell
- C. Estrogen - inhibits FSH
- D. LH - ovulation

Answer key: A

Explanation: The Graffian follicle primarily produces estrogen, not progesterone. Progesterone is produced by the corpus luteum after ovulation. Hence, this is the mismatched pair.

Q.32: Which of the following would not be compromised in the absence of the lymphatic system?

Options:

- A. Blood pressure
- B. Oxygen-carrying capacity of blood
- C. Blood composition
- D. Defense mechanism

Answer key: C

Explanation: While the lymphatic system plays a crucial role in immune defense and fluid balance, it does not directly affect the oxygen-carrying capacity of blood or alter its basic composition. These are functions primarily managed by the circulatory system.

Q.33: The presence of which molecules distinguishes blood from interstitial fluid?

Options:

- A. Large proteins and electrolytes
- B. Glucose and RBCs
- C. Antibodies and electrolytes
- D. RBCs and large proteins

Answer key: C

Explanation: Blood contains large proteins, such as antibodies, and electrolytes, which are not present in interstitial fluid. These proteins play vital roles in immune responses and maintaining fluid balance.

Q.34: During the COVID-19 epidemic, the plasma of recovered patients was injected into COVID patients. This proved quite effective. Which component of plasma do you think was responsible for this?

Options:

- A. Plasminogen
- B. Interferons
- C. Antibodies
- D. Interleukin-I

Answer key: C

Explanation: Antibodies in the plasma of recovered patients can neutralize the virus, providing passive immunity to the recipient. This treatment, known as convalescent plasma therapy, was used to help COVID-19 patients fight the infection.

Q.35: Choose the one which is an example of artificial active immunity:

Options:

- A. Fetus receiving antibodies of mother through placenta
- B. Infant receiving antibodies
- C. Baby receiving MMR shots
- D. Prevention of a disease due to previous infection

Answer key: C

Explanation: Artificial active immunity occurs when a person is vaccinated with an antigen, such as in the MMR (measles, mumps, rubella) shots. This stimulates the

immune system to produce antibodies and memory cells, providing long-term protection.

Q.36: Which of the following types of T cells are required for the activation of B cells?

Options:

- A. Helper T cells
- B. Cytotoxic T cells
- C. Suppressor T cells
- D. Memory T cells

Answer key: A

Explanation: Helper T cells are essential for activating B cells, which then differentiate into plasma cells to produce antibodies. They play a critical role in both humoral and cell-mediated immune responses.

Q.37: What is the fate of a neurotransmitter after the transmission of a nerve impulse across a synapse?

Options:

- A. It is taken into the postsynaptic neuron
- B. Remains bound to the postsynaptic membrane
- C. Remains stray in the synaptic cleft
- D. Broken down by enzymes

Answer key: D

Explanation: After the transmission of a nerve impulse, neurotransmitters are often broken down by specific enzymes in the synaptic cleft. This prevents continuous stimulation of the postsynaptic neuron and allows the synapse to reset.

Q.38: Which immediate change is brought about in the postsynaptic membrane on binding with excitatory neurotransmitter?

Options:

- A. Calcium gates open
- B. Sodium gates open
- C. Sodium gates close
- D. Sodium-potassium pump ceases to work

Answer key: B

Explanation: When an excitatory neurotransmitter binds to receptors on the postsynaptic membrane, it typically causes sodium gates to open. The influx of sodium ions depolarizes the membrane, bringing it closer to the threshold for generating an action potential.

Q.39: Somatic effects cause:

Options:

- A. Skin burn
- B. Eye rash

- C. Genetic mutation
- D. Chromosomal deformity

Answer key: A

Explanation: Somatic effects refer to damage caused to body tissues due to exposure to harmful agents, such as radiation. These effects can lead to symptoms like skin burns, which are localized to the exposed area.

Q.40: Probiotics in milk for children do all except:

Options:

- A. Kill pathogens
- B. Enhance immunity
- C. Restrict growth of bacteria
- D. Produce vitamins

Answer key: D

Explanation: Probiotics primarily function by killing pathogens, enhancing immunity, and restricting the growth of harmful bacteria. They do not typically produce vitamins, which is why this option is the exception.

Q.41: What is the innermost layer surrounding a muscle fiber? (NUMS 2024)

Options:

- A. Epimysium
- B. Perimysium
- C. Endomysium
- D. Fascia

Answer key: C

Explanation: The endomysium is the innermost layer of connective tissue that surrounds each individual muscle fiber within a muscle. It plays a crucial role in providing structural support and facilitating the exchange of nutrients and waste products between the muscle fibers and the bloodstream.

Q.42: You are familiar with hamstring injury in players. What is correct about hamstring muscles?

Options:

- A. It is an extensor muscle
- B. Its insertion is present on tibia
- C. It is present between ilium and pubis

Answer key: A

Explanation: The hamstring muscles are primarily involved in extending the hip and flexing the knee. They are located at the back of the thigh and play a crucial role in various activities such as running, jumping, and walking.