Grade 10 Biology Kerala 2024

Time: 11/2 Hours **Total Score: 40**

Instruction:

- The first 15 minutes is cool-off time.
- You may use the time to read the questions and plan your answers.
- Answer only based on instructions and questions given.
- Consider score and time while answering.

Answer any 5 questions from Q. No. 1 to 6. Each carries 1 score.

Q1. Identify the pigment present in the given photoreceptor cell.

Solution:

Rhodopsin or Iodopsin

Q2. Which among the following is not a component of a nucleotide?

(a) Phosphate (b) Sugar

(c) Protein (d) Nitrogen

Solution:

(c) Protein

Q3. Find out the correct one from the given pairs.

Monocyte	:	Stimulates other white blood cells.
Lymphocyte	:	Engulfs and destroys germs.
Neutrophil	:	Identifies and destroys germs specifically.
Eosinophil	:	Synthesizes chemicals required for the inflammatory responses.

Solution:

Eosinophil: Synthesizes chemicals required for inflammatory responses

Q4. Identify the word pair relation and fill in the blanks.

Fruit formation	:	Auxin
Ripening of fruits	:	_____

Solution:

Ethylene

Q5. The technology used to identify the location of a gene in the DNA responsible for a particular trait is:

(a) Gene therapy (b) Gene mapping

(c) DNA profiling (d) DNA fingerprinting

Solution:

(b)Gene mapping

Q6. Correct the mistakes in the underlined part of the given statements.

(a) The Panspermia argues that life originated on another planet and accidentally reached the Earth.

(b)Hugo de Vries is the scientist who put forward the scientific theory on evolution called the Natural Selection theory.

(c) Organs that are similar in structure and perform different functions are called homologous organs.

Solution:

(a) The **Panspermia hypothesis** argues that life originated on another planet and accidentally reached the Earth.

(b) **Charles Darwin** is the scientist who put forward the scientific theory on evolution called the Natural Selection theory**.**

Answer any 6 from the questions 7-13. Each carries 2 scores.

Q7. Analyze the symptoms of a disease given and answer the questions.

Loss of memory, inability to recognize friends and relatives.

(a) Identify the disease.

(b) Write the cause of the disease.

Solution:

(a) Alzheimer's.

(b) Accumulation of an insoluble protein in the neural tissues of the brain. Neurons get destroyed.

Q8. Analyze the given table related to the activities of hormones and complete it

A(Causes)	B(Gland)	C(Disease)
_____(i)_____	_____(ii)_____	Cretinism
Reabsorption of water in the kidney decreases	_____(iii)_____	_____(iv)_____

Solution:

(i) Hypothyroidism refers to a decrease in the amount of thyroxine during the foetal stage or infancy.

(ii) Thyroid

(iii) Hypothalamus

(iv) Diabetes insipidus

Q9. Analyze the illustration and answer the questions.

(a) Identify the process.

(b) What is the importance of this process?

Solution:

(a) Crossing over of Chromosomes.

(b) Responsible for creating genetic variation within individuals of a species.

Q10. Write appropriate reasons for the given statements.

(a) An ash-colored thick coating is formed in the throat of Diphtheria-affected person.

(b) Complete cure is not possible for Haemophilia.

Solution:

(a) The toxins produced by the bacteria (Corynebacterium diphtheriae) destroy the mucus membrane of the throat.

(b) It is a genetic disease.

Q11. Choose the activities of the Sympathetic system from the box.

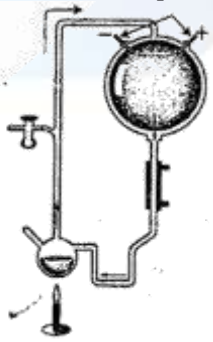
Production of saliva decreases, Urinary bladder contracts, Gastric activities become Normal, Production of saliva increases, Glycogen is converted to glucose.

Solution:

The activities of the Sympathetic system from the box.

- Production of saliva decreases: This occurs as the body diverts energy away from non-essential functions like digestion.
- Glycogen is converted to glucose: This provides a quick source of energy for the body's heightened activity levels during stress.

Q12. Analyze the given illustration and answer the questions.



(a) Which theory of evolution is proved by this experiment?

(b) What are the main postulates put forward by this theory?

Solution:

(a) Theory of Chemical Evolution/Oparin-Haldane hypothesis.

(b) Life originated by the change that occurred in the chemical substances in water, under specific conditions of the primitive earth.

Q13. How does smoking harmfully affect the following organ systems?

(a)Respiratory system

(b)Circulatory system

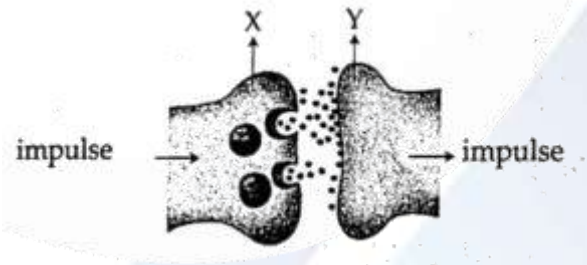
Solution:

(a) Lung cancer, Bronchitis, Emphysema.

(b) Hypertension, arteries lose elasticity, and decrease in functional efficiency.

Answer any 5 from questions 14 – 20. Each carries 3 scores.

Q14. Observe the illustration of impulse transmission through synapse and answer the following questions.



(a) Which part is denoted as 'X'?

(b) Which chemical is secreted from 'X'?

(c) Why does impulse travel only from X to Y?

Solution:

(a) X: synaptic knob

(b) Neurotransmitter (Acetylcholine/dopamine/GABA)

(c) Synaptic knob (X) secret neurotransmitters which is receives an impulse from adjacent neurons by Dendrite (Y).

Q15. Analyze the given stages in the process of detecting smell and write in sequential order.

1. Experiences smell.
2. Aromatic particles enter the nostrils.
3. Generate impulses.
4. Stimulate the Olfactory receptors.
5. These aromatic particles dissolve in the mucus.
6. Impulses reach the brain.

Solution:

The correct sequential order for the process of detecting smell is:

1. Aromatic particles enter the nostrils - The process begins when aromatic molecules in the air enter the nasal cavity through the nostrils.

2. These aromatic particles dissolve in the mucus - The aromatic molecules dissolve in the mucus lining the olfactory epithelium.

3. Stimulate the Olfactory receptors - The dissolved molecules bind to and stimulate the olfactory receptors located in the olfactory epithelium.

4. Generate impulses - The stimulation of the olfactory receptors generates electrical impulses (action potentials).

5. Impulses reach the brain - The impulses are transmitted via the olfactory nerve to the olfactory bulb and then to the brain for processing.

6. Experiences smell - The brain interprets the signals, allowing the individual to perceive and recognize the smell.

Q16. Analyze the given table and arrange columns B and C according to column A.

A-Disease	B - Symptoms	C - Transmission
Tuberculosis	Dark yellow colour to the mucus membrane, white portion of the eyes and the nails.	Spread by Culex mosquitoes.

Hepatitis	High fever with shivering and profuse sweating, headache, vomiting, diarrhea and anemia.	When the patient speaks, coughs or sneezes, the pathogens spread into the air.
Malaria	Loss of body weight, fatigue and persistent cough.	Contaminated food and water, blood components and excreta of the patient.
	Appearance of reddish scaly rashes that cause itching.	Spread by female Anopheles mosquito.

Q17. Analyze the given statement and answer the questions.

"The basis of blood grouping is the presence of antigen A and antigen B in red blood cells."

According to this, how many blood groups are there in humans?

Write the antigen and antibody of each group.

Solution:

Based on the statement, the ABO blood group system in humans is determined by the presence or absence of antigen A and antigen B on the surface of red blood cells. There are 4 main blood groups in humans:

Blood Group	Antigen	Antibodies
A	A	B
B	B	A
AB	A and B	Nil
O	Nil	A and B

Q18. Some of the features of nucleic acids and their constituents are given below.

Ribose sugar, Uracil, Deoxyribose sugar, Double helical model, Single strand, Thymine.

DNA	RNA
• • •	• • •

Solution:

DNA	RNA
• Deoxyribose Sugar • Double helical model • Thymine	• Ribose Sugar • Single stand • Uracil

Q19. Observe the illustration of bacteria and answer the questions.

(a) Which part is denoted as 'X'?

(b) What is the significance of 'X' in the process of genetic engineering?

Solution:

(a) X: Plasmid/Circular DNA of bacteria

(b) Plasmid acts as vectors to transfer genes from one cell to another. Vectors that contain recombined genes enter target cells and the new genes become a part of the genetic constitution of target cells.

Q20. Write any three pieces of evidence from biochemistry and physiology to prove bacteria and humans evolved from a common ancestor.

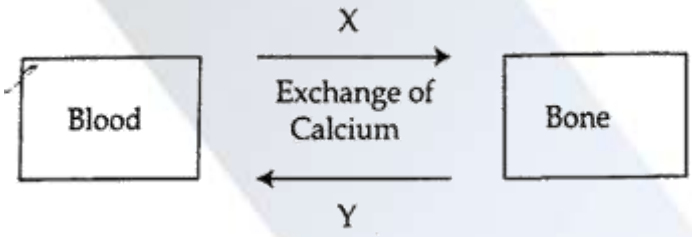
Solution:

- Enzymes control chemical reactions.
- Energy is stored in ATP molecules.
- Genes determine the hereditary traits.

- Carbohydrates, proteins, and fats are the basic substances.

Answer any 2 questions from 21 – 23. Each carries 4 scores.

Q21. The function of regulating the level of calcium in the blood is illustrated. Analyze it and answer the following questions.



(a) Which gland produces the hormone indicated as 'X'?

(b) Which hormone is indicated by 'Y'?

(c) Write down the other functions of these hormones.

Solution:

(a) Thyroid Gland

(b) Parathormone

(c) Calcitonin – Lowering the calcium levels in your blood.

Q22. Explain how the following strategies of defense help in immune function.

(a) Phagocytosis (b) Fever

(c) Healing of Wounds (d) Blood Clotting

Solution:

(a) Engulfing and destroying germs.

(b) An increase in body temperature reduces the multiplication of pathogens and increases the effect of phagocytosis.

(c) Reduces the chance of infection by the healing wounds reduction.

(d) Helps to prevent bleeding and checks the entry of pathogens through wounds.

Q23. Redraw the diagram, and identify and label the parts with their names.

Redraw the diagram.

(a) The part that carries impulses out of the cell body.

(b) The part that receives messages from the adjacent neuron.

(c) The part that carries impulses to the cell body.

Solution: