Grade 10 Biology Kerala 2019

Time : **$1^{1/2}$ Hours** Total Score : **40**

Instructions:

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

Answer any five questions from Q. No. 1 to 6. Each carries one score. 5x1=5

Q1. Identify the word pair relation and fill the blanks.

(a) Monkeys **:** Cercopithecoidea **::** Chimpanzee **:** _____

(b) A. I. Oparin **:** Theory of chemical evolution **::** Hugo de Vries **:** _____

Solution:

(a) Chimpanzee **: Hominoidea**

(b) Hugo de Vries **: Mutation theory**

Q2. Find out the parts that are not related to retina from the following.

Photoreceptor, Yellow spot, Conjunctiva, Blind spot, Iris

Solution:

The **conjunctiva** and **iris** are not related to the retina.

Q3. "Myelin sheath accelerates the speed of impulses through axon and provides nutrition to it."

(a) How does myelin sheath form?

Solution:

The myelin sheath is formed by specialized glial cells. In the central nervous system (CNS), oligodendrocytes wrap around the axons of neurons, while in the peripheral nervous system (PNS), Schwann cells perform this function. These cells

produce layers of myelin, a fatty substance, which insulates the axon and facilitates rapid transmission of nerve impulses through saltatory conduction.

Q4. Identify the relation in the Indicator (A) and complete (B) accordingly.

Indicator(A)	(B)
DNA	RNA
↓	↓
Deoxyribose Sugar	(i).....
↓	↓
ATGC	(ii).....

Solution:

(i) Ribose Sugar (ii) AUGC

Q5. Find out the fungal diseases from the following:

Malaria, Ringworm, Filariasis, Athlete's foot

Solution:

The fungal diseases are: **Ringworm** and **Athlete's foot**.

Q6. Complete the statement suitably:

"In _____(a)_____, the specialised part in pancreas two types of cells are found. Of these _____(b)_____ cells produce insulin."

Solution:

(a) Islets of Langerhans (b) Beta cells

Answer any six from Q. No. 7 to 13. Each carries two score. 6x2=12

Q7. Make suitable pairs of different white blood cells and the function they perform.

Monocyte Basophil Eosinophil Neutrophil	• Produces chemicals that can destroy bacteria • Engulfs and destroys germs • Stimulates other white blood cells • Produces chemical substance needed for inflammatory response

Solution:

Monocyte - Engulfs and destroys germs

Basophil - Produces chemical substance needed for inflammatory response

Eosinophil - Produces chemicals that can destroy bacteria

Neutrophil - Stimulates other white blood cells

Q8. Write the name of pathogens and symptoms of the given diseases:

	A. Malaria	B. Tuberculosis
Pathogens :	_____	_____
Symptoms :	_____	_____

Solution:

A: Malaria

Pathogens: Protozoan - *Plasmodium*

Symptoms:

- High fever with shivering
- Profuse sweating, severe headache
- Vomiting, diarrhoea, anaemia

B: Tuberculosis

Pathogens: Bacteria: *Mycobacterium tuberculosis*

Symptoms:

- Loss of body weight
- Fatigue and body ache
- Continuous dry cough

Q9. Complete the table by selecting suitable items from the box:

	A	**B**	**C**
Disease	Alzheimer's	Parkinson's	Epilepsy
Cause	(a)	(b)	(d)
Symptom	Loss of memory	(c)	Epilepsy frothy discharge

- Excess blood is lost even though minor, injuries.
- Loss of body balance
- Accumulation of insoluble proteins in the neutral tissues of brain
- Production of dopamine reduces
- Irregular flow of electric charges in brain.

Solution:

	A	B	C
Disease	**Alzheimer's**	**Parkinson's**	**Epilepsy**
Cause	Accumulation of insoluble proteins in the neutral tissues of brain	Production of dopamine reduces	Irregular flow of electric charges in brain
Symptom	Loss of memory	Loss of body balance	Epilepsy frothy discharge

Q10. Observe the illustration and answer the questions.

(a) Name the Scientists who devised the experimental setup shown above.

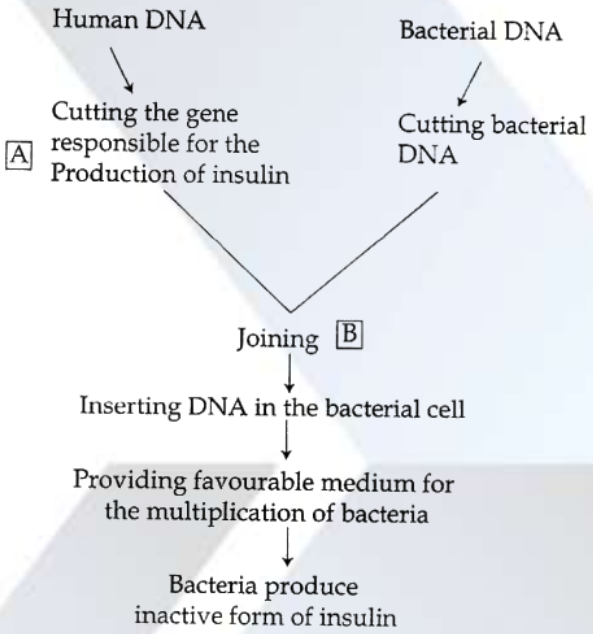
(b) Which theory of evolution is substantiated by this experiment?

Solution:

(a) Stanley L. Miller and Harold C. Urey in 1953 devised the experimental set up.

(b) Theory of chemical evolution is substantiated by this experiment. They simulated early Earth conditions, producing organic compounds like amino acids which supported the idea that life's building blocks could form under prebiotic conditions.

Q11. Observe the illustration and answer the questions.



(a) Name the enzymes used for the processes [A] and [B].

(b) Will the future generation of this bacteria have the ability to produce insulin? Why?

Solution:

(a) A: **Restriction endonuclease**, and B: **DNA Ligase**

(b) (b) Yes, because the insulin gene integrated into their DNA is passed on during replication, ensuring that all future generations retain this ability. However, if a mutation occurs, the gene may lose its ability to produce insulin.

Q12. List out the four major concepts to be included in a blood donation campaign.

Solution:

Key concepts for a blood donation campaign:

- Individuals aged 18 to 60 are eligible to donate blood.

- Blood donation is allowed once every three months.
- Donating blood does not negatively impact the donor's health.
- Pregnant women and breastfeeding mothers should avoid donating blood.

Q13. Mutation cause variations in organisms. It leads to evolution of species:

(a) What is mutation?

(b) Explain two other factors that cause variations in organisms.

Solution:

(a) A sudden heritable change in the genetic constitution of an organism leading to genetic variations is called **mutation**.

(b) Two factors causing variations:

- **Crossing over:** Exchange of genetic material during meiosis creates new allele combinations, leading to variation.
- **Gene flow:** Migration of individuals between populations introduces new alleles, increasing diversity.

Answer any five from Q. No. 14 to 20. Each carries 3 score. 5x3=15

Q14. Observe the illustration and answer the questions.

(a) Why do the forelimbs of these organisms show differences in external appearance?

(b) What inferences regarding evolution can be drawn from the anatomy of these organs?

(c) Write any two other scientific evidences which proves evolution.

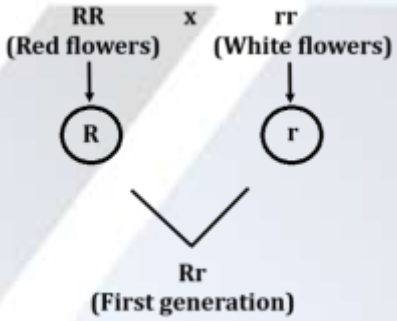
Solution:

(a) In animals, forelimbs consist of blood vessels, nerves, muscles, and bones. Variations in their external appearance serve as adaptations that help them thrive in their respective habitats.

(b) Homologous organs, like vertebrate forelimbs, have a similar structure but different functions, indicating divergent evolution. This suggests a common ancestor, with adaptations arising over time for different environments. Anatomical similarities provide strong evidence of evolutionary relationships, supporting the idea that organisms evolved from a shared ancestor through gradual modifications.

(c) Two other scientific evidences which proves evolution are physiology & biochemistry and molecular biology.

Q15. Observe the illustration.



(a) What does R, r denote in the illustration?

(b) Which character is expressed in first generation? Why?

Solution:

(a) In the above illustration, 'R', 'r' denote the different **alleles** of a gene that controls the character.

(b) The red flower is expressed in the first generation. In a hybridization experiment, the dominant allele (R) determines the trait, while the recessive allele (r) remains unexpressed. As a result, all first-generation offspring (Rr) exhibit the dominant red colour.

Q16. "Smoking harmfully affects internal organs."

This is a general statement.

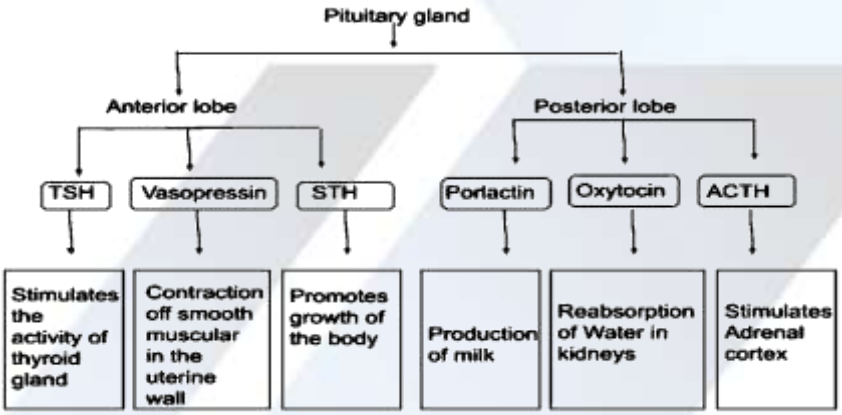
Explain how smoking affects brain, heart and lungs.

Solution:

Smoking has harmful effects on the brain, heart, and lungs:

- **Brain:** Smoking reduces blood flow, increasing the risk of stroke and impairing cognitive function.
- **Heart:** Increases blood pressure and heart rate, raising the risk of heart disease, heart attacks, and stroke.
- **Lungs:** Damages airways and tissue, leading to chronic bronchitis, emphysema, lung cancer, and reduced lung capacity.

Q17. There are certain mistakes in the given chart. Find out and correct it.

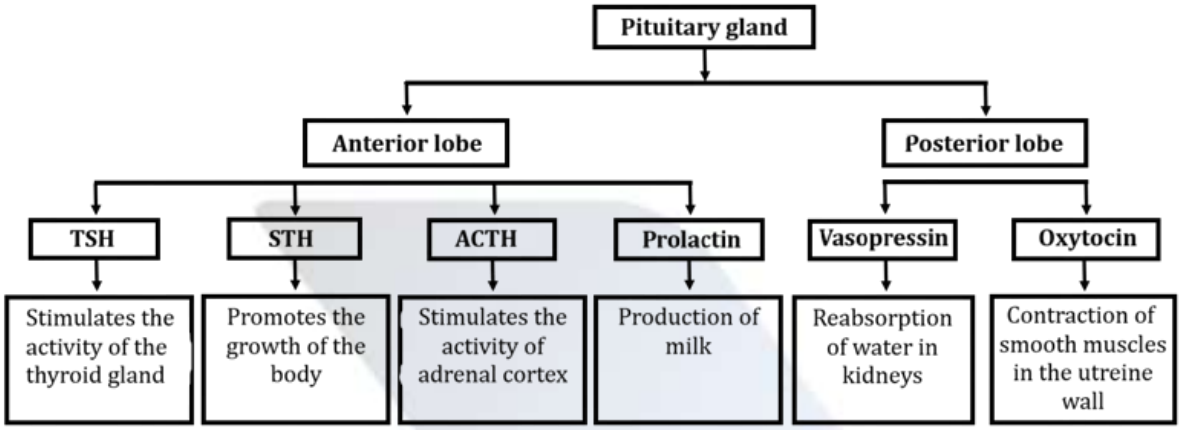


Solution:

The pituitary gland often called the master gland is divided into two lobes: anterior and posterior lobes.

(a) Anterior lobe secretes TSH (thyroid stimulating hormone), STH (somatotropin hormone), ACTH (Adrenocorticotropic hormone), and Prolactin hormones.

(b) Posterior lobe secretes Vasopressin, and oxytocin hormones.



Q18. Analyse the statement and answer the questions. "Antibiotics, the miraculous medicines of 20th century helped a lot to bring many diseases under control. But the use of antibiotics without consulting doctor is not advisable."

(a) Why antibiotics considered as miraculous medicines?

(b) Write two side effects of antibiotics.

Solution:

(a) Antibiotics are considered miraculous medicines because they are derived from microorganisms and effectively inhibit or destroy harmful microorganisms such as bacteria, fungi, and parasites. This has greatly helped in controlling infections and preventing the spread of diseases.

(b) Two side effects of antibiotics:

- Regular use can lead to antibiotic resistance in pathogens.
- They can destroy beneficial bacteria in the body, reducing levels of certain vitamins.

Q19. Correct mistakes if any in the underlined part of the given statements.

(a) Curvature of lens increases when viewing near objects.

(b) Vitreous humor is formed from blood, and is reabsorbed by blood.

(c) Membraneous labyrinth in the inner ear is filled with Perilymph.

(d) Eustachian tube amplifies and transmits the vibrations of tympanum to the internal ear.

Solution:

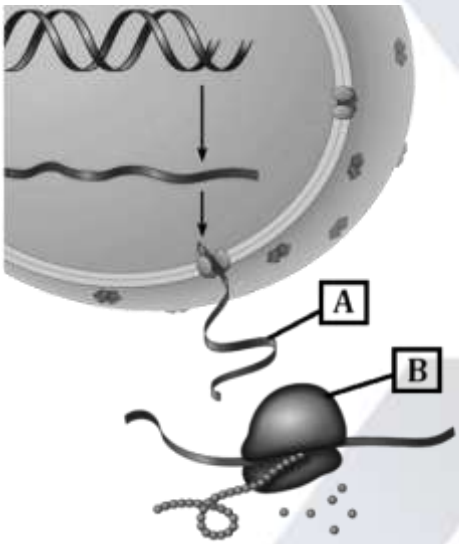
The corrected statements are:

(b) **Aqueous humor** is formed from blood and reabsorbed by blood.

(c) Membraneous labyrinth in the inner ear is filled with **endolymph**.

(d) **Ear ossicles** amplify and transmit the vibration of tympanum to the internal ear.

Q20. Observe the figure and answer the questions:



(a) Identify the parts A and B.

(b) What is the function of 'A'?

(c) Explain the process that takes place in 'B'.

Solution:

(a) A: **mRNA** and B: **Ribosome**

(b) **Function of mRNA:** mRNA carries information from DNA to ribosomes and controls protein synthesis.

(c) mRNA molecule that carries information from DNA to ribosomes.

mRNA reaches ribosomes. tRNA carry different kinds of amino acids to ribosomes. Based on the information in mRNA protein is synthesized in ribosomes adding amino acids.

Answer any two from Q. No. 21 to 23. Each carries 4 score. **2x4=8**

Q21. Analyse the given informations related to plant hormones and answer the questions.

(a) to increase the size of apple.

(b) to prevent dropping of premature fruits.

(c) to increase the production of latex.

(d) to enable flowering of pineapple plants at a time.

Ethyphon
Ethylene
Gibberellin
Auxin
2, 4-D

(i) Match hormones and their functions properly.

(ii) Write the name and function of any other two hormones occur naturally in plants.

Solution:

(i) The hormones and their functions are:

(a) to increase the size of apple - Gibberellins

(b) to prevent dropping of premature fruits. - Auxins

(c) to increase the production of latex. - Ethyphon

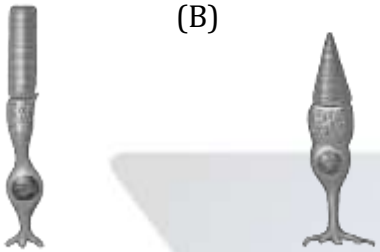
(d) to enable flowering of pineapple plants at a time. - Ethylene

(ii) Two hormones occurring naturally in plants are:

Hormone		**Functions**
Cytokinins	-	Promote cell division, cell growth and differentiation along with auxin.
Abscisic acid	-	Controls the seed dormancy and flowering, and also helps the plant sustain in adverse conditions.

Q22. Observe the illustration and answer the following questions.

(A) (B)



(a) Name the cells (A) and (B).

(b) Explain the role of these cells in making vision possible.

(c) How impulses are generated in these cells when light rays fall on it?

Solution:

(a) A. **Rod cells** and B. **Cone cells**

(b) Role of rod cells and cone cells in vision:

- Rod cells are highly sensitive to low light. They enable vision in dim light, detecting black, white, and gray.
- Cone cells provide colour vision and sharpness in bright light (day vision). They detect red, blue, and green colours and combine them to produce the full spectrum of colours.

(c) Light activates **photopigments** in rod and cone cells, triggering a **biochemical reaction** that generates **electrical impulses**. These impulses travel via the **optic nerve** to the brain for **image processing**.

Q23. Redraw the diagram.

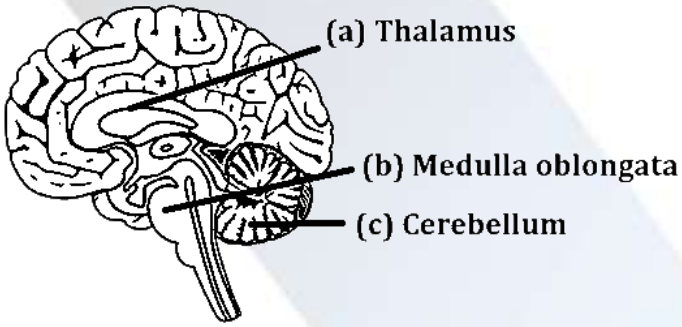
Name and label the parts that perform the given functions.

(a) Relay station of impulses.

(b) Controls heartbeat, breathing etc.

(c) Maintains equilibrium of the body.

Solution:



(a) **Thalamus** situated below the cerebrum acts as the relay station of impulses.

(b) **Medulla oblongata** situated below the cerebrum and near the cerebellum controls involuntary actions such as heartbeat, breathing etc.

(c) **Cerebellum** situated behind the cerebrum as two flaps maintains equilibrium of the body and coordinated muscular activities.