Summative Assessment – Term I - 2025-26

Class: **10** Model Question Paper Time : **1½** Hours

SCERT **BIOLOGY** Score : **40**

Instructions

- The first 15 minutes are cool - off time.
- This time can be used for reading the questions and planning the answers.
- Write answers only according to the instructions and questions.
- While writing the answers , consider the score and time.

Answer questions 1-4. (1 score each). **(4 x 1=4)**

1. Arrange the columns in the table given below in the appropriate order and select the correct answer from the options given.

Scientists	Contributions related to the evolution of life
(1) Thomas Malthus	(P) Inheritance of Acquired Characters
(2) Charles Darwin	(Q) Population growth is causing natural resources to become limited
(3) Jean Baptiste Lamarck	(R) On the Origin of Species

(**i**). (1) – (P); (2) – (R); (3) – (Q) (**ii**). (1) – (R); (2) – (Q); (3) – (P)
(**iii**). (1) – (Q); (2) – (P); (3) – (R) (**iv**). (1) – (Q); (2) – (R); (3) – (P)

2. Evaluate the statement and the reason and choose the correct answer.

Statement: The **roan coat** seen in some cattle and horses is an example of co-dominance.
Reason: The allele for the dominant trait cannot completely mask the allele for the recessive trait.

i) The statement and reason are correct. **ii**) The statement is false, but the reason is correct.
iii) The statement is true, but the reason is incorrect. **iv**) Both the statement and reason are incorrect.

3. Which of the following is related to the process of transcription?

i) DNA ⟶ mRNA **ii**) DNA ⟶ Protein
iii) mRNA ⟶ Protein **iv**) mRNA ⟶ DNA

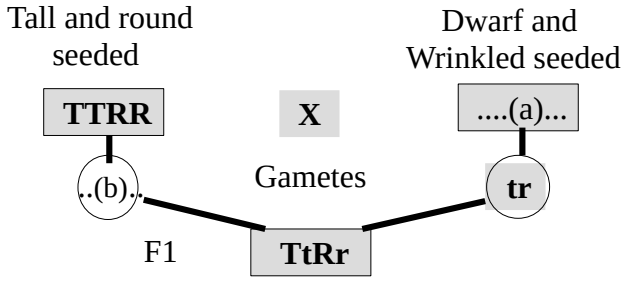
4. Identify the characteristics of primates and choose the correct answer.

(P). The thumb will not be in the opposite direction.
(Q). Binocular-tridimensional vision.
(R). Live in groups.

(**i**). (P), (Q), (R) are correct. (**ii**). (Q), (R) are correct.
(**iii**). (P), (Q) are correct. (**iv**). (R) is correct.

Answer questions 5-11. (2 score each). **(7 x 2=14)**

5. A) Observe the illustration given below and answer the questions.

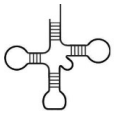


(**i**). Complete (a) and (b). (1)
(**ii**). What are the characteristics of the F1 plant? (1)

OR

B). Observe the illustration and and answer the questions.

X

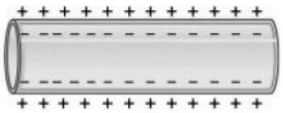


Y

(**i**). Identify and name the RNAs X and Y. (1)

(**ii**). Write one function of X and one of Y. (1)

6. The electric charge on each side of the plasma membrane of a nerve cell is illustration below. Analyze it and answer the questions .



Non- stimulated state

(**i**). What changes occur in this state when stimulated? (1)

(**ii**). How does this change result in the transmission of impulses? (1)

7. A). " The diversity in the beaks of the finches on the Galapagos Islands helped them survive." Explain this using the indicators given below.

<u>Indicators</u>:

- The reason for the diversity in the beaks of finches.
- Survival and reproduction.

OR

B). "Although Darwin's theory of natural selection was criticized because he did not understand the genetic basis of variation, it later gained wider acceptance".
Explain this statement based on the findings of Neo - Darwinism. (2)

8. The genetic structure of a person is given below. Analyse it and answer the questions.

44+XX

(**i**). What do 44 and XX indicate? (1)

(**ii**). Is the person with this genetic structure male or female? Why? (1)

9. Observe the illustration and write answers to the questions.

Over production

↓

Struggle for existence

(**i**). Which theory of evolution is indicated here? Who proposed this theory? (1)

(**ii**). What is the significance of variation in the situation shown in the illustration? (1)

10. Part of a scientific article about the evolution of life is given below. Read it and answer the questions.

"Random changes in genes that are passed down from generation to generation have a major impact on the evolution of life".

(**i**). What is the genetic process mentioned in the scientific article? How does this process influence the evolution of life? (1)

(**ii**) Suggest any 2 reasons that lead to this process. (1)

11. Give the reason.

(**i**). Y chromosomes are responsible for the development of male embryo. (1)

(**ii**). When tall plants with red flowers are crossed with short plants with white flowers, in the second generation, some plants may be tall with white flowers. (1)

Answer questions 12-17. (3 score each). **(6 x 3=18)**

12. A). Analyse the statements and answer the questions:

Statement 1: In humans, different blood groups like A, B, and O are seen.

St**atement 2**: The difference in human skin colour is not due to race, but due to genetics.

(**i**). Identify the genetic phenomena related to the given statement. (1)

(**ii**). Explain these phenomena in connection with the above statements. (2)

OR

B). The topic of the seminar is "Genetics: The Blueprint of Life."

Some hints for the presentation slides are given below. Give a short explanation for each of these. (3)

(**i**). Heredity and Variation

(**ii**). Gene and Allele.

(**iii**). Phenotype and Genotype.

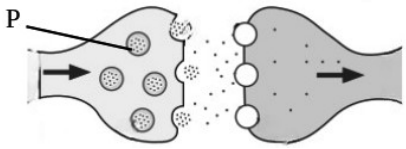
13. A). Analyse the given picture and answer the questions.

(**i**). In the picture, which part is marked as X? How is this part different in the central nervous system and the peripheral nervous system? (1½)

(**ii**). Write 3 functions of the part X. (1½)

OR

B). The structure of a synapse, which is found at the junction of two nerve cells, is illustrated. Observe this and answer the questions.

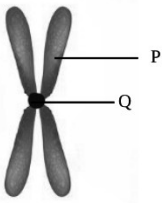


i). What does P represent? What is the general name of the chemicals seen here? (1)

ii). How does this part help control the speed and direction of nerve impulses? (1)

iii).In humans, how does this part help to improve the efficiency of brain function? (1)

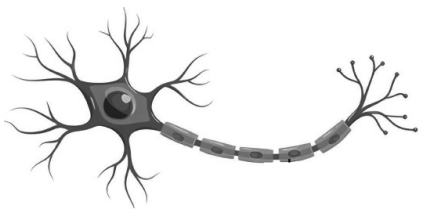
14. Observe the illustration of a chromosome given below and answer the questions .



i). Identify the parts labelled P and Q. (1)

ii). How is the structure shown in the diagram formed by the combination of DNA and proteins?(2)

15. Redraw the diagram and label the following parts.



i). The part that contains neurotransmitters. (1)

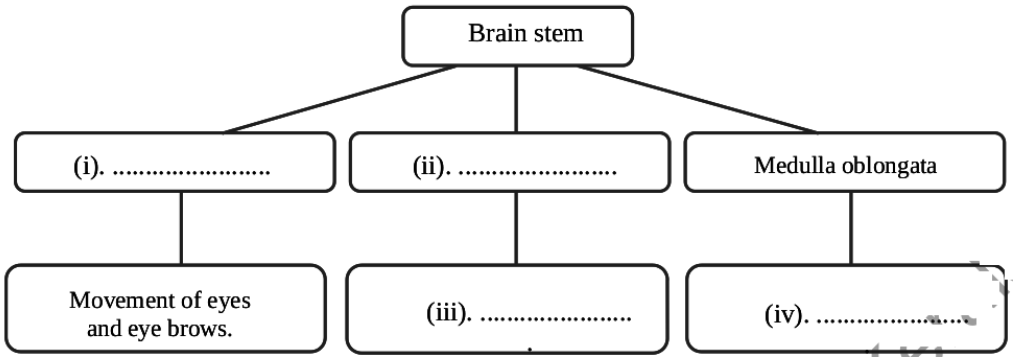
ii). Short thin fibre that extends from the cell body. (1)

Drawing the diagram: (1)

16. Explain how the fossils of the following organisms support the idea of evolution. (3)

i). Archaeopteryx
ii). Dinosaurs.
iii). Horses.

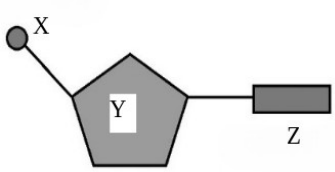
17. Complete the illustration appropriately.



What are the parts (**i**) and (**ii**)? (1)
Write the functions (**iii**) and (**iv**). (2)

Answer question 18. (Score 4). **(1 x 4=4)**

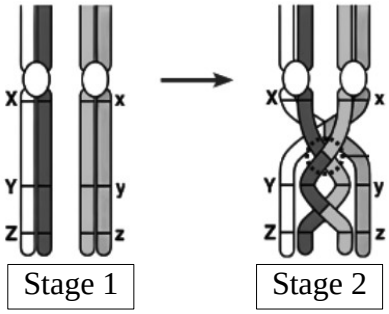
18. A). Observe the illustration and answer the questions .



i). What does the illustration indicate? (1)
ii). What is the function of the molecule labeled X? (1)
iii). Identify and write the names of Y and Z. How is Y different in DNA and RNA? (2)

OR

B). A process that causes variations in organisms is shown below. Observe it and answer the questions.



i). What is the process? In which cell division does this process take place? (1)
ii). List the activities that take place in stages 1 and 2 (2)
iii). How does this process lead to variations? (1)

Answers

1. (**iv**). (1) – (Q); (2) – (R); (3) – (P)

2. **iii**) The statement is true, but the reason is incorrect.

3. **i**) DNA ⟶ mRNA

4. (**ii**). (Q), (R) are correct.

5. A). (**i**). (a) – ttrr (b) - TR (**ii**). Tall and round seeded.

OR

B). (**i**). X- rRNA, Y- tRNA

(**ii**). X- Helps in the formation of bonds between amino acids, to form a protein.
Y- Bring specific amino acids to the ribosome, according to the message.

6. (**i**). When not stimulated, the outer surface of the cell membrane is positively charged and the inner surface is negatively charged.

(**ii**).When stimulated, positive ions from outside the cell membrane enter the cell. As a result, a temporary charge variation in that region occur and this potential transmits as an mpulse.

7. A). The beaks of Galapagos finches varied in shape and size depending on the availability of food resources around them. Those with beaks suited to each environment survived and produced more offspring.

OR

B). Darwin was unable to explain how variation occurs in organisms. Later, it was recognised that the causes of variations that lead to evolution were genetic changes, genetic recombination during sexual reproduction and gene flow. Thus more information from the fields of population genetics, palaeontology, environmental science, etc were added to Darwinism to form an uncritically rationalised Neo Darwinism.

8. (**i**). 44 - somatic chromosomes, XX- sex chromosomes.

(**ii**). XX sex chromosomes determine the person as female.

9. (**i**). Darwinism (Theory of Natural Selection). Charles Robert Darwin.

(**ii**). Organisms with favourable variations overcome the struggle for existence. They survive and reproduce more effectively and create new generations.

10. (**i**). Mutation. This causes changes in genes leading to variations, may be evolution.

(**ii**). Errors during DNA replication, exposure to certain chemicals, radiations etc. (any 2)

11. (**i**). The Y contains SRY gene is responsible for the development of testis in the embryo.

(**ii**). Because, each rait is inherited independently to the next generation without mixing each other.

12. A). (**i**). ABO blood group - Multiple allelism. Skin colour difference – Polygenic inheritance.

(**ii**).More than two alleles (I^A, I^B, i alleles) determine the blood group.
More than one gene controls the production of melanin, that gives colour to the skin.

OR

B). (**i**). Heredity refers to the transmission of characteristics from parents to their offspring.
Variations are characters expressed in offspring, that differ from their parents.

(**ii**). A gene, which is a specific sequence of nucleotides in DNA, is responsible for characteristic features through synthesizing proteins. The different forms of a gene that determins a character are called alleles.

(**iii**). According to the dominant allele, the observable characteristics of an organism are called phenotype and the genetic constitution responsible for these characteristics are called genotype.

13. A). (**i**). Myelin sheath. In brain and spinal cord the sheath is formed by oligodendrocytes and in peripheral nerves, it is formed by Schwann cells.

(**ii**).Myelin sheath acts as an insulator, increases the speed of impulse transmission and provides nourishment and protecting it from external injuries.

OR

B). **i**). Presynaptic knob. Neurotransmitter.

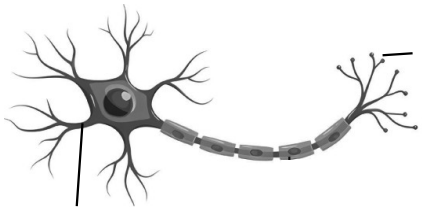
ii). The neurotransmitter binds with the receptors of post synaptic membrane and stimulates that neuron.

iii). Synapse transmit the impulses to only one direction and increase the speed of the impulses.
Advanced mental processes are made possible with the help of the synapses of neocortex.

14. **i**). P-Chromatids Q- Centromere.

ii). Eight histone proteins join together to form a histone octamer. DNA strands wind around this octamer to form a nucleosome. The chromosome is formed by packing and coiling numerous nucleosomes and recoiling the chains of nucleosomes.

15.



i). Synaptic knobs

ii).Dendron

16. **i**). Archaeopteryx fossil, which possesses the characteristic features of both reptiles and birds, indicates the evolutionary relationship between organisms.

ii). The fossil of Dinosaurs indicates the extinction of some species.

iii). The horse fossil reveals that organic evolution is a gradual process from a simple to complex structure.

17. (**i**)- Mid Brain. (**ii**) – Pons.

(**iii**)- Coordinates the muscular activities of the eye and the face / Regulates the rate of ventilation.

(i**v**)- Involuntary activities (heartbeat / ventilation / vomiting / cough / sneezing)

18. A). **i**). Nucleotide.

ii). X (phosphate) helps in the bonding of nucleotides.

iii).Y- Sugar molecule. Z- Nitrogen base.
Deoxyribose in DNA and ribose in RNA.

OR

B). **i**). Crossing over. The cell division process is meiosis.

ii). Stage 1 - During the first phase of meiosis, pairing of homologous chromosomes occur. Then (Stage2) chromatids at the chiasma region exchange the broken segments each other.

iii). Through this exchange of genes, a recombination of alleles occur resulting the appearance of new traits in offspring.

Answer key is prepared by:
Rasheed Odakkal Kondotty 9846626323