

AGA KHAN UNIVERSITY EXAMINATION BOARD

HIGHER SECONDARY SCHOOL CERTIFICATE

CLASS XII

ANNUAL EXAMINATIONS (THEORY) 2025

Biology Paper II

Time: 1 hour 30 minutes Marks: 35

INSTRUCTIONS

Please read the following instructions carefully.

1. Check your name and school information. Sign if it is accurate.

<p>I agree that this is my name and school. Candidate's Signature</p>

RUBRIC

2. There are ELEVEN questions. Answer ALL questions. Questions 10 and 11 offer TWO choices. Attempt any ONE choice from each.

3. When answering the questions:

Read each question carefully.

Use a black pointer to write your answers. DO NOT write your answers in pencil.

Use a black pencil for diagrams. DO NOT use coloured pencils.

DO NOT use staples, paper clips, glue, correcting fluid or ink erasers.

Complete your answer in the allocated space only. DO NOT write outside the answer box.

4. The marks for the questions are shown in brackets ().

Q.1. (Total 3 Marks)

a. Define positive feedback mechanism in biological systems. (1 Mark)

b. Why is the production of oxytocin hormone during childbirth considered a positive feedback mechanism? (2 Marks)

Q.2. (Total 2 Marks)

Briefly describe how bones contribute to mineral homeostasis, taking calcium as an example.

Q.3. (Total 2 Marks)

Ambreen sees a snake crawling towards her.

Write any TWO ways in which her sympathetic nervous system will respond to this stressful situation.

Q.4. (Total 2 Marks)

Albinism in mice is caused by a dominant gene that suppresses (masks) the expression of pigment in their eyes, skin, and hair.

a. Identify the type of inheritance exemplified in the case of albinism in mice. (1 Mark)

b. Give a reason for identifying the type of inheritance in part 'a'. (1 Mark)

Q.5. (Total 2 Marks)

Clomiphene citrate is a drug used to cure infertility in females. This drug causes increased release of FSH (Follicle Stimulating Hormone) and LH (Luteinising Hormone).

How does clomiphene citrate enhance the likelihood of conception by stimulating these hormones?

Q.6. (Total 2 Marks)

State any TWO extrinsic factors that cause skin aging in humans.

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Q.7. (Total 2 Marks)

Describe the termination phase of translation in the process of protein synthesis.

Q.8. (Total 3 Marks)

Describe THREE basic changes in the metastatic cancerous cells that are caused by genetic mutations.

Q.9. (Total 3 Marks)

a. What is the function of vectors in gene therapy? (1 Mark)

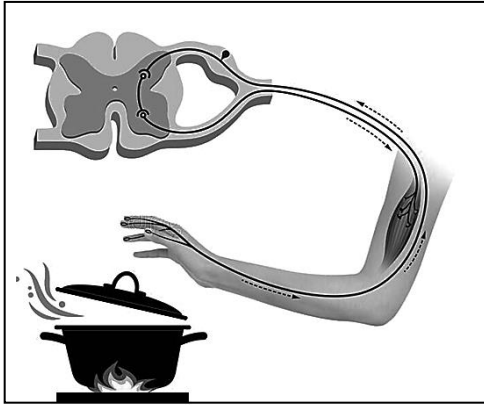
b. Mention any TWO types of vectors commonly used in gene therapy. (2 Marks)

Q.11.

(Total 7 Marks)

EITHER

a. The given diagram shows a simple reflex arc.



- i. What is a reflex arc? (1 Mark)
- ii. With reference to the components of reflex arc, describe the sequential steps of the shown reflex arc. (5 Marks)
- iii. Write any ONE point of significance of this reflex arc. (1 Mark)

OR

b. In cockroach (*Periplaneta americana*), the trait of normal-shaped wings is dominant over the curved-shape wings, which is controlled by a single gene with a pair of alleles.

- i. Construct a Punnet square to determine the phenotype percentage of offspring when a homozygous individual with curved wings was allowed to breed with a heterozygous individual. (3 Marks)
- ii. Deduce the phenotype ratio of the F₂ generation if the offspring with normal shape wings (of cross done in part 'i') were allowed to interbreed together. (1 Mark)
- iii. Describe how one could find out whether individuals were homozygous or heterozygous for the normal wings. (3 Marks)

(Note: Use the symbol 'W' to represent the dominant allele for normal wings and 'w' to represent the recessive allele for curved wings.)

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