

AGA KHAN UNIVERSITY EXAMINATION BOARD
HIGHER SECONDARY SCHOOL CERTIFICATE
CLASS XII
MODEL EXAMINATION PAPER 2023 AND ONWARDS
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.

I agree that this is my name and school.
Candidate's Signature

RUBRIC

2. There are ELEVEN questions. Answer ALL questions. Questions 10 & 11 offer TWO choices. Attempt any ONE choice from each.
3. When answering the questions:

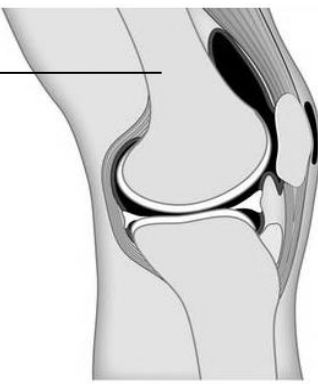

Read each question carefully.
Use a black pointer to write your answers. DO NOT write your answers in pencil.
Use a black pencil for diagrams. DO NOT use coloured pencils.
DO NOT use staples, paper clips, glue, correcting fluid or ink erasers.
Complete your answer in the allocated space only. DO NOT write outside the answer box.
4. The marks for the questions are shown in brackets ().

Q.1. (Total 3 Marks)

Identify any TWO thermoregulatory adaptations in plants at low temperatures. Describe any ONE of the identified adaptations.

Q.2. (Total 2 Marks)

The given diagrams show a comparison of normal and diseased knee joint.

Normal Condition of Joint	Diseased Condition of Joint
 <p>Bone</p>	 <p>Bone</p>
Diagram I	Diagram II

With reference to diagram II, identify the

i. diseased condition of the joint. (1 Mark)

ii. part of the joint that degenerates to cause this condition. (1 Mark)

Q.3.

(Total 2 Marks)

Procaine is used to cause insensitivity to pain during dental surgeries. This drug acts by blocking the opening of voltage gated sodium channels in the neurons.

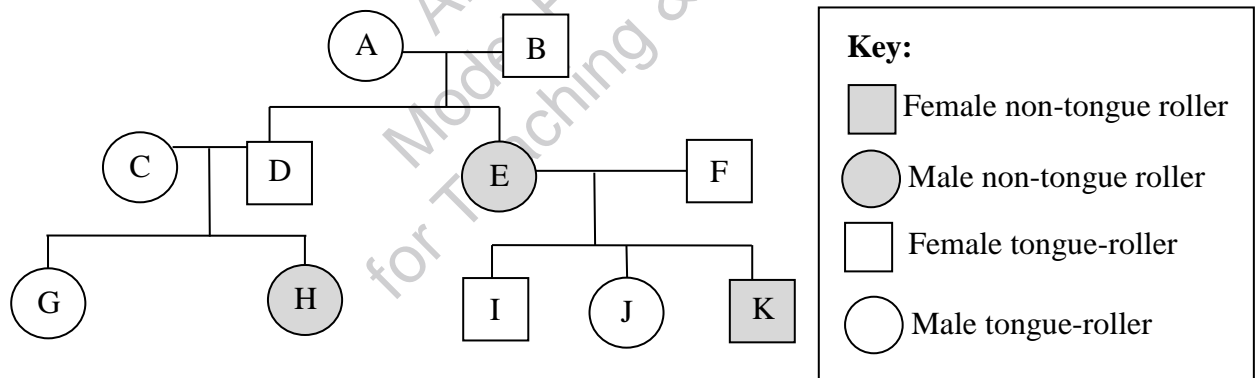
How does the blockage of sodium channels cause anaesthesia (in-sensitivity)?

Q.4.

(Total 2 Marks)

In humans, tongue-rolling is one of the dominant inherited traits controlled by different forms of a gene.

The family tree diagram shows a pattern of inheritance of the tongue-rolling trait.



Show the gametes produced by **E** and **F** and the expected genotypes of their offspring by using Punnet square.

Space for Punnet Square

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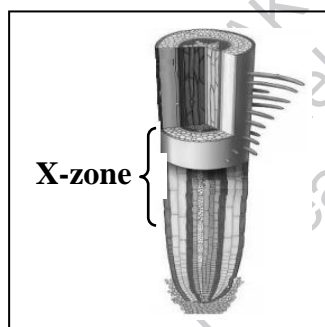
Q.5. (Total 2 Marks)

Complete the given table by identifying the source of nourishment of embryo in each type of animals.

Type of Animal	Source of Nourishment
Oviparous	
Viviparous	

Q.6. (Total 2 Marks)

The given diagram depicts the structure of a generalised root tip of a plant.



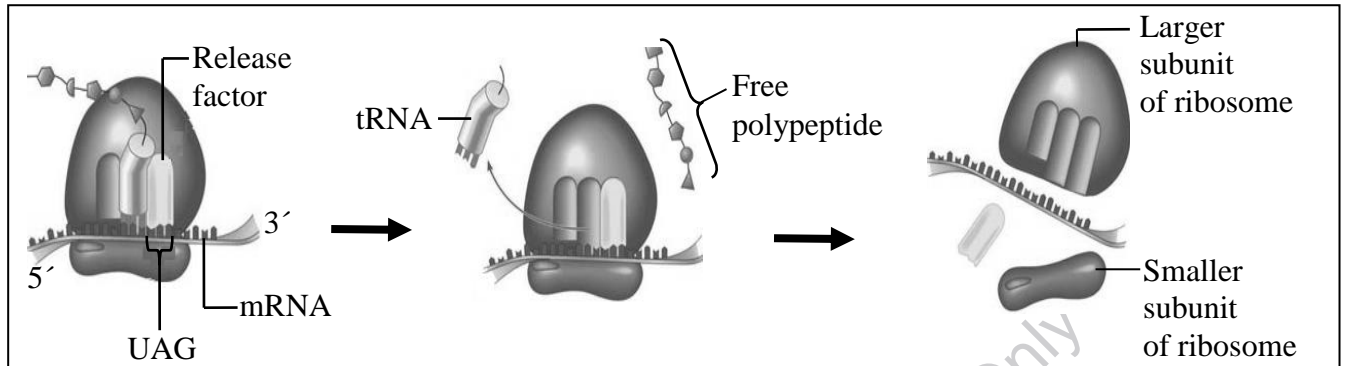
a. Identify the **X-zone** shown in the diagram. (1 Mark)

b. Write any ONE change that occurs in the cells of **X-zone**. (1 Mark)

Q.7.

(Total 2 Marks)

a. The given diagram represents one of the steps of protein synthesis.



i. Identify the step of protein synthesis shown in the given diagram.

(1 Mark)

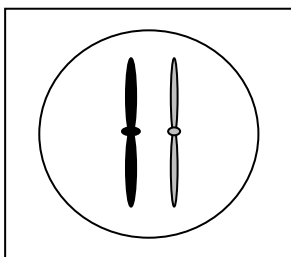
ii. Describe the role of release factor.

(1 Mark)

Q.8.

(Total 3 Marks)

The given diagram shows a cell with two chromosomes.



Illustrate the condition of chromosomes in the given stages of mitosis and meiosis.

Metaphase (Mitosis)	Anaphase (Mitosis)	Metaphase I (Meiosis)

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Q.9. (Total 3 Marks)

- a. Name the most efficient method that produces large number of copies of DNA fragments in limited time period. (1 Mark)

- b. Mention the TWO important tools (molecules) that are used in this method. (2 Marks)

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Q.10.

(Total 7 Marks)

EITHER

- a. With reference to the structure and function of the loop of Henle, explain the production of concentrated urine by the human kidneys. (7 Marks)

OR

- b. The given table shows the characteristic feature of **X** which is a type of paratonic movements in plants.

Paratonic Movements	Characteristic Feature
X	The movement in curvature of whole organ towards or away from stimuli

- i. Identify **X**. (1 Mark)
- ii. Describe **THREE** types of growth movements in plants. (6 Marks)

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Q.11.

(Total 7 Marks)

EITHER

a.

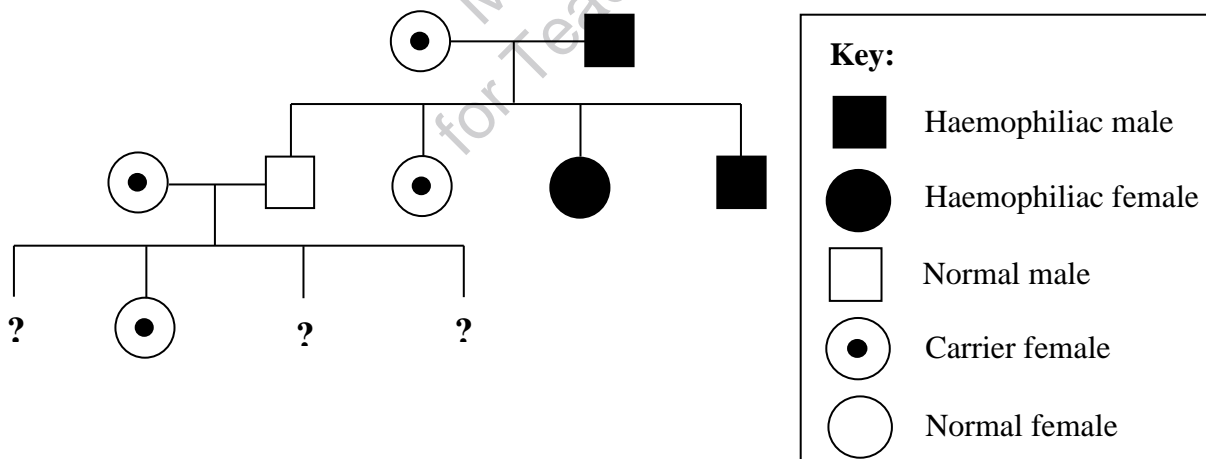
- i. State any ONE advantage of learned behaviour for animals. (1 Mark)
- ii. Identify the type of learned behaviour for each description mentioned in the given table. (2 Marks)

S. No.	Description	Type of Learned Behaviour
I	Pairing of an irrelevant stimulus with a natural primary stimulus	
II	Association of a stimulus with a reward	

- iii. Elaborate each description (from part ii) with the help of an example or an experiment. (4 Marks)

OR

- b. The given pedigree shows the inheritance of haemophilia.



- i. Identify the phenotypes of the unknown offspring in the given pedigree. (3 Marks)
- ii. Describe the pattern of inheritance of haemophilia in male and female individuals referring to the given pedigree. (4 Marks)

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END OF PAPER

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