

**AGA KHAN UNIVERSITY EXAMINATION BOARD**

**HIGHER SECONDARY SCHOOL CERTIFICATE**

**CLASS XII EXAMINATION**

**APRIL/ MAY 2017**

**Biology Paper II**

**Time: 2 hours 20 minutes    Marks: 55**

**INSTRUCTIONS**

**Please read the following instructions carefully.**

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

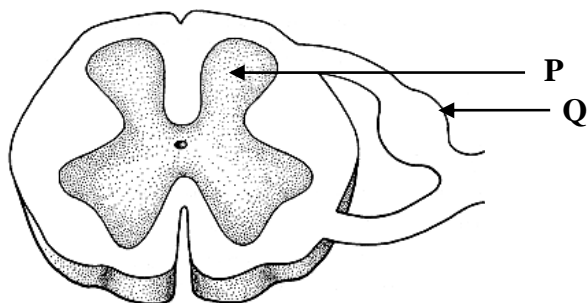
**I agree that this is my name and school.  
Candidate's signature**

2. RUBRIC. 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 4 Marks)

The diagram shows a cross-section of the spinal cord of human being.



Describe the structures that are labelled as **P** and **Q**.

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Q.2.

(Total 4 Marks)

Complete the given table by stating the name(s) of structure(s) formed during spermatogenesis and oogenesis in meiosis **I** and **II**.

	Structure(s) Formed During Spermatogenesis	Structure(s) Formed During Oogenesis (before or after fertilisation)
Meiosis I		
Meiosis II		

Q.3.

(Total 4 Marks)

- a. Sara and Zara are twins but do not resemble each other. Describe the phenomenon responsible for this situation. (2 Marks)

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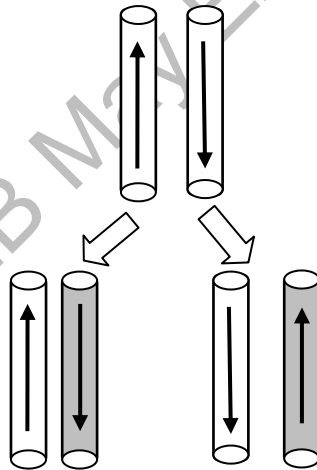
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- b. Mention a property of metanephridium that makes it more developed than protonephridium. (1 Mark)

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- c. Justify that the given diagram depicts semi-conservative replication of DNA. (1 Mark)



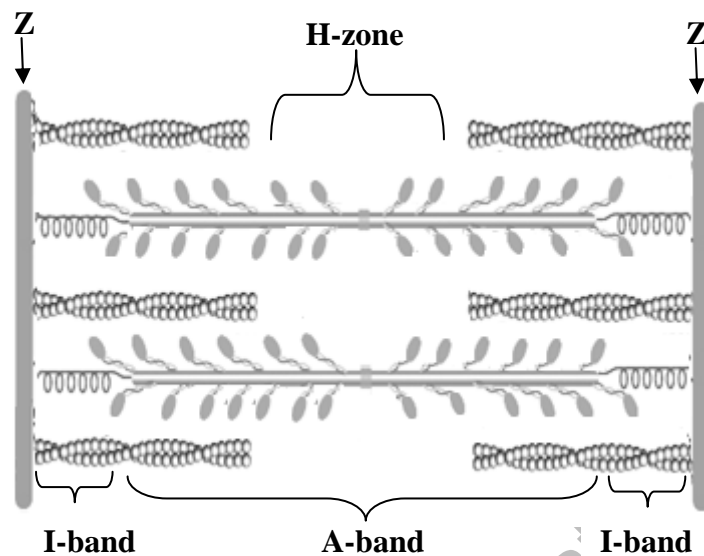
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Q.4. (Total 5 Marks)

a. The given diagram represents sarcomere in the relaxed condition.



Sketch the sarcomere in the given space when it is in the contracted condition. (3 Marks)

Space for sketch

b. Interphase is commonly known as the resting phase.

Justify that, the above concept is misleading. (2 Marks)

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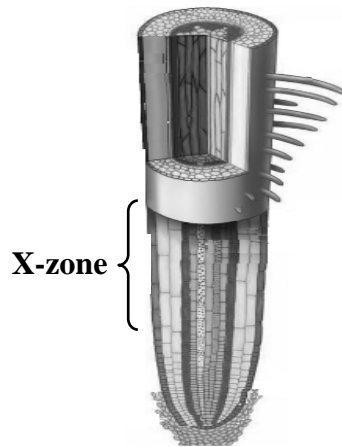


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Q.5.

(Total 5 Marks)

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



- i. Name the **X-zone** shown in the diagram.

(1 Mark)

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- ii. Mention any **THREE** changes that occur in the cells of **X-zone**.

(3 Marks)

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- b. Why is the plane of cleavage furrow always perpendicular to the mitotic spindle during cytokinesis?

(1 Mark)

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Q.6. (Total 5 Marks)

- a. A genome library is the collection of thousands of clones of DNA fragments. A genetic engineer is asked to find out the gene of interest from the genome library using **GAATAC** nucleotide sequence.

How can the **GAATAC** nucleotide sequence be useful to search out the gene of interest and trace out its location from the genome library? (2 Marks)

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- b. When an Rh<sup>-ve</sup> mother conceives an Rh<sup>+ve</sup> baby, it may result in erythroblastosis foetalis. How can this condition be prevented? (1 Mark)

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- c. The International Union for the Conservation of Nature (IUCN) issues the yearly Red List of Endangered Species and provides conservation plans for the protection of endangered animals. One of the conservation plans is protection of wildlife corridors.

How can wildlife corridors decrease the risk of extinction of endangered animals? (2 Marks)

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Q.7.

(Total 5 Marks)

- a. 'The more complicated a food web, the more stable the community is.' How? (3 Marks)

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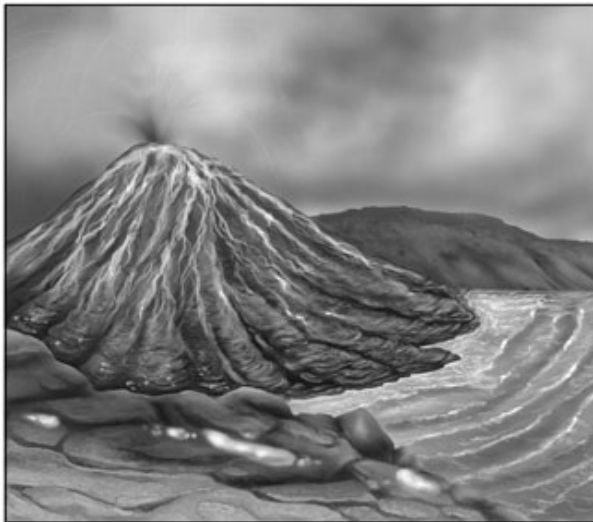
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- b. Diagram **I** represents the condition of an area after a volcanic eruption and diagram **II** depicts the condition of the same area after ten years.



**I**



**II**

Identify the type of succession in the given scenario with a reason.

(2 Marks)

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Q.8. (Total 4 Marks)

a. How can comparative embryology prove to be an evidence of evolution? (2 Marks)

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b. The transmission of acquired characters is a concept of the Lamarck's theory of evolution.  
Justify the rejection of the given concept of the theory using any TWO examples from your observation. (2 Marks)

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Q.9. (Total 4 Marks)

Name and differentiate between the grassland in tropical and temperate climates.

	Temperate Climate	Tropical Climate
Name		
Difference		



Q.10.

(Total 7 Marks)

**EITHER**

a.

- i. Classify the following animals on the basis of source of heat production for thermoregulation. (2 Marks)
  - Reptiles
  - Bats
- ii. Describe thermoregulation with reference to negative feedback mechanism that takes place in the human body after a vigorous exercise. (5 Marks)

**OR**

- b. The given diagram depicts a stressful condition where a dog is running after an officer. After running for 20 minutes, he is rescued and hence gets out of this stressful condition.



- i. Describe the effects of stimulations of sympathetic nervous system on the liver, cardiac muscles, pancreas and adrenal medulla of the officer. (4 Marks)
- ii. Describe any THREE roles of parasympathetic nervous system in the relaxed situation when the officer is rescued. (3 Marks)

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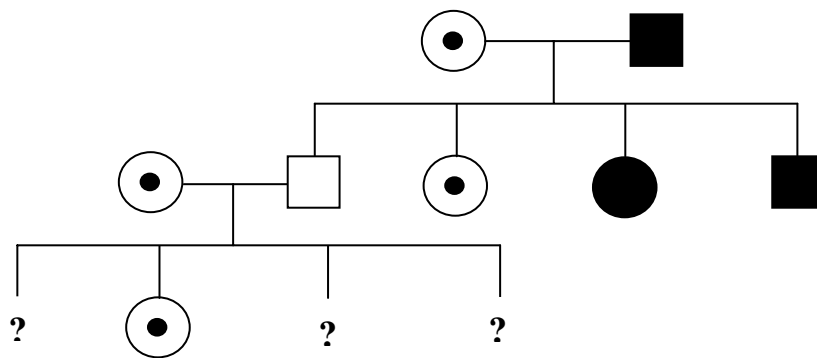
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Q.11.

(Total 8 Marks)

**EITHER**

a. The given pedigree shows the inheritance of haemophilia.

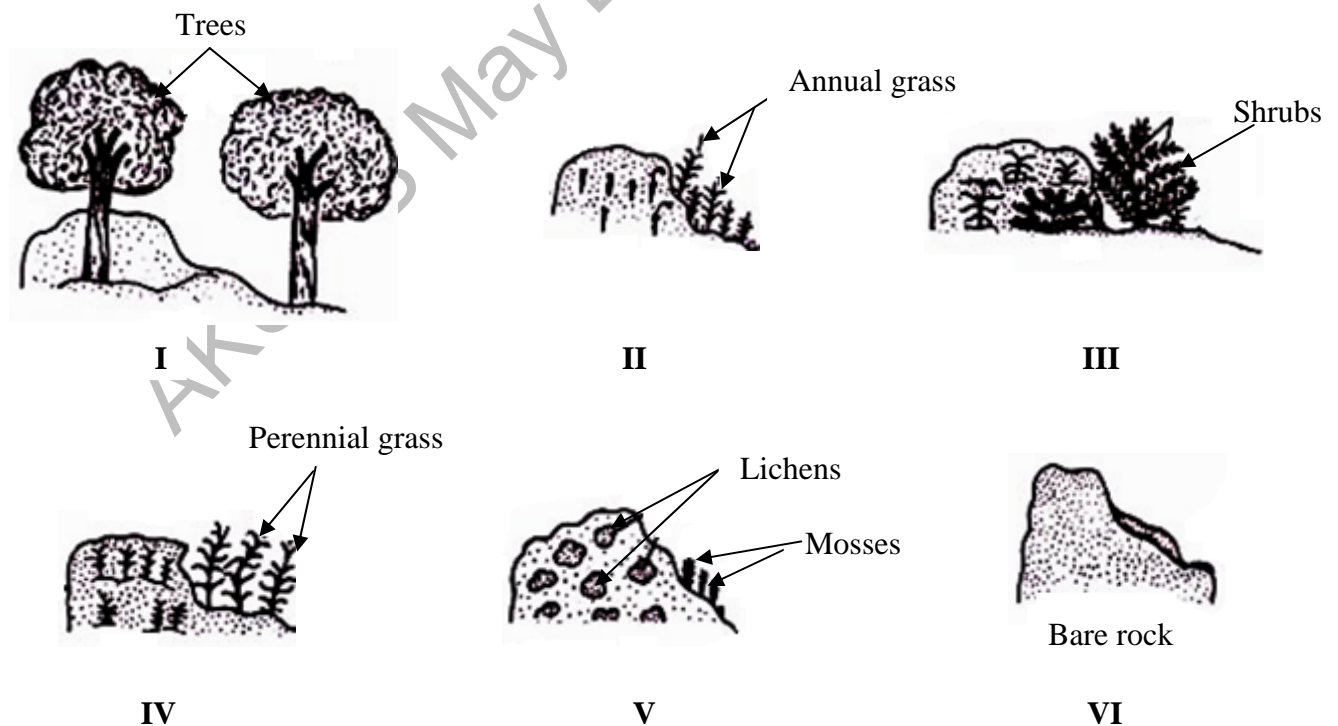
**Key:**

	Haemophiliac male
	Haemophiliac female
	Normal male
	Carrier female
	Normal female

- Identify the phenotypes of the unknown offspring in the given pedigree. (3 Marks)
- Describe the pattern of inheritance of haemophilia in male and female individuals referring to the given pedigree. (5 Marks)

**OR**

b. The given diagrams show different stages involved in the xerarch succession.



- Identify and arrange the given stages in their correct order. (2 Marks)
- Describe the features of any THREE of the given stages. (6 Marks)

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