

AGA KHAN UNIVERSITY EXAMINATION BOARD

HIGHER SECONDARY SCHOOL CERTIFICATE

CLASS XII

ANNUAL EXAMINATIONS (THEORY) 2024

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 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)

Five human red blood cells are placed in salt solutions of different concentrations.

Label of red blood cells	Concentrations of salt solution (in percentage)
1	0.2
2	0.3
3	0.4
4	0.5
5	0.6

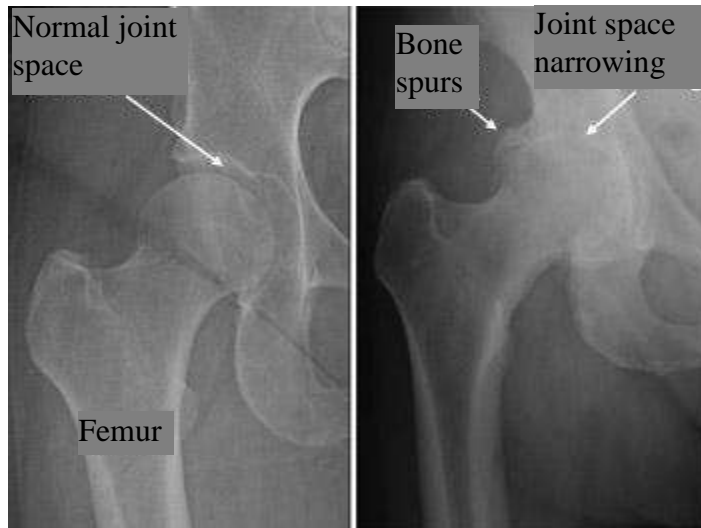
a. What will be the effect of increasing concentration of salt solution on red blood cells? (1 Mark)

b. Write any TWO changes that will occur in cell 4 if it is placed in 0.1% salt solution? (2 Marks)

Q.2.

(Total 2 Marks)

The given image shows X-rays of a normal and overweight patient's hip joints.



Normal hip joint

Hip joint of an overweight patient

- a. Identify the skeletal disease based on the features shown in the joint of an overweight patient?

(1 Mark)

- b. Write any ONE change (other than shown in the image) that occurs in the hip joint of the patient?

(1 Mark)

Q.3.

(Total 2 Marks)

Differentiate between the sympathetic and parasympathetic nervous systems in the given table.

Characteristic	Sympathetic Nervous System	Parasympathetic Nervous System
Neurotransmitter		
Response		

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Q.4. (Total 2 Marks)

Describe why type-II diabetes mellitus is referred as non-insulin dependent diabetes.

Q.5. (Total 2 Marks)

How does the obstruction of umbilical cord during pregnancy affect the development of foetus?

Q.6. (Total 2 Marks)

Write any TWO factors which cause cell differentiation during the process of embryonic development.

Q.7.

(Total 2 Marks)

To initiate the process of DNA replication in a laboratory, polymerase enzymes are added along with DNA template and nucleotides. The result shows that the DNA does not replicate by using these components alone.

Identify TWO other essential components which are missing in this process.

Component 1:

Component 2:

Q.8.

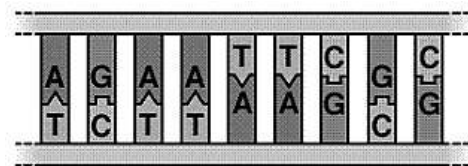
(Total 3 Marks)

Mention any THREE distinguishing characteristics of cancerous cells.

Q.9. (Total 3 Marks)

- a. In recombinant DNA technology, how do restriction enzymes cleave DNA and facilitate the insertion of desired gene? (2 Marks)

- b. Identify the four nucleotides sequence as a specific cutting site for restriction enzyme in the given part of DNA duplex. (1 Mark)



Q.10

(Total 7 Marks)

EITHER

- a. Describe any THREE physiological and FOUR behavioural adaptations in animals for regulating their body temperature in cold environment. (7 Marks)

OR

- b.
- i. Describe how the distribution of auxin within the plant cells induces phototropic and geotropic movements in plants. (4 Marks)
 - ii. Describe any **THREE** types of tropic movements in plants other than phototropic and geotropic movements. (3 Marks)

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Q.11.

(Total 7 Marks)

EITHER

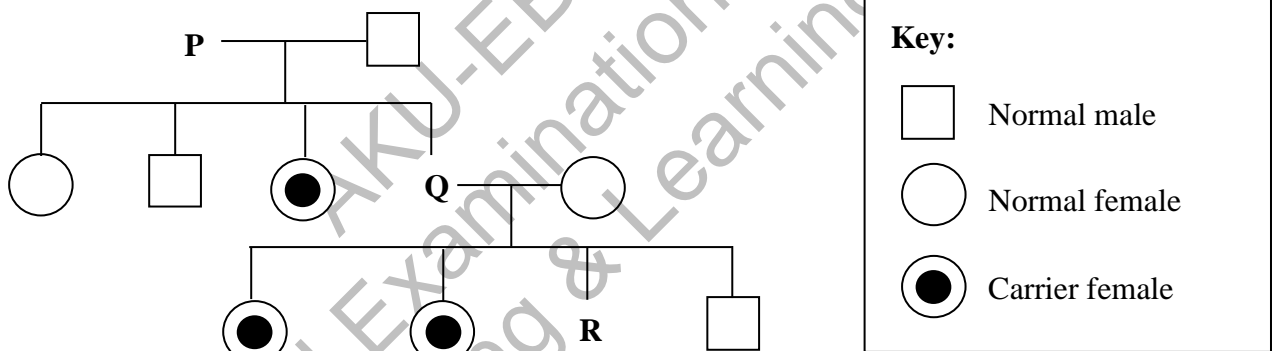
a.

- i. Identify the site of antidiuretic hormone (ADH) formation? (1 Mark)
- ii. Describe any ONE function and any ONE disorder caused by the hyposecretion of each of the following hormones. (6 Marks)
 - Somatotrophin hormone (STH)/ Growth hormone
 - Thyroxine hormone/ T4 hormone
 - Antidiuretic hormone (ADH)/ Vasopressin

OR

b.

The given pedigree shows inheritance of colour blindness in human.



- i. Identify the phenotype of **P**, **Q** and **R** in the given pedigree. (3 Marks)
- ii. Describe the pattern of inheritance of X-linked genes. (4 Marks)

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