AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS X

ANNUAL EXAMINATIONS (THEORY) 2025

Biology Paper I

Time: 1 hour 10 minutes Marks: 40

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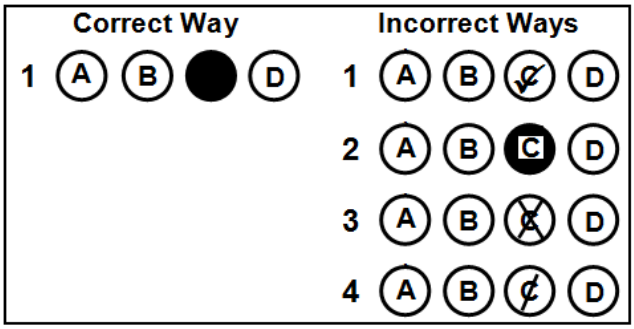
INSTRUCTIONS

1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 40 only.
4. In each question, there are four choices A, B, C, D. Choose ONE. On the answer grid, black out the circle for your choice with a pencil as shown below.



Candidate's Signature

5. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
6. DO NOT write anything in the answer grid. The computer only records what is in the circles.
7. You may use a simple calculator if you wish.

1. The CORRECT description about the metaphase plate is that it is

   A. a plate-like structure composed of phragmoplast.
   B. originated from the centromeres of chromosomes.
   C. a region in a dividing cell where centrioles multiply.
   D. the equatorial plane at which the chromosomes are aligned.

2. Skin cells do NOT enter Go phase of the cell cycle as

   A. they lack G1 phase.
   B. they keep on dividing.
   C. their nuclei degenerate forever.
   D. their supply of proteins is stopped.

3. If a cell undergoes three successive mitotic divisions, then the total number of daughter cells formed by this division will be

   A. 2
   B. 4
   C. 6
   D. 8

4. The given diagram shows homologous chromosomes in early prophase-I of meiosis.

   The positioning of homologous chromosomes shows the

   A. synapsis between sister chromatids.
   B. synapsis between non-sister chromatids.
   C. crossing over between sister chromatids.
   D. crossing over between non-sister chromatids.

5. In a patient, kidney tests reveal the malfunctioning of a portion of nephrons that assist in adjusting blood pH by secreting hydrogen and ammonium ions.

   The part of the nephrons that would be affected in this patient is

   A. loop of Henle.
   B. Bowman's capsule.
   C. distal convoluted tubule.
   D. proximal convoluted tubule.

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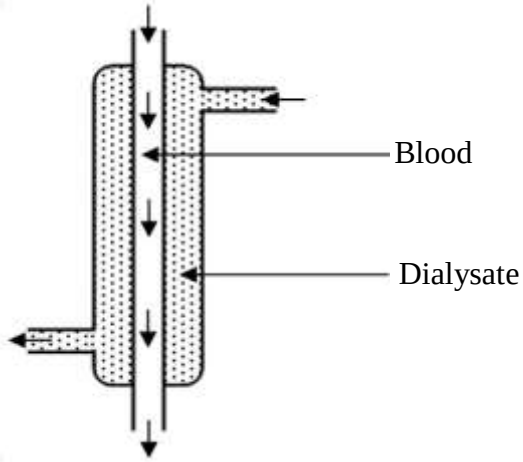
6. The given diagram represents a part of the dialyser.



The substances that would be present in the dialysate are

A. water, salt and urea.
B. glucose, urea and salt.
C. glucose, water and salt.
D. water, glucose and urea.

7. The given flowchart shows the components of a negative feedback control system for thermoregulation.

In the human body, the structure(s) that serve(s) as coordinator is/ are

A. hypothalamus.
B. thermoreceptors.
C. hair erector muscles in skin.
D. blood capillaries in the skin.

8. In the kidneys of human beings, blood pressure plays an important role in the process of urine formation. This is because blood pressure helps to

A. secrete hydrogen ions in tubules.
B. form filtrate through glomerulus.
C. reabsorb glucose in the Loop of Henle.
D. increase solute concentration in the filtrate.

9. Halophytes tend to maintain a hypertonic cell sap. However, if they failed to maintain this hypertonicity then

A. the stomata would close.
B. water would enter the cell.
C. transpiration would increase.
D. the cells would become flaccid.

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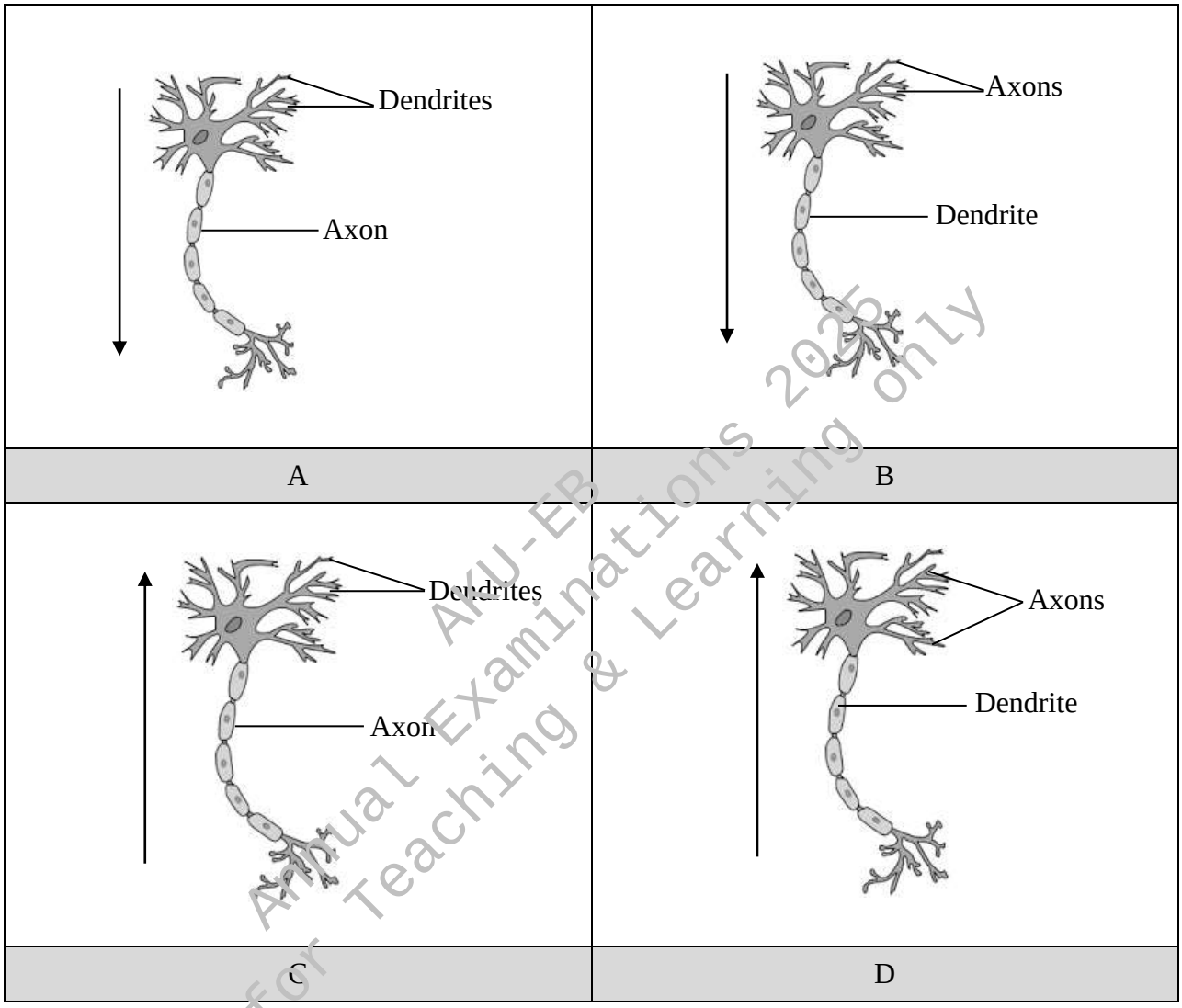
10. Based on the direction of nerve impulses, the CORRECTLY labelled structure of a motor neuron is

(**Note**: Arrow indicates direction of nerve impulse)



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11. Consider the given functions.

- Blinking of eye
- Peristalsis
- Heartbeat

The part of human brain that controls the given functions is

A. cerebrum.
B. cerebellum.
C. hypothalamus.
D. medulla oblongata.

12. In the central nervous system, relay neuron transmits nerve impulse from

A. receptor to effector.
B. motor neuron to effector.
C. sensory neuron to receptor.
D. sensory neuron to motor neuron.

13. In the human body, endocrine glands are located adjacent to different organs.

The option that CORRECTLY matches the endocrine gland with its adjacent organ is

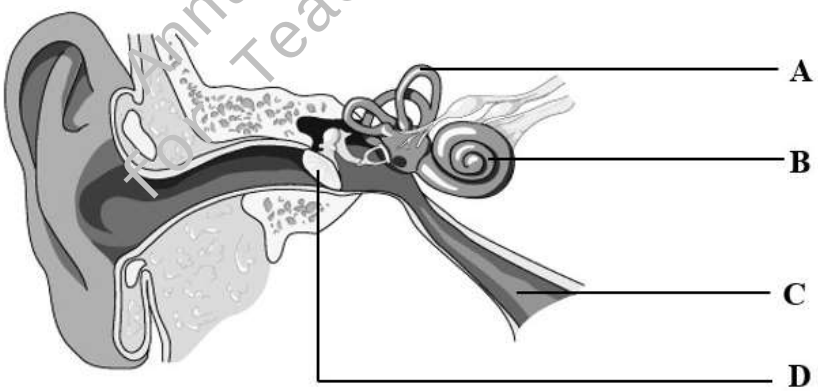
	Gland	Adjacent Organ
A	adrenal gland	liver
B	pituitary gland	brain
C	pancreas	kidney
D	thyroid gland	stomach

14. An example of involuntary action is

A. raising hand to ask a question.
B. stretching arms during exercise.
C. exhaling air while blowing a whistle.
D. sneezing in response to inhalation of irritants.

15. The given diagram represents the internal structure of human ear.

The part which contains sound receptors is labelled as



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16. Consider the given diagrams **I** and **II**.

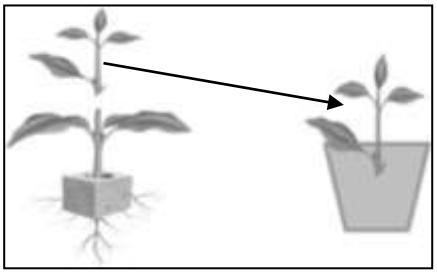

Diagram I

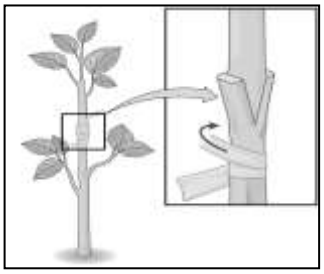

Diagram II

The types of artificial vegetative propagation in plants shown in the given diagrams are

	Diagram I	**Diagram II**
A	budding	suckering
B	suckering	budding
C	stem cutting	grafting
D	grafting	stem cutting

17. Double fertilisation in plants results in the formation of

A. one haploid zygote.
B. two haploid zygotes.
C. one triploid endosperm cell.
D. two triploid endosperm cells.

18. The option that exemplifies the disadvantage of asexual reproduction is that

A. mango trees take five to six years to bloom from the time of planting.
B. a bacterial infection in tomato plants spread rapidly and causes a massive lose.
C. trees developed by seeds are often large and expensive to maintain in an orchard.
D. retention of superior qualities in wheat crops is difficult to maintain due to genetic variations.

19. In the embryo sac of flowering plants, the synergid cells are found near the

A. antipodal cells.
B. central cell.
C. tube cells.
D. egg cell.

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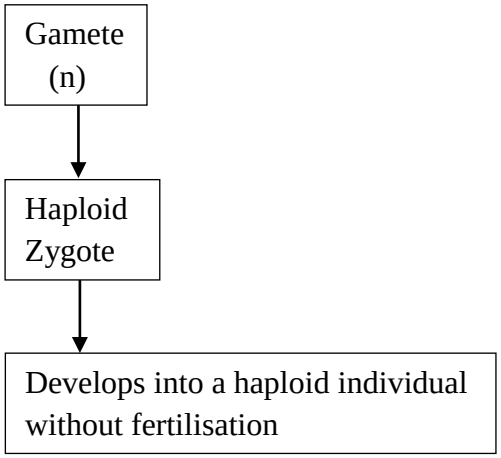
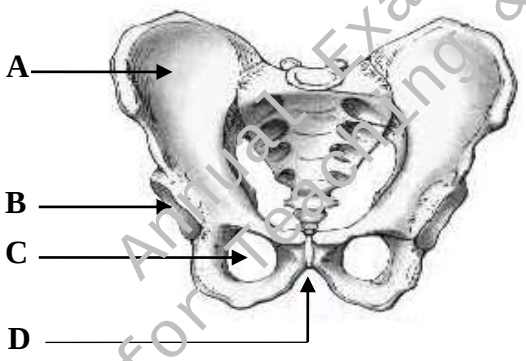
20. The given schematic diagram represents one of the forms of reproduction.



This type of reproduction is identified as

A. budding.
B. fragmentation.
C. multiple fission.
D. parthenogenesis.

21. In the given diagram of pelvic girdle, the part that forms ball and socket joint with femur is labelled as



22. In the human body, the set of structures which is composed of cartilage is

A. epiglottis, trachea and nose tip.
B. ear pinnae, larynx and pharynx.
C. pharynx, larynx and oesophagus.
D. epiglottis, oesophagus and trachea.

23. The CORRECT description about the hyoid bone is that it

A. helps in moving the tongue.
B. covers the opening of the trachea.
C. is a part of the appendicular skeleton.
D. is the shortest bone of the human skeleton.

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24. In the living cells, the hereditary unit that controls the production of proteins is

A. genes.
B. nucleus.
C. ribosomes.
D. cytoplasm.

25. If the sequence of nucleotides of the parent strand in a DNA molecule is CTGTTAG, then the daughter strand would have the sequence as

A. TCACCGA
B. GACAATC
C. UCACCGA
D. GACAAUC

26. The given table shows some examples of genetic cross and their resultant phenotypes.

	Genetic Cross	Resultant Phenotype
I	Two flies with brown body and red eyes are crossed	19% offspring appear with black body and red eyes
II	A man with free earlobe marries a woman with attached earlobe	50% offspring appear with attached earlobe and 50% with free earlobe
III	A cat with black fur mates with a cat with brown fur	100% offspring with black fur
IV	A tall pea plant with purple flower is crossed with a same pea plant	Out of 16 offspring, only one short pea plant with white colour flower is produced

Based on the genetic cross and phenotypes of offspring, the Mendel's law of independent assortment is applied on

A. I and II.
B. I and IV.
C. II and III.
D. III and IV.

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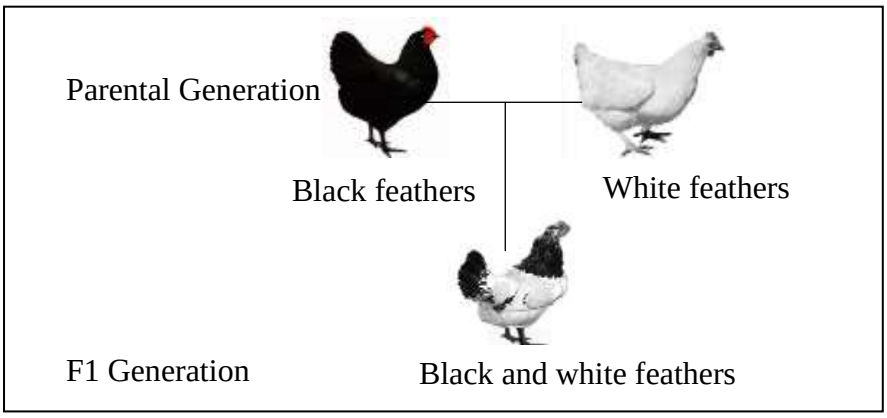
27. A botanist crossed a heterozygous red fruit plant with a yellow fruit plant.

(**Note**: The allele for red fruit (R) colour is dominant over the allele for yellow fruit (r) colour.)

The genotypes of offspring produced by this cross will be

A. Rr, Rr, rr, rr.
B. RR, RR, rr, rr.
C. RR, Rr, Rr, rr.
D. Rr, RR, RR, rr.

28. A black feathered chicken is crossed with a white feathered chicken in the given cross.



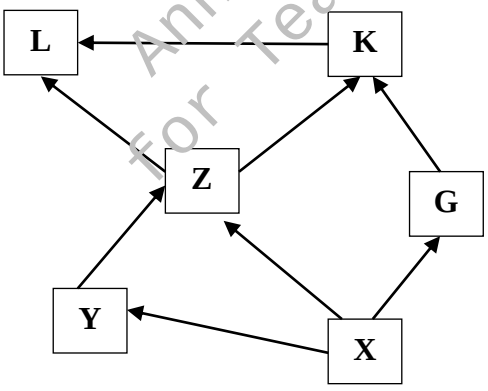
The appearance of feather colour in F1 generation is an example of

A. dominance.
B. codominance.
C. recessiveness.
D. incomplete dominance.

29. In a population, the beneficial traits become more common due to natural selection because of the

A. survival of diseased organisms.
B. modification of environmental factors.
C. adaptability of organisms to the environment.
D. complete change in genetic makeup of organisms.

30. The given diagram illustrates a food web.



All of the following information is interpreted from the given food web EXCEPT that

A. flow of energy is bidirectional.
B. organisms have greater adaptability.
C. organisms have alternate food resources.
D. it contains several interconnected food chains.

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31. In an ecosystem, the population size of a species increases to a certain time, and then it starts to level-off (no further increase in the population size).

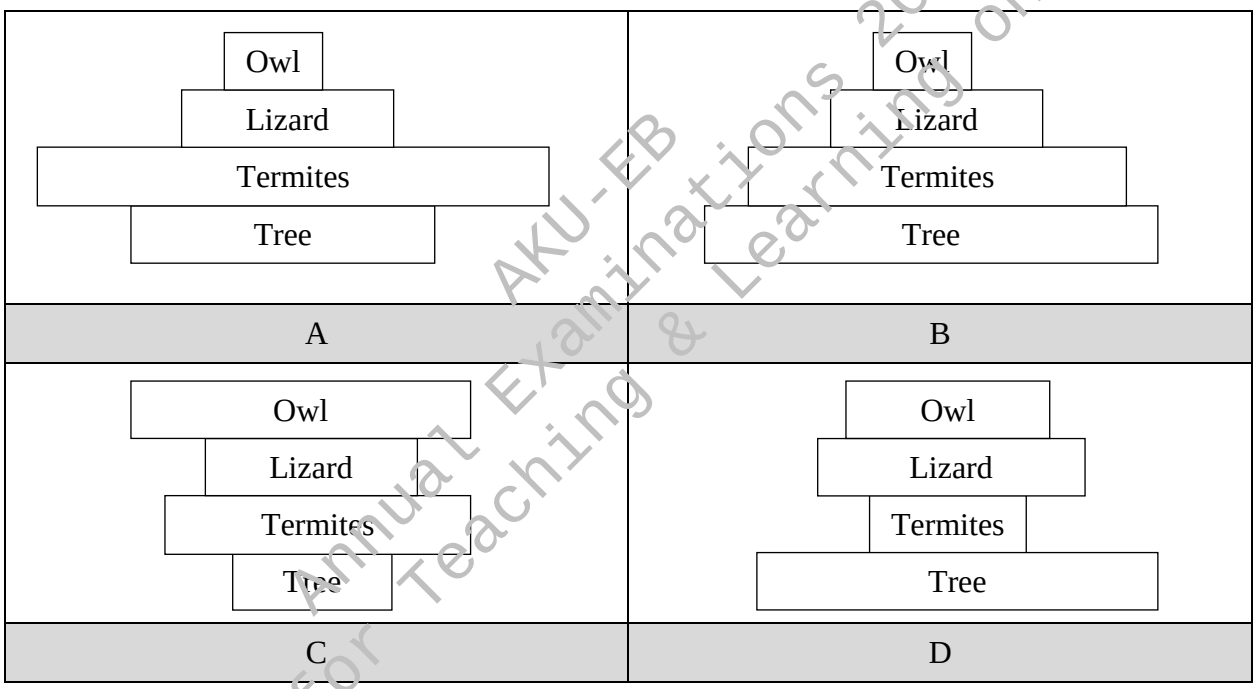
The population size levels-off PRIMARILY due to

A. decreased predation pressure.
B. migration of species to other ecosystems.
C. competition within species for limited resources.
D. decreased reproductive success due to genetic mutation.

32. Consider the given food chain.

Tree ⟶ Termites ⟶ Lizard ⟶ Owl

The CORRECT pyramid of number for this food chain is



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33. The suggestion that exemplifies the 'reduce principle' of the 3Rs cycle is

A. buying items as per need.
B. using biodegradable bags.
C. processing old materials into new products.
D. sharing leftovers rather than throwing them away.

34. In contrast to the flow of energy in an ecosystem, the flow of materials

A. remains unaffected by sunlight.
B. causes energy loss at each trophic level.
C. is from producers to tertiary consumers.
D. is cyclic due to the activity of decomposers.

35. In the food and beverage industry, bacteria are used in the production of

    A. bread.
    B. cream.
    C. yogurt.
    D. alcohol.

36. A bacterium is considered genetically modified when it has

    A. a foreign gene.
    B. many plasmids.
    C. a complete genome.
    D. restriction endonucleases.

37. Haemophilia, an inherited disease can be eliminated from human population with the help of genetic engineering by

    A. producing vaccines.
    B. making anti-viral proteins.
    C. modifying the genes in the human egg cells.
    D. providing enzymes through transgenic bacteria.

38. One of the MAIN causes of development of resistance in bacteria is

    A. self-medication.
    B. self-examination.
    C. use of genetically modified crops.
    D. use of advanced diagnostic techniques.

39. A doctor prescribed cephalosporin antibiotic to a patient for the treatment of an infection.

    Based on the prescribed medication, the type of infection this patient suffers from is

    A. viral.
    B. fungal.
    C. bacterial.
    D. parasitic.

40. The MOST expected withdrawal symptoms that a person addicted with heroine may experience are

    A. restlessness and insomnia.
    B. feeling overjoyed and hyperactive.
    C. extreme food craving and constipation.
    D. acute alertness and excessive sweating.

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