

AGA KHAN UNIVERSITY EXAMINATION BOARD

SECONDARY SCHOOL CERTIFICATE

CLASS X

ANNUAL EXAMINATIONS (THEORY) 2023

Biology Paper I

Time: 1 hour 10 minutes Marks: 40

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.

Correct Way	Incorrect Ways
1 (A) (B) ● (D)	1 (A) (B) (C) (D)
	2 (A) (B) (C) (D)
	3 (A) (B) (C) (D)
	4 (A) (B) (C) (D)

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 pair of animal cells which has complete set of chromosomes ($2n$) is
 - A. sperm and egg cells.
 - B. egg and cardiac cells.
 - C. sperm and nerve cells.
 - D. cardiac and nerve cells.

2. The similarity between meiosis-II and mitosis is that they both involve the
 - A. separation of sister chromatids.
 - B. formation of diploid daughter cells.
 - C. replication of deoxyribonucleic acid in interphase.
 - D. reduction of chromosomal number in each daughter cell.

3. Chromosomes can be seen clearly during prophase of cell division under the microscope. This is because in prophase,
 - A. nuclear membrane disintegrates.
 - B. chromosomes attach with spindle fibres.
 - C. chromosomes become highly condensed.
 - D. centrosomes reach at the poles of the cell.

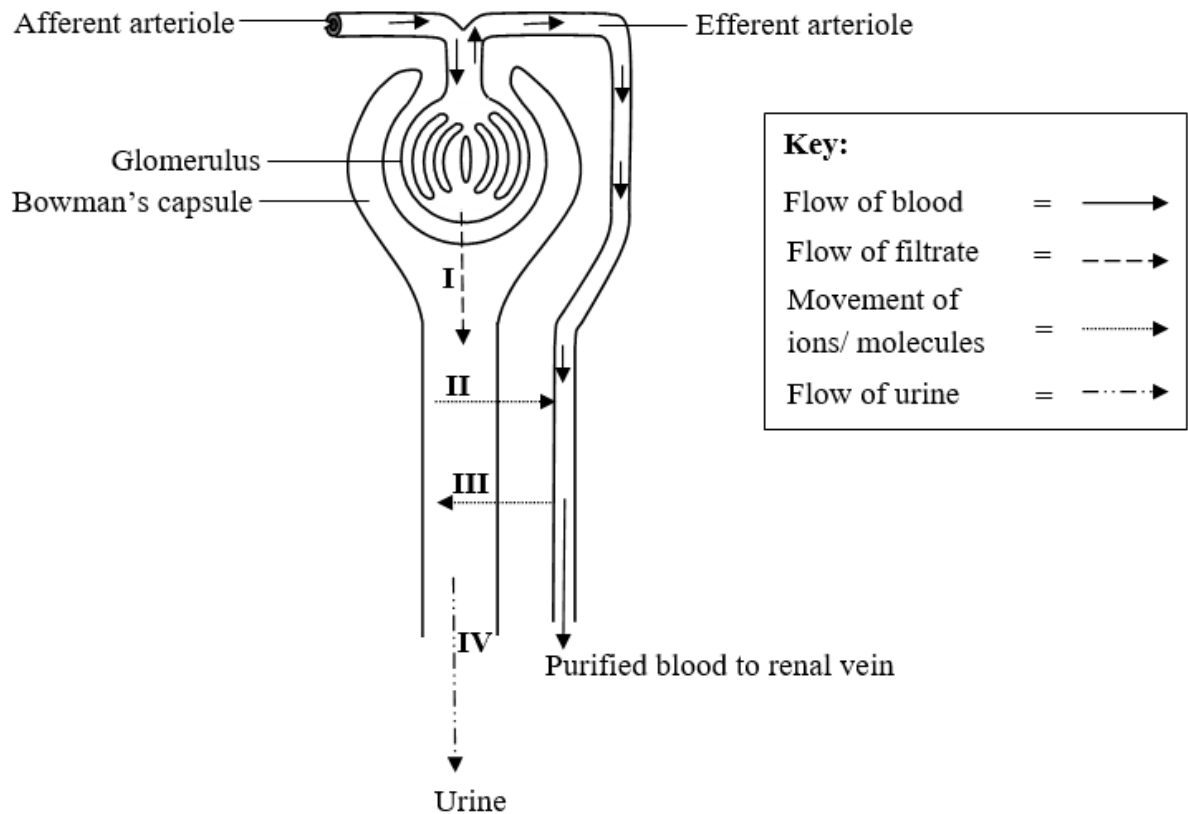
4. The process of cytokinesis is different in animal and plant cells.

Which of the following options supports the given statement?

The Process of Cytokinesis in		
	Animal Cells	Plant Cells
A	It is the last stage of cell division.	It occurs during interphase.
B	Daughter cells receive equal amount of cytoplasm.	Daughter cells receives unequal amount of cytoplasm.
C	Cleavage furrow forms at the equatorial plane.	Phragmoplast forms at the equatorial plane.
D	Contractile ring causes the division of cell.	Spindle apparatus causes the division of cell.

5. An example of negative feedback mechanism in the human body is the
 - A. breakdown of starch into maltose in the presence of amylase enzyme.
 - B. conversion of glycogen into glucose due to the lower blood sugar level.
 - C. closure of atrio-ventricular valves in response to high pressure in ventricles.
 - D. contraction and relaxation of muscles for the movement of food in alimentary canal.

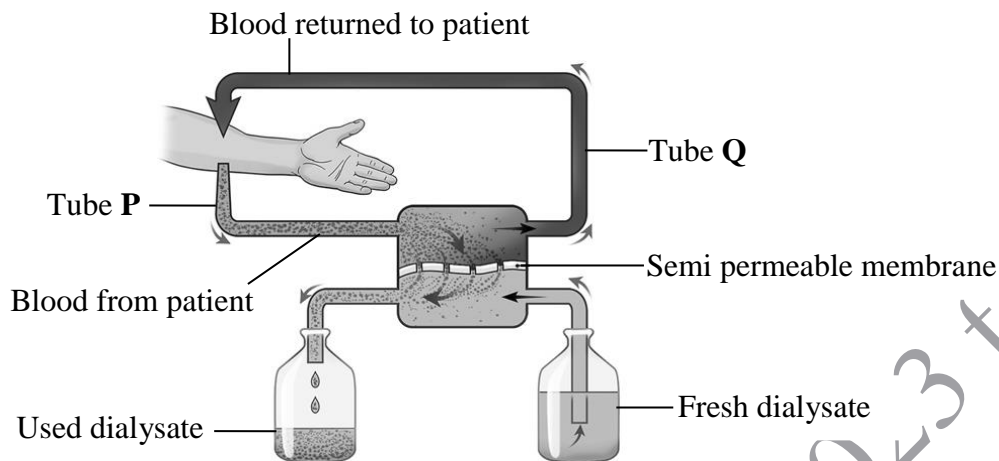
6. The given generalised diagram of a human nephron shows different processes (I, II, III and IV) involved in the urine formation and excretion.



The process of urine formation, 'secretion' is labelled as

- A. I.
 B. II.
 C. III.
 D. IV.
7. A person is suffering from kidney failure.
 Which of the following conditions is MOST likely to be the part of patient's medical history?
- A. Anaemia
 B. Bluish skin
 C. Excessive sweating
 D. High blood pressure

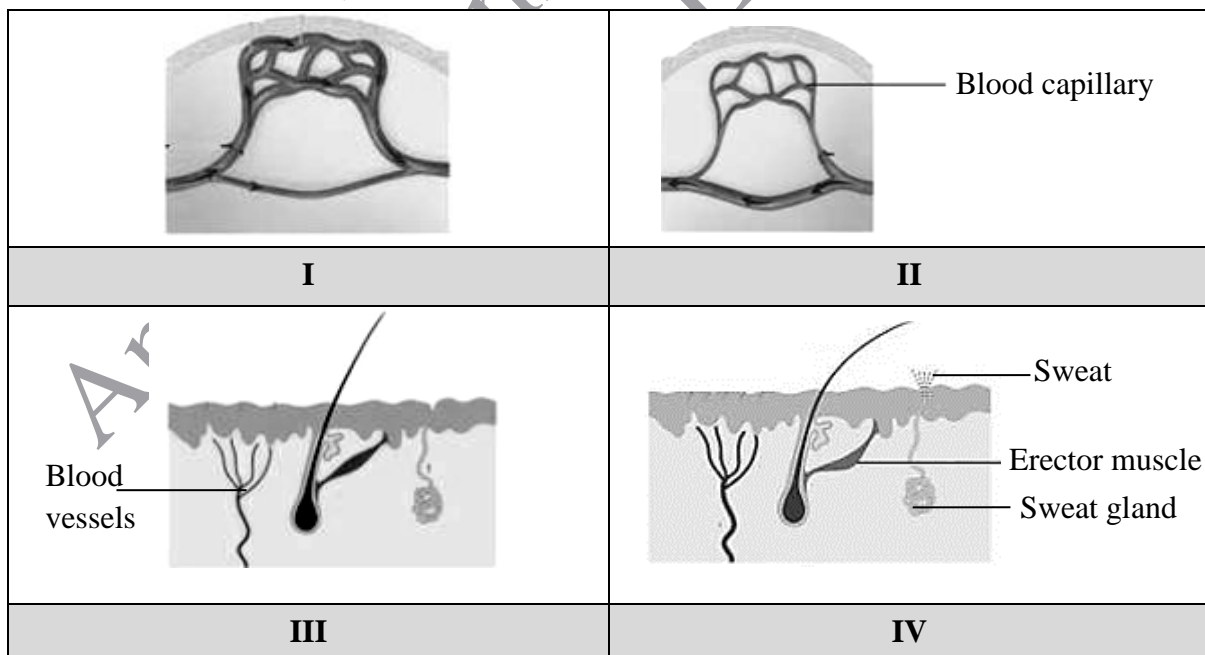
8. The given diagram shows the process of haemodialysis.



The blood present in tube **Q** is different from the blood in tube **P** due to a considerable decrease in the concentration of

- A. urea.
- B. glucose.
- C. amino acids.
- D. sodium chloride.

9. Consider the given changes that occur during thermoregulation in the human skin.



The images that illustrate thermoregulation in cold weathers are

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

10. During hot weather, a person eats excessive amount of salty foods, drinks little water and sweats more.

In this situation, which of the following hormones is secreted in higher amounts in his/ her body?

- A. Glucagon
 - B. Vasopressin
 - C. Progesterone
 - D. Thyroid stimulating hormone
11. The animals that search their prey at night have sharp night vision because their eyes have more
- A. rods.
 - B. cones.
 - C. aqueous humour.
 - D. vitreous humour.
12. A person, during his eye-sight test, was asked to read the following chart from a distance of 20 feet. The image of the alphabets appears to him as follows.

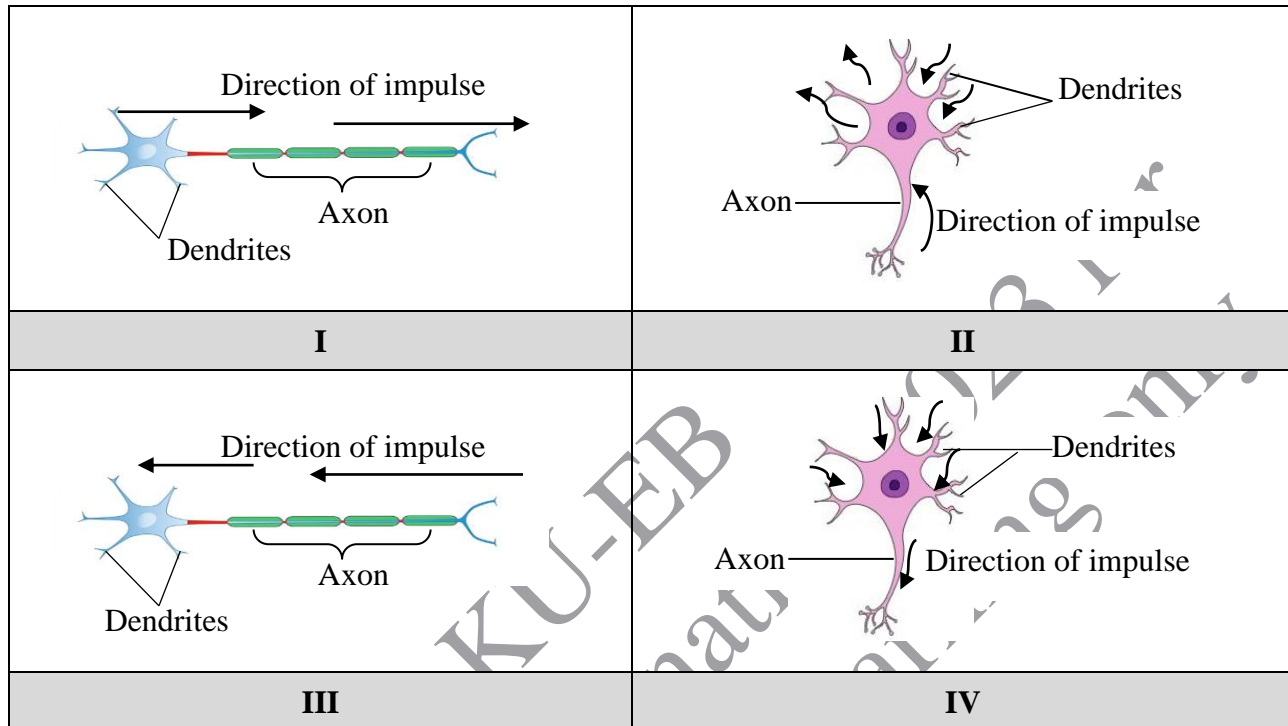


Which of the following options is CORRECT about the type of eye disorder he has and its recommended treatment?

	Disorder of Eyes	Treatment
A	Long-sightedness (hypermetropia)	Use of convex lens
B	Long-sightedness (hypermetropia)	Use of concave lens
C	Short-sightedness (myopia)	Use of convex lens
D	Short-sightedness (myopia)	Use of concave lens

13. The images that CORRECTLY show the direction of impulse in two different types of neurons are

(Note: arrows (→) show direction of impulse)



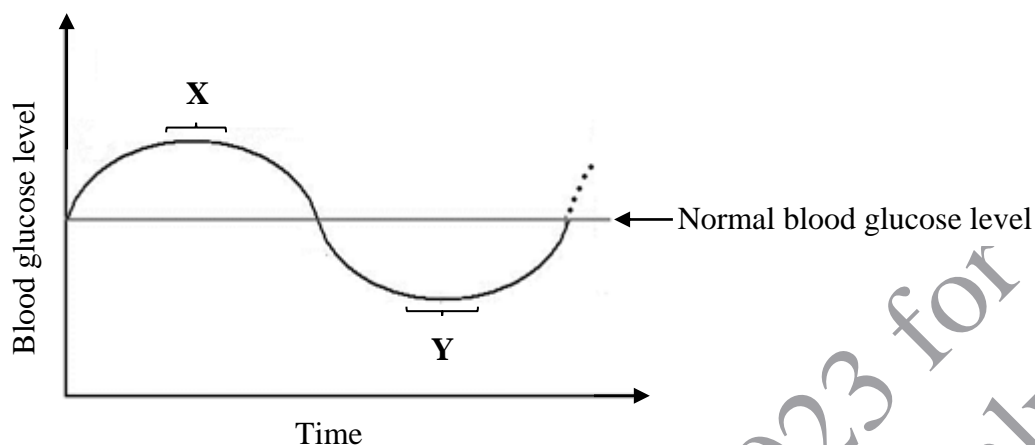
- A. I and III.
 B. I and IV.
 C. II and III.
 D. II and IV.
14. In the given diagram, a goalkeeper is looking at the ball coming towards him and is consciously getting ready to catch it.



In the given scenario, the CORRECT sequence for the flow of nervous information is

- A. brain → sensory neuron → spinal cord → effector.
 B. sense organ → motor neuron → spinal cord → effector
 C. brain → sense organ → spinal cord → motor neuron → effector.
 D. sense organ → sensory neuron → spinal cord → brain → motor neuron → effector.

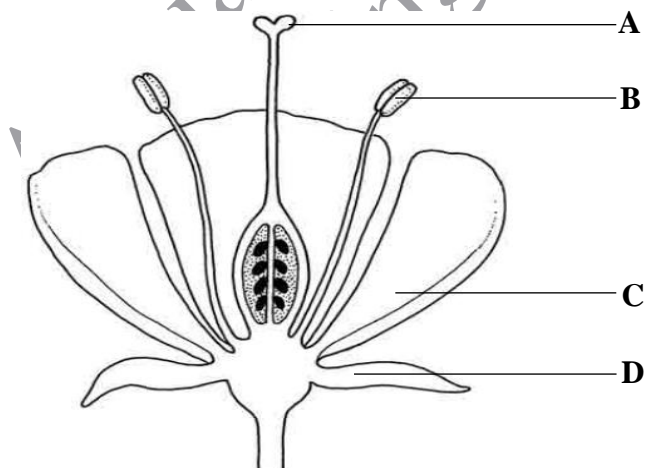
15. The given graph shows the changes in the blood glucose concentration over a period of time.



In order to maintain the blood glucose concentration, the hormones that will be secreted in higher concentration at point X and Y are

	Hormone at Point	
	X	Y
A	estrogen	progesterone
B	insulin	glucagon
C	glucagon	insulin
D	progesterone	estrogen

16. The part of a flower where germination of pollen grains take place after pollination is labelled as

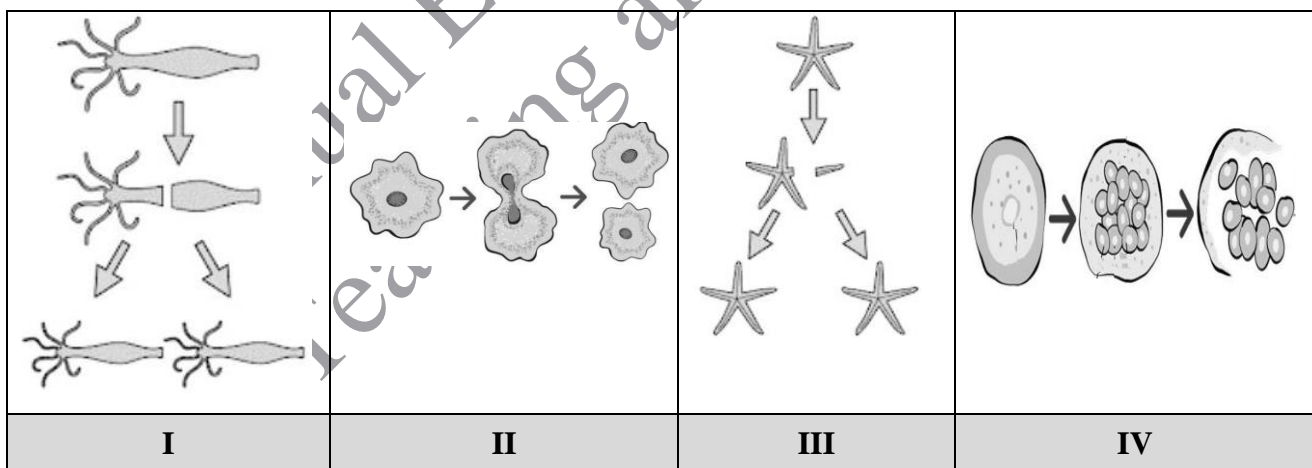


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17. In flowering plants, the number of nuclei and cells in the mature female gametophyte (embryo sac) are

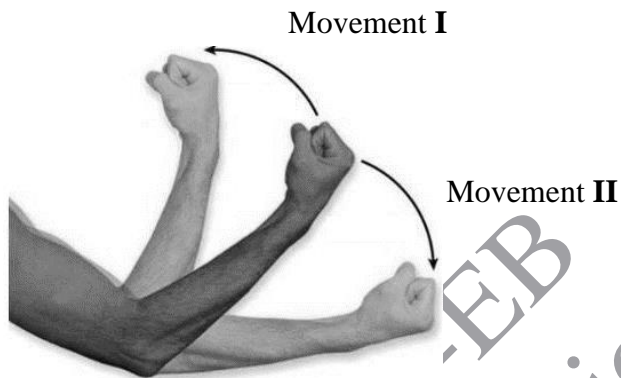
	Number of Nuclei	Number of Cells
A	8	6
B	8	7
C	4	4
D	3	4

18. The process of oogenesis in a female rabbit results in the formation of
- four egg cells and zero polar body.
 - three egg cells and one polar body.
 - two egg cells and two polar bodies.
 - one egg cell and three polar bodies.
19. In animals, during external fertilisation, the success rate of fusion of gametes is mostly low because
- the gamete producing animals are mostly invertebrates.
 - sperms and ova encounter various environmental hazards.
 - the medium where gametes are released lack essential nutrients.
 - sperms and eggs immediately disintegrate after their release from the body.
20. In the given diagrams of different types of asexual reproduction, the process of fragmentation is illustrated in



- I and II.
- I and III.
- II and IV.
- III and IV.

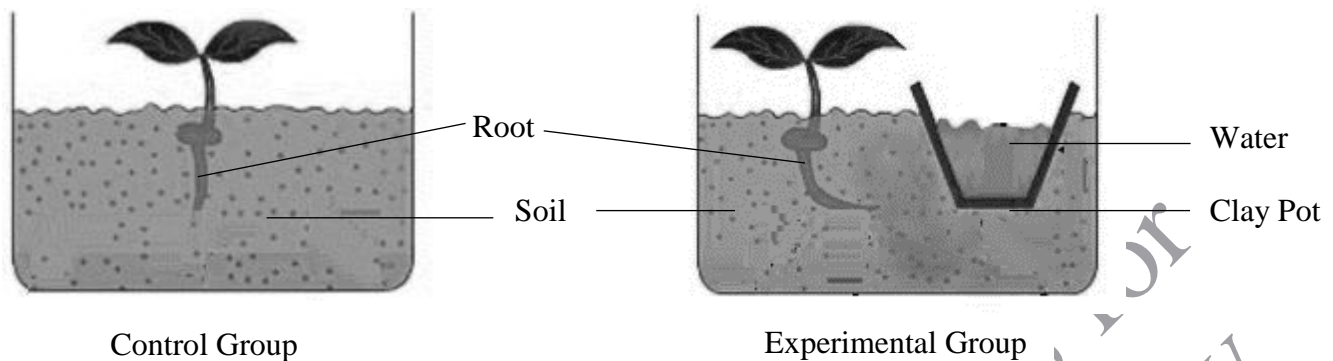
21. In contrast to a fractured bone, a damaged cartilage takes longer time to heal. This is because the cartilage
- A. is elastic in nature.
 - B. cells lack calcium ions.
 - C. is devoid of blood vessels.
 - D. matrix is composed of organic substances.
22. The given diagram represents the range of movement provided by the elbow joint.



The option which CORRECTLY identifies the movement **I** and **II** is

	Movement I	Movement II
A	flexion	extension
B	flexion	flexion
C	extension	extension
D	extension	flexion

23. A student set the materials in the following ways to conduct an experiment for one of the types of tropism in plants.



In the given experimental group, the bending of root indicates that the stimulus tested for tropic movement is

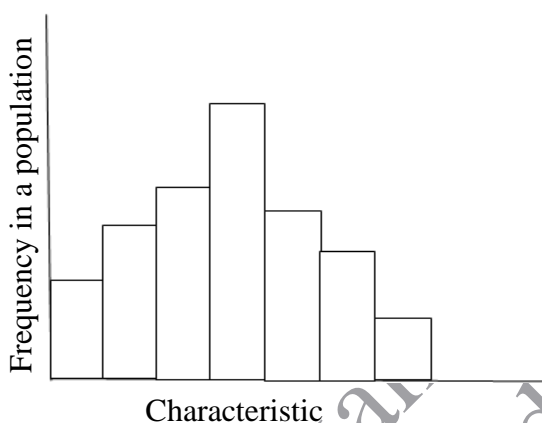
- A. soil.
B. root.
C. water.
D. clay pot.
24. The parental genotypes that can produce offspring with 50% A and 50% AB blood group are
- A. $I^A i$ and $I^B i$.
B. $I^A I^A$ and $I^B I^B$.
C. $I^A I^A$ and $I^B i$.
D. $I^A I^A$ and $I^B I^B$.
25. When short-haired cats were crossed with long-haired cats, all the offspring in F1 generation were short-haired. However, in F2 generation, some cats appeared with long hair.
- Based on the phenotypes of F1 and F2 generations, it can be inferred that the trait of
- A. short hair is recessive over long hair.
B. short hair is dominant over long hair.
C. long hair is co-dominant with short hair.
D. long hair is incompletely dominant over short hair.
26. The total number of different types of gametes expected to be produced by an organism with the genotype $RrYyTt$ is
- A. four.
B. six.
C. eight.
D. sixteen.

27. Pea plants that are heterozygous for inflated pod shape and green pod colour were crossed. This cross produced total 240 offspring.

(**Note:** The allele (I) for inflated pod shape is dominant over the allele (i) for constricted pod shape. Similarly, the allele (G) for green pod colour is dominant over the allele (g) for yellow pod colour.)

The total number of offspring with inflated pod shape and green pod colour would be

- A. 45
 - B. 90
 - C. 105
 - D. 135
28. The given graph represents one of the types of genetic variation in human characteristics.



The characteristic plotted in the given graph is

- A. blood group.
 - B. body weight.
 - C. tongue rolling.
 - D. type of ear lobe.
29. A homozygous red-skinned apple is crossed with a yellow-skinned apple. As a result, all the apples obtained in the F1 generation are red-skinned.

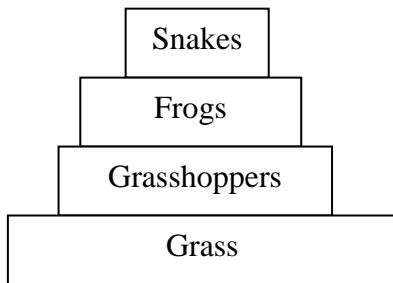
(**Note:** The allele (R) for red-skinned apple is dominant over the allele (r) for yellow-skinned apple.)

If any two individuals of F1 generation are crossed, then the expected phenotypic ratio will be

	Red Skin Apple : Yellow Skin Apple	
A	1	1
B	2	1
C	3	1
D	1	3

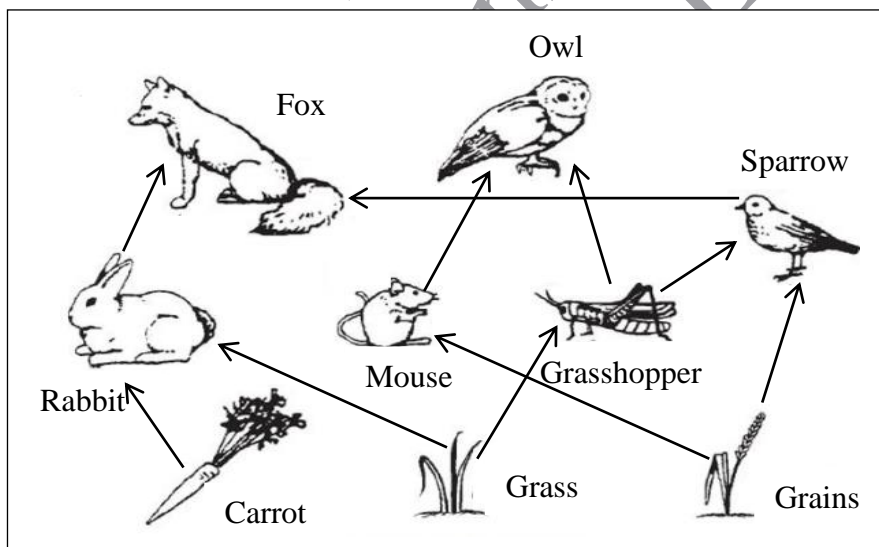
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30. In contrast to a food chain, a food web in an ecosystem
- A. illustrates linear pathway of energy flow.
 - B. has no effect on the competitiveness of organisms.
 - C. shows that a predator feeds only on one specific consumer.
 - D. describes feeding relationships of organisms at multiple trophic levels.
31. Consider the given pyramid of energy.



Which of the following statements is CORRECT about the given pyramid?

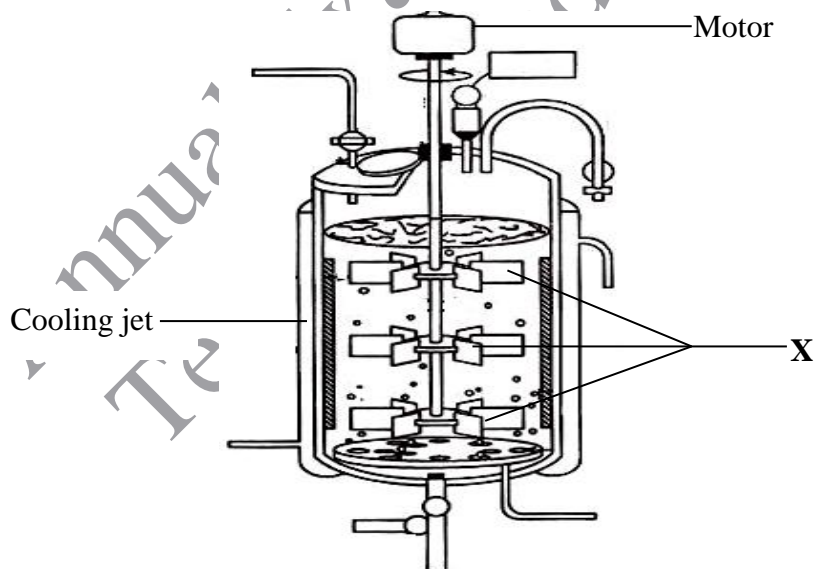
- A. Snakes gain the least amount of energy.
 - B. Frogs obtain more energy than grasshoppers.
 - C. The amount of energy remains constant throughout the food chain.
 - D. The flow of energy takes place from grass to snakes and snakes to grass.
32. The given diagram represents a food web.



In the given food web, the organism obtaining energy simultaneously from the producer and the consumer is

- A. rabbit.
- B. mouse.
- C. sparrow.
- D. grasshopper.

33. Plasmodium is categorised as a parasite of human beings because it
- I. completely paralyses the host
 - II. lives within the host
 - III. acts as a vector of various pathogens
 - IV. gets benefit at the expense of its host
- A. I and IV.
 - B. I and III.
 - C. II and III.
 - D. II and IV.
34. Decomposers are advantageous to the terrestrial ecosystem because they
- A. return nutrients to the soil.
 - B. produce energy for animals.
 - C. consume carbon dioxide from air.
 - D. provide oxygen to the atmosphere.
35. The stage of cheese production, which requires the addition of bacteria to form curd is
- A. cheese packing.
 - B. coagulation of milk.
 - C. pasteurisation of milk.
 - D. separation of curd from whey.
36. The given diagram represents an industrial fermenter.



In the process of fermentation, the MAIN function of component labelled as **X** is to

- A. remove heat.
- B. control pressure.
- C. mix the culture medium properly.
- D. monitor the change in temperature.

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37. A bacterium is considered genetically modified when it has

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

38. A person experiences an alteration in his/ her perception of reality on taking a drug.

This drug is identified as a/ an

- A. sedative.
- B. analgesic.
- C. antibiotic.
- D. hallucinogen.

39. Referring to the causative agent of the disease in the given table, the use of antibiotics can cure

	Disease	Causative Agent
A	ascariasis	round worm
B	typhoid	bacteria
C	dandruff	fungus
D	measles	virus

40. Which of the following blood components is stimulated after vaccination?

- A. Platelets
- B. Basophils
- C. Lymphocytes
- D. Red blood cells

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