

AGA KHAN UNIVERSITY EXAMINATION BOARD

HIGHER SECONDARY SCHOOL CERTIFICATE

CLASS XII

MODEL EXAMINATION PAPER 2020

Biology Paper I

Time: 50 minutes Marks: 35

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 35 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)	(C)	1	(A)	(B)	(C)
				2	(A)	(B)	(C)
				3	(A)	(B)	(C)
				4	(A)	(B)	(C)

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.

1. As compared to the nephrons of fresh water vertebrates, the nephrons of desert rodents have
 - A. longer loop of Henle.
 - B. shorter collecting duct.
 - C. less convoluted distal tubule.
 - D. more convoluted proximal tubule.
2. Vasa recta is the cluster of blood capillaries present in the nephron of human beings. It is derived from **X** and surrounds **Y**, where **X** are arterioles and **Y** are tube-like structures.

Which of the following CORRECTLY identifies **X** and **Y**?

	X	Y
A	Efferent arterioles	Proximal convoluted tubules
B	Afferent arterioles	Proximal convoluted tubules
C	Efferent arterioles	Loop of Henle
D	Afferent arterioles	Loop of Henle

3. A person is suffering from hyper-secretion of aldosterone.
The laboratory report of his urine composition will show the absence or very low level of
 - A. glucose.
 - B. creatinine.
 - C. sodium ions.
 - D. phosphate ions.
4. Read the given features.
 - I. Globular proteins
 - II. Thin thread-like structure
 - III. Wound around the actin filament

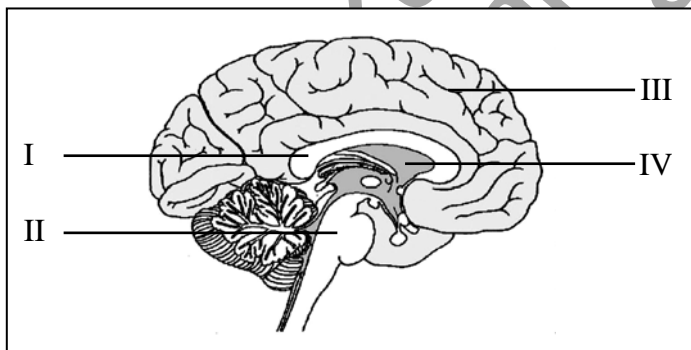
The feature(s) which describe(s) tropomyosin molecules is/ are

 - A. I only.
 - B. III only.
 - C. I and II.
 - D. II and III.
5. In the muscle fibre, transverse tubules (T-tubules) are formed by the invagination of sarcolemma. The function of these T-tubules is to
 - A. unblock the binding sites of actin.
 - B. conduct nerve impulse into the cell.
 - C. synthesise glycogen in the sarcoplasm.
 - D. store calcium ions in the sarcoplasmic reticulum.

6. It is observed that if plants are grown in dark, their stems elongate much more rapidly than normal and fail to form chlorophyll.

This phenomenon is called

- A. etiolation.
 - B. chlorosis.
 - C. dormancy.
 - D. retarded growth.
7. Auxins and gibberellins are plant hormones. The common role of these hormones is to
- A. delay both bud initiation and leaf senescence.
 - B. promote both bud initiation and leaf senescence.
 - C. promote bud initiation and delay leaf senescence.
 - D. promote leaf senescence and delay bud initiation.
8. In contrast to motor and relay neurons, the sensory neurons contain
- A. single axon.
 - B. single dendron.
 - C. multiple dendrites.
 - D. multiple nodes of Ranvier.
9. The given diagram shows a section through the midline of the human brain.



The labelled structure that connects right and left cerebral hemisphere is

- A. I.
 - B. II.
 - C. III.
 - D. IV.
10. When two heterozygotes (AaBb) of completely dominant traits are crossed, then the probability of appearance of AABB genotype would be
- A. 1/16
 - B. 3/16
 - C. 6/16
 - D. 9/16

11. In a particular type of pigeons, brown (B) feather and red (R) eye colour is completely dominant over white (b) feather and black (r) eye colour.

The following result is obtained from a cross between two such pigeons.

1	:	1	:	1	:	1
BbRr		Bbrr		bbRr		brrr

The genotypes of the parent pigeons would be

- A. BBrr and Bbrr.
 B. Bbrr and bbRr.
 C. BBrr and Bbrr.
 D. BbRr and bbRR.
12. The genotypes of parents of a baby girl who is born with haemophilia would be

	Genotype of Mother	Genotype of Father
A	Carrier	normal
B	Haemophiliac	normal
C	Carrier	haemophiliac
D	Normal	haemophiliac

13. XX-XY type of sex determination is found in humans and drosophila.

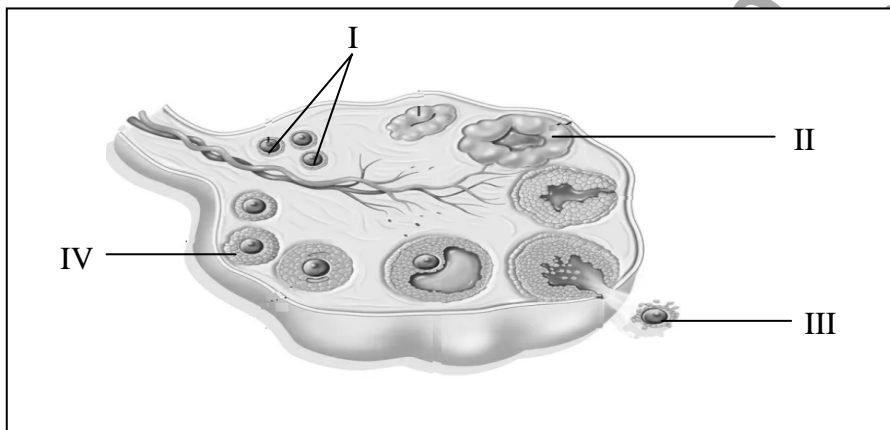
A drosophila offspring with genotype XXY produced through non-disjunctional gametes will be a

- A. sterile male.
 B. fertile male.
 C. sterile female.
 D. fertile female.
14. Some patterns of inheritance for an X-linked traits are listed below.
- I. It is more common in females than males.
 II. An affected father will pass the trait to all of his daughters.
 III. A carrier mother will pass the trait to one of every two sons.

The pattern(s) of inheritance for an X-linked dominant trait is/ are

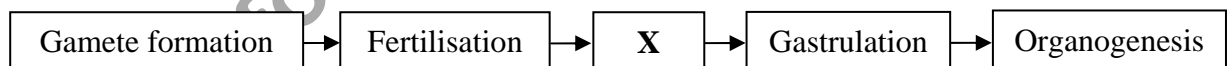
- A. I only.
 B. III only.
 C. I and II.
 D. II and III.

15. In human beings, what is the ratio of the number of gametes produced from one male primary sex cell to the number of gametes produced from one female primary sex cell?
- A. 1 : 3
B. 1 : 4
C. 3 : 1
D. 4 : 1
16. The phase of uterine cycle in which degeneration of endometrium occurs is
- A. luteal.
B. follicular.
C. ovulation.
D. menstruation.
17. The given diagram shows the ovarian cycle of a human female.



The structure that produces estrogen is labelled as

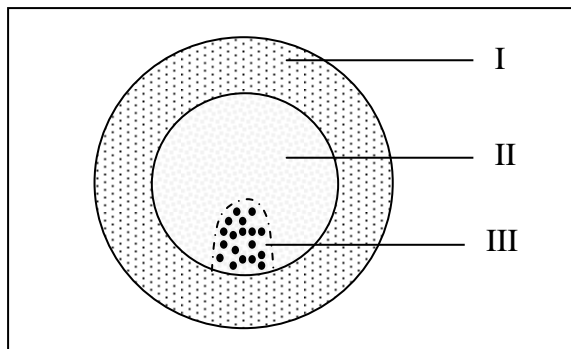
- A. I.
B. II.
C. III.
D. IV.
18. Following are some of the events that occur during the development of animals.



The structures formed during the event **X** are

- A. somites.
B. blastomeres.
C. epiblast and hypoblast.
D. neural groove and neurocoel.

19. The given diagram shows a chick's embryo after 4 hours of incubation.



The labelled structures I, II and III represent

	I	II	III
A	area opaca	area pellucida	primitive streak
B	area pellucida	area opaca	Hensen's node
C	epiblast	hypoblast	notochord
D	hypoblast	epiblast	mesoderm

20. Open growth occurs in plants because meristematic tissues
- continuously replace themselves.
 - are produced by all types of cells.
 - for secondary growth are present in the shoot tips.
 - for primary growth are present throughout the plant body.

21. The genetic code is universal across organisms.

This feature is advantageous in the process of

- karyotyping.
 - amplification of a gene.
 - isolation of genes from organism.
 - synthesis of insulin from bacteria.
22. A section of deoxyribonucleic acid (DNA) contains the following sequence of bases.

G A T C A G C C A T A C

The number of amino acids that the given section of DNA can code is

- 3
- 4
- 6
- 12

23. Which of the following CORRECTLY represents the separation of sister chromatids and homologous chromosomes during mitosis and meiosis?

	Mitosis	Meiosis I	Meiosis II
A	Sister chromatids	Sister chromatids	Homologous chromosomes
B	Homologous chromosomes	Homologous chromosomes	Sister chromatids
C	Sister chromatids	Homologous chromosomes	Sister chromatids
D	Homologous chromosomes	Sister chromatids	Homologous chromosomes

24. A cell contains 8 chromosomes in its diploid state.

When this cell undergoes meiosis, its each daughter cells would contain

- A. two genetically identical chromosomes each.
 - B. two genetically different chromosomes each.
 - C. four genetically identical chromosomes each.
 - D. four genetically different chromosomes each.
25. Haploid (n) number of chromosome in a cell is 10.
- The number of chromosomes in a monosomic condition due to meiotic error (non-disjunction) will be
- A. 21
 - B. 20
 - C. 19
 - D. 18
26. A 16 weeks pregnant woman, who already has a son with haemophilia, visits a genetic counsellor to know about the genetic health of her second baby.

The diagnostic test that the genetic counsellor refers to the woman would be

- A. ultrasound.
- B. gene therapy.
- C. tissue culture.
- D. amniocenteses.

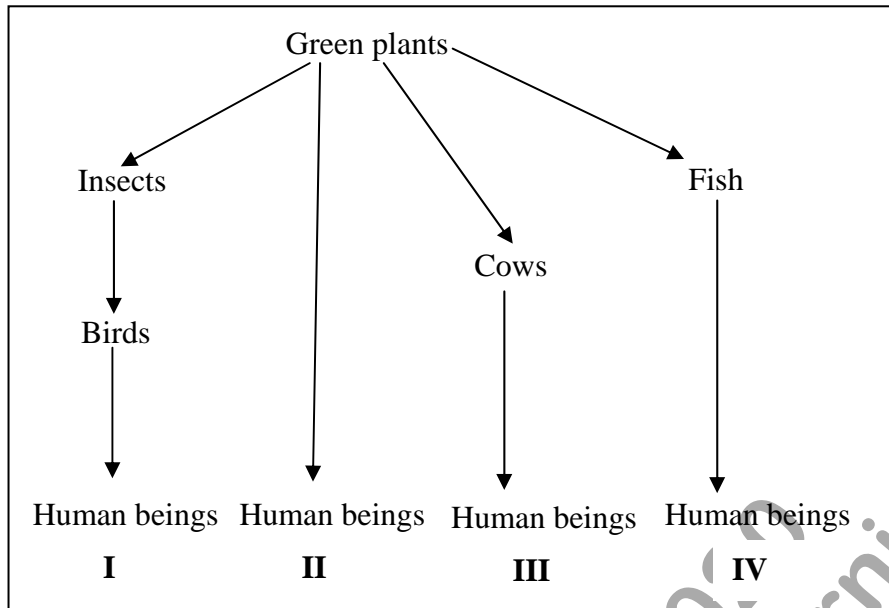
27. The given table shows a forensic investigation result comprising of DNA fingerprints.

DNA Fingerprints of Blood Sample from				
Crime Scene	Suspect 1	Suspect 2	Suspect 3	Suspect 4

Based on the given result, the culprit would be

- A. suspect 1.
 B. suspect 2.
 C. suspect 3.
 D. suspect 4.
28. If the frequency of allele q is 0.568 in a population, then the frequency of heterozygous genotype in the population would be
- A. 0.490
 B. 0.98
 C. 1.058
 D. 1.136
29. In a pyramid of energy, if the energy at a specific trophic level is 1,000 J, the amount of energy available for the next higher trophic level would be
- A. 10 J.
 B. 100 J.
 C. 1,000 J.
 D. 10,000 J.

30. The given diagram shows four food chains.



The food chain that transfers MINIMUM energy to the human beings is

- A. I.
 - B. II.
 - C. III.
 - D. IV.
31. The terrestrial biome in which the average temperature remains low throughout the year is
- A. tundra.
 - B. grassland.
 - C. tropical rain forest.
 - D. temperate deciduous forests.
32. The reason that coniferous forests mainly comprise of evergreen coniferous trees is
- A. low altitude.
 - B. heavy rainfall.
 - C. highly fertile soil.
 - D. short summer season.

PLEASE TURN OVER THE PAGE

33. Soil moisture is limited in the grassland ecosystem because of

	Precipitation	Evaporation
A	low	high
B	low	low
C	high	low
D	high	high

34. An abnormal condition develops in an individual upon exposure to microbes. This condition would be classified as a

- A. genetic disorder.
- B. pathogenic disease.
- C. metabolic disorder.
- D. nutritional deficient disease.

35. In an environment where sulphur dioxide and nitrogen dioxide are present in excess, the pH level of the rainfall would be approximately

- A. 4.0
- B. 6.9
- C. 7.5
- D. 8.0

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