

12th
STD.

Register Number

--	--	--	--	--	--	--	--

QUARTERLY COMMON EXAMINATION - 2019

TIME ALLOWED : 2.30 Hours

BIOLOGY

MAXIMUM MARKS : 70

BIO-ZOOLOGY

(35 MARKS)

Instructions:

- i. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
- ii. Use **Blue** or **Black** ink to write and underline and use **pencil** to draw diagrams:

SECTION – I

- Note :** (i) Answer **all** the questions: (8 × 1 = 8)
 (ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

1. In which type of parthenogenesis are only males produced?
 - (a) Arrhenotoky
 - (b) Thelytoky
 - (c) amphitoky
 - (d) Both a and c
2. Which of the following is not belonging to the accessory glands of the male reproductive system?
 - (a) Bulbourethral gland
 - (b) Cowper's gland
 - (c) Bartholin's gland
 - (d) Prostate gland
3. Assertion (A) : LNG - 20 are often called as hormone releasing intrauterine systems (IUS)
 Reason (R) : They increase the viscosity of the cervical mucus and there by prevent sperms from entering the cervix.
 - (a) (A) is true, (R) is false
 - (b) Both (A) and (B) are true (R) is the correct explanation of (A)
 - (c) (A) is false, (R) is true
 - (d) Both (A) and (B) are true but (R) is not the correct explanation of (A)

4. Meselson and Stahl's experiment proved
 - (a) Transduction
 - (b) Transformation
 - (c) DNA is the genetic material
 - (d) Semi-Conservative nature of DNA replication
5. Sudden appearance of vestigial organs in highly evolved organisms is called
 - (a) Vestigial organs
 - (b) Connecting link
 - (c) Atavistic organs
 - (d) Adaptive radiation
6. Which one of the following statements is not correct?
 - (a) Bursa of Fabricius is a primary lymphoid organ of birds
 - (b) Blymphocytes mature in the bursa.
 - (c) Bursa of Fabricius brings cell mediated immunity
 - (d) Bursa of Fabricius brings humoral immunity.
7. The gases produced in anaerobic sludge digesters are
 - i) Methane, oxygen and hydrogen sulphid
 - ii) Hydrogen sulphide, methane and sulphur dioxide
 - iii) Hydrogen sulphhde, methane and nitrogen
 - iv) Methane, hydrogen sulphide and CO₂
 - (a) (i) is true (ii), (iii) and (iv) are false.
 - (b) (i), (ii) and (iii) are false (iv) is true.
 - (c) (ii), (iii) and (iv) are true.
 - (d) All are false statements.

[1]

8. Match the following and choose the correct combination from the option given below.

	Column I		Column II
1	Mutualism	i	Lion and deer
2	Commensalism	ii	Round worm and man
3	Parasitism	iii	Birds compete with squirrels for nuts
4	Competition	iv	Sea anemone on hermit crab
5.	Predation	v	Birds and mammals are helpful in dispersal of seeds.

- (a) 1-iv, 2-v, 3-ii, 4-iii, 5-i
 (b) 1-iii, 2-i, 3-iv, 4-ii, 5-v
 (c) 1-ii, 2-iii, 3-i, 4-v, 5-iv
 (d) 1-v, 2-iv, 3-ii, 4-iii, 5-i

SECTION – II

Answer **any four** of the following question.

(4 × 2 = 8)

9. What is known as Paedogamy?
 10. Differentiate foeticide and infanticide.
 11. Write the symptoms of Patau's syndrome.
 12. Mention any two objection to Darwinism.
 13. What is Zymology?
 14. What are Stenotherms?

SECTION – III

Answer any 3 of the following. Question No. 19 is compulsory. (3 × 3 = 9)

15. What is parthenogenesis? Give two examples from animals.
 16. What is amniocentesis? Why a statutory ban is imposed on this technique?
 17. State the name of an immunosuppressant used in organ transplantation is produced from Trichoderma polysporum and write its uses.
 18. Give the salient features of Mutation Theory.
 19. Define Ecological Niche.

SECTION – IV

Answer all the questions

(2 × 5 = 10)

20. Give a schematic representation of spermatogenesis and oogenesis in humans.

(OR)

What is colour Blindness? How X-linked gene inherited in the marriage between hemizygous recessive male and normal visioned woman?

21. Why did Hershey and Chase use radioactively labelled phosphorus and sulphur only? Would they have got the same result if the if used radio labelled carbon and nitrogen?

(OR)

Describe the structure of immunoglobulin with suitable diagram.

ANSWERS

SECTION – I

1. (a) Arrhenotoky
 2. (c) Bartholin's gland
 3. (b) Both (A) and (B) are true (R) is the correct explanation of (A)
 4. (d) Semi-Conservative nature of DNA replication
 5. (c) Atavistic organs
 6. (c) Bursa of Fabricius brings cell mediated immunity
 7. (b) (i), (ii) and (iii) are false (iv) is true.
 8. (a) 1-iv, 2-v, 3-ii, 4-iii, 5-i

SECTION – II

9. Paedogamy is the sexual union of young individuals produced immediately after the division of the adult parent cell by mitosis.

- 10.

Foeticide	Infanticide
It refers to 'aborting the foetus in the mother's womb' intentionally.	It is 'killing the child after the birth'.

11. Symptoms of Patau's syndrome

- (i) It is characterized by multiple and severe body malformations as well as profound mental deficiency.
- (ii) Small head with small eyes, cleft palate, malformation of the brain and internal organs are some of the symptoms of this syndrome.

12. Some objections raised against Darwinism were

- (i) Darwin failed to explain the mechanism of variation.
- (ii) Darwinism explains the survival of the fittest but not the arrival of the fittest.
- (iii) He focused on small fluctuating variations that are mostly non-heritable.
- (iv) He did not distinguish between somatic and germinal variations.
- (v) He could not explain the occurrence of vestigial organs, over specialization of some organs like large tusks in extinct mammoths, oversized antlers in the extinct Irish deer, etc.,

13. Zymology is an applied science which deals with the biochemical process of fermentation and its practical uses.

14. Organisms which can tolerate only a narrow range of temperature are *stenotherms*. (Fish, Frogs, Lizards and Snakes).

SECTION – III

15. (i) Development of an egg into a complete individual without fertilization is known as parthenogenesis.

- (ii) Parthenogenesis is of two main types namely, Natural Parthenogenesis and Artificial Parthenogenesis.

(iii) Ex: Honey bees, Gall fly.

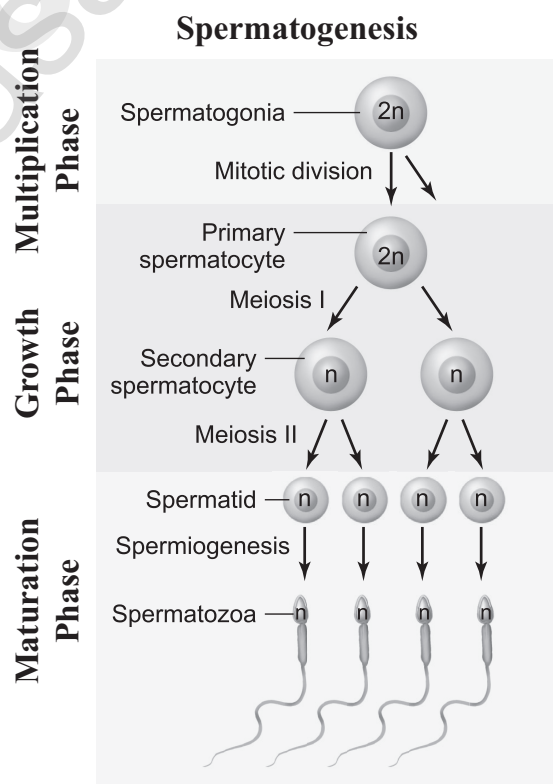
16. Amniocentesis is a prenatal technique used to detect any chromosomal abnormalities in the foetus and it is being often misused to determine the sex of the foetus. Once the sex of the foetus is known, there may be a chance of female foeticide. Hence, a statutory ban on amniocentesis is imposed.

17. Cyclosporin A, an immunosuppressant used in organ transplantation is produced from the fungus *Trichoderma polysporum*. It is also used for its anti-inflammatory, anti-fungal and antiparasitic properties.

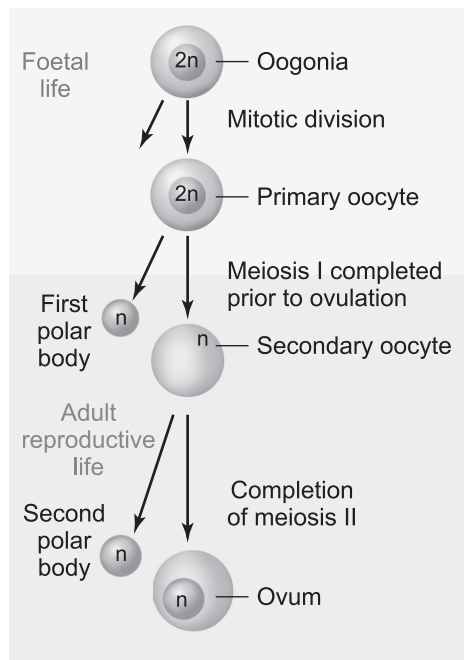
18. Salient features of Mutation Theory:

- (i) Mutations or discontinuous variation are transmitted to other generations.
- (ii) In naturally breeding populations, mutations occur from time to time.
- (iii) There are no intermediate forms, as they are fully fledged.
- (iv) They are strictly subjected to natural selection.

19. The physical space occupied by an organism and its functional role in the community is called Ecological Niche.

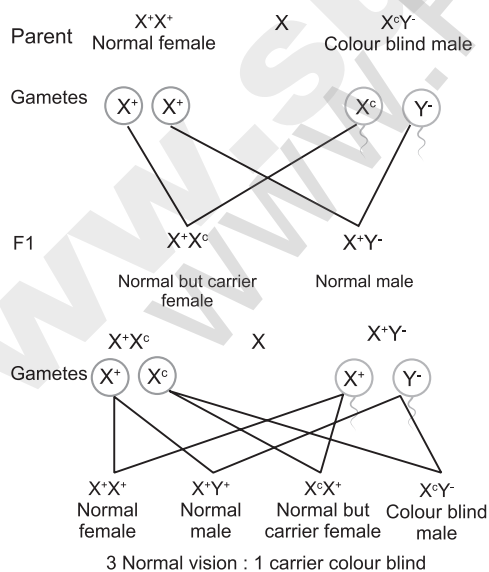
SECTION – IV**20.**

Oogenesis



(OR)

In human beings a dominant X-linked gene is necessary for the formation of colour sensitive cells, the cones. The recessive form of this gene is incapable of producing colour sensitive cone cells. Homozygous recessive females (X^cX^c) and hemizygous recessive males (X^cY) are unable to distinguish red and green colour. The inheritance of colour blindness can be studied in the following two types of marriages.



Marriage between colour blind man and normal visioned woman

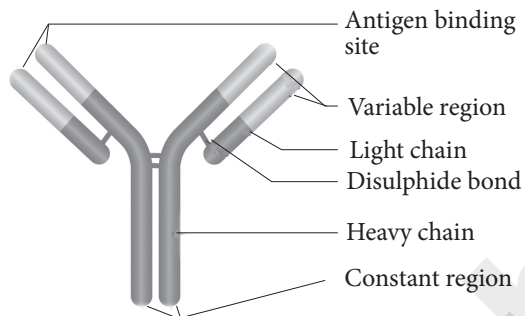
(i) **Marriage between colour blind man and normal visioned woman:**

A marriage between a colour blind man and a normal visioned woman will produce normal visioned male and female individuals in F1 generation but the females are carriers. The marriage between a F1 normal visioned carrier woman and a normal visioned male will produce one normal visioned female, one carrier female, one normal visioned male and one colour blind male. Colour blind trait is inherited from the male parent to his grandson through carrier daughter, which is an example of criss-cross pattern of inheritance.

- 21.** (i) **Alfred Hershey and Martha Chase (1952)** conducted experiments on bacteriophages that infect bacteria.
- (ii) Hershey and Chase wanted to observe whether it was DNA or protein that entered the bacteria.
- (iii) All nucleic acids contain phosphorus and contain sulphur (in the amino acid cysteine and methionine)
- (iv) Hershey and Chase used radioactive isotopes of Sulphur (^{35}S) and phosphorus (^{32}P) to keep separate track of the viral protein and nucleic acids during the infection process.
- (v) The phages were allowed to infect bacteria in culture medium which contained the radioactive isotopes ^{35}S or ^{32}P .
- (vi) The bacteriophage that grew in the presence of ^{35}S had labelled proteins and bacteriophages grown in the presence of ^{32}P had labelled DNA.
- (vii) The differential labelling thus enabled them to identify DNA and proteins of the phage.
- (viii) Hershey and Chase mixed the labelled phages with unlabelled *E. coli* and allowed bacteriophages to attack and inject their genetic material.
- (ix) It was observed that only ^{32}P was found associated with bacterial cells and ^{35}S was in the surrounding medium and not in the bacterial cells. When phage progeny was studied for radioactivity, it was found that it carried only ^{32}P and not ^{35}S .

- (x) Hershey and Chase thus conclusively proved that it was DNA, not protein, which carries the hereditary information from virus to bacteria.
- (xi) If they had used radioactive labelled carbon and nitrogen they would have not got the same result because carbon and nitrogen are found in DNA and protein.
- (xii) If they had used radioactive labelled carbon and nitrogen these labelled molecules would have been found in DNA and proteins and they would never be able to prove whether DNA or protein of a virus causes the heredity information

(OR)



Structure of immunoglobulin

- (i) In the 1950s, experiments by **Porter and Edelman** revealed the basic structure of the immunoglobulin.
- (ii) An antibody molecule is Y shaped structure that comprises of four polypeptide chains, two identical light chains (L) of molecular

- weight 25,000 Da (approximately 214 amino acids) and two identical heavy chains (H) of molecular weight 50,000 Da (approximately 450 amino acids).
- (iii) The polypeptide chains are linked together by di-sulphide (S-S) bonds. One light chain is attached to each heavy chain and two heavy chains are attached to each other to form a Y shaped structure. Hence, an antibody is represented by H_2L_2 .
- (iv) Each chain (L and H) has two terminals. They are C - terminal (Carboxyl) and amino or N-terminal.
- (v) Each chain (L and H) has two regions. They have variable (V) region at one end and a much larger constant (C) region at the other end.
- (vi) Antibodies responding to different antigens have very different (V) regions but their (C) regions are the same in all antibodies.
- (vii) In each arm of the monomer antibody, the (V) regions of the heavy and light chains combines to form an antigen - binding site shaped to 'fit' a specific antigenic determinant. Consequently each antibody monomer has two such antigen - binding regions.
- (viii) The (C) regions that forms the stem of the antibody monomer determine the antibody class and serve common functions in all antibodies.

