

NATIONAL HR SEC SCHOOL- VARATTAMPATTI
XII - ANNUAL EXAMINATIONS - MAY-2022
BIO-ZOOLOGY ANSWER KEY
PART - I (BIO - ZOOLOGY)

	TYPE -A	TYPE -B
1	D) Transcription	A) Amphibians
2	C) Trichoderma Polysporum	B) Extinction
3	A) Devonian	A) Epididymis
4	B) Extinction	D) O
5	A) Amphibians	D) Transcription
6	D) O	C) Trichoderma Polysporum
7	B) Denaturation, Annealing, Synthesis	A) Devonian
8	A) Epididymis	B) Denaturation, Annealing, Synthesis

Section- 2

answer the following questions

4x2=8

9. What is parthenogenesis ? Give Example ?

Parthenogenesis is a form of asexual reproduction in which an unfertilized egg develops into a new individual. Example: Honey bee, Wasps and Gall fly

10. What is surrogacy?

Surrogacy is a method of assisted reproduction or an agreement whereby a woman agrees to carry a pregnancy for another person who will become the parent of the new born child after birth. The embryos are produced through in vitro fertilization in the lab and are transferred into the uterus of surrogate mother.

11. Differentiate - Template strand and coding strand

Template strand	Coding strand
▶ It act as a template for synthesis of mRNA.	▶ It does not act as template.
▶ It has a sequence complementary to the mRNA.	▶ It has a sequence similar to the mRNA.
▶ It runs in 3' → 5' direction or polarity.	▶ It runs from 5' → 3' direction or polarity

12. Who disproved Lamarck's Theory of acquired characters? How?

1. Characters that are developed during the life time of an organism are called acquired characters and these are than inherited.
2. Lamark's "Theory of Acquired characters" was disproved by August Weismann who conducted experiments on mice for twenty generations by cutting their tails and breeding them.
3. All mice born were with tail. Weismann proved his germplasm theory that change in the somatoplasm will not be transferred to the next generation but

13. Write the symptoms of fillariasis.

The accoumulation of the worms in lymph glands block the lymphatic system resulting in inflammation of the lymph nodes. In some cases, the obstruction of lymph vessels causes elephantaiais or filariasis of the limbs, scrotum and mammary glands

14. What does gene therapy mean?

- * The transfer of a normal gene into a person's cells that carries one or more mutant alleles.
- * Expression of normal gene in the person results in a functional gene product whose action produces a normal phenotype.

Section- 3

Answer any three of the following questions . Q.No .19 is Compulsory 3x3=9

15. Differentiate foeticide and infanticide.

Foeticide:

Foeticide refers to aborting the foetus in the mother's womb.

Infanticide:

Infanticide is killing the female child after her birth

16. Autoimmune disease is a misdirected immunity response. justify

Autoimmunity is due to an abnormal immune response in which the immune system fails to properly distinguish between self and non-self and attacks its own body. Our body produces antibodies (**auto antibodies**) and **cytotoxic T cells** that destroy our own tissues. If a disease-state results, it is referred to as auto-immune disease. Thus, autoimmunity is a misdirected immune response. Autoimmunity is evidenced by the presence of **auto antibodies and T cells** that are reactive with host antigens. When the cells act as antigens in the same body, they are called autoantigens.

17. When does antibiotic resistance develop?

1. Antibiotic resistance occurs when bacteria develop the ability to defeat the drug designed to kill or inhibit their growth. It is one of the most acute threats to public health.
2. Antibiotic resistance is accelerated by the misuse and over use of antibiotics, as well as poor infection prevention control.
3. Antibiotics should be used only when prescribed by a certified health professional.
4. When the bacteria become resistant, antibiotics cannot fight against them and the bacteria multiply.

5. Narrow spectrum antibiotics are preferred over broad spectrum antibiotics. They effectively and accurately target specific pathogenic organisms and are less likely to cause resistance.

18. Differentiate Natality and Mortality

Natality	Mortality
The production of new individuals in the population by birth, hatching, germination or fission.	Loss of individuals in unit time or death rate.
Birth rate number of organism born per female per unit time.	The number of members of an original population dying after the lapse of a given time.
Birth rate (b) = $\frac{\text{number of birth per unit time}}{\text{Average population}}$	Death Rate = $\frac{\text{number of deaths per unit time}}{\text{Average population}}$

19. In the XY chromosomal system of sex determination, males have only one X chromosome, whereas females have two. A question arises: how does the organism compensate for this dosage differences between the sexes?

In mammals the necessary dosage compensation is accomplished by the inactivation of one of the X chromosome in females so that both males and females have only one functional X chromosome per cell.

Mary Lyon suggested that Barr bodies represented an inactive chromosome, which in females becomes tightly coiled into a heterochromatin, a condensed and visible form of chromatin (Lyon's hypothesis). The number of Barr bodies observed in cell was one less than the number of X-Chromosome. XO females have no Barr body, whereas XXY males have one Barr body.

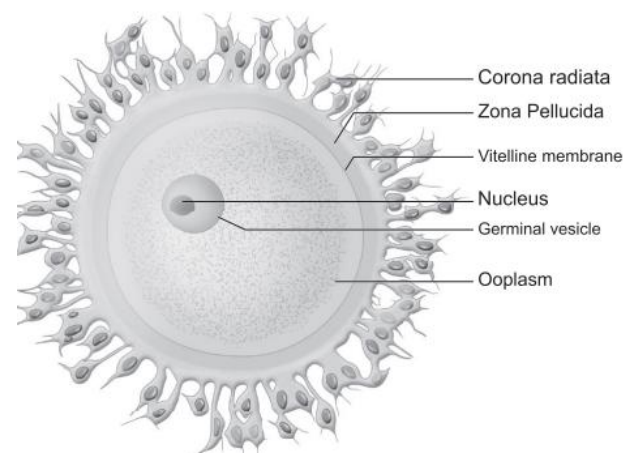
Section – 4

Answer the following questions

2x5=10

20. a) Explain the structure of human Ovum with a neat labelled diagram

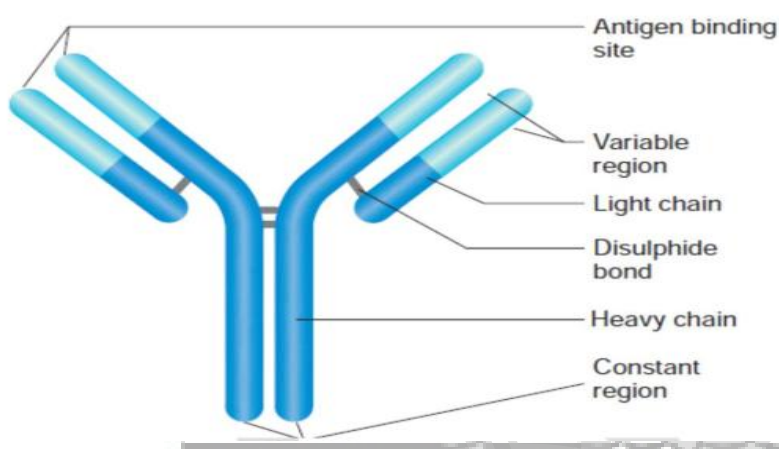
- Human ovum is non - cleidoic and alecithal.
- It is microscopic in nature
- It's cytoplasm is called Ooplasm. Ooplasm contains large nucleus called germinal vesicle.
- It has outer thick coat of follicular cells called corona radiata.
- The middle thick layer is called zona pellucida.
- The inner thin transparent layer is called vitelline membrane.
- Between the vitelline membrane and zona pellucida is a narrow space called perivitelline space.



20. b) What are the salient features of HGP? or Human Genome project

- HG - contain 3 billion nucleotide bases but the DNA sequence encoding proteins make up only less than 5% of the genome.
- An average gene consists of **3000 bases** **Largest known gene - dystrophin** has 2, 4 million base
- Genes distributed over 24 chromosomes - (show diversity) **Chromosome 19** - highest gene density **Chromosome 13 & y** - has lowest gene density.
- **Chromosome - 1** - has 2968 genes y - has only 231 genes.
- HG - has 35000 - 40,000 genes - 99.9 nucleotide bases are exactly same in all people.
- Functions of over 50% discovered genes - unknown
- Repeated sequences - make up large portion of Genome no coding function. It helps to understand

21. a) Explain the structure of immunoglobulin with suitable diagram.



1. In the 1950, experiments by **Porter and Edelman** revealed the basic structure of the immunoglobulin.
2. An antibody molecule is **Y** shaped structure that comprises of four polypeptide chains, two identical light chain (**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).
3. The polypeptide chains are linked together by di-sulphide (s-s) bonds.
4. One light chain is attached to each heavy chain and two heavy chains are attached to each other to form a Y shaped structure.
5. The heavy chains have a flexible hinge region at their approximate middles.
6. Each chain (L and H) has two terminals. They are C- terminal and N- terminal.
7. Each chain has two regions they have variable (v) region at one end and a much larger constant (c) region at the other end.
8. Antibodies responding to different antigens have very different (V) regions but their (C) regions are the same in all antibodies.
9. 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.
10. Consequently, each antibody monomer has two such antigen- binding regions.
11. The (C) regions that forms the stem of the antibody monomer determine the antibody class and serve common functions in all antibodies

21.b) Write an essay on radioactive waste management

Radioactive waste management involves the treatment, storage, and disposal of liquid, airborne, and solid effluents from the nuclear industry

Methods of disposal of radioactive wastes are

- 1. Limit generation** - Limiting the generation of waste is the first and most important consideration in managing radioactive wastes.
- 2. Dilute and disperse** - For wastes having low radioactivity, dilution and dispersion are adopted.
- 3. Delay and decay** - Delay and decay is frequently an important strategy because much of the radioactivity in nuclear reactors and accelerators is very short lived.
- 4. Concentrate and confine process** - Concentrating and containing is the objective of treatment activities for longer lived radioactivity. The waste is contained in corrosion resistant containers and transported to disposal sites. Leaching of heavy metals and radionuclides from these sites is a problem of growing concern.