DE BRITTO HR SEC SCHOOL, DEVAKOTTAI. SIVAGANGAI DIST.

HIGHER SECONDARY SECOND YEAR EXAMINATION - MAY-2025

ZOOLOGY - ANSWER KEY (TENTATIVE)

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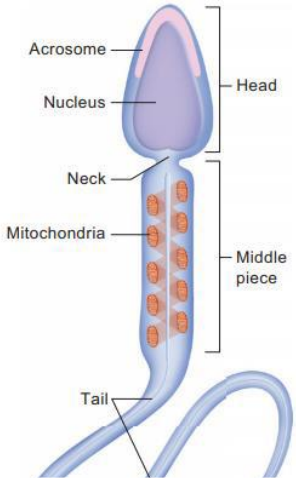
PART - I **15 x 1 = 15**

Note: (1) Answer all the questions.
(2) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.

Q. NO	A - TYPE	MARK	Q. NO	B - TYPE	MARK
1	c) Inflammation	1	1	a) Klinefelter's syndrome – XXY Female	1
2	a) UUU, Phenylalanine	1	2	d) Syphilis, Chlamydiasis, Gonorrhoea	1
3	a) Klinefelter's syndrome – XXY Female	1	3	a) Prolactin	1
4	c) 1400cc	1	4	d) Dobson units	1
5	d) Syphilis, Chlamydiasis, Gonorrhoea	1	5	d) Detection of Pathogens	1
6	d) Detection of Pathogens	1	6	b) Both Assertion and Reason are true and Reason explains Assertion correctly	1
7	a) Prolactin	1	7	c) Inflammation	1
8	b) Both Assertion and Reason are true and Reason explains Assertion correctly	1	8	c) 1400cc	1
9	b) Conformer – Regulator - Partial Regulator	1	9	a) *Aspergillus niger*	1
10	a) Conjugation	1	10	b) Conformer – Regulator - Partial Regulator	1
11	d) Chennai	1	11	a) UUU, Phenylalanine	1
12	c) Oprons	1	12	a) A toxin from *Plasmodium* species	1
13	a) *Aspergillus niger*	1	13	a) Conjugation	1
14	d) Dobson units	1	14	c) Oprons	1
15	a) A toxin from *Plasmodium* species	1	15	d) Chennai	1

PART - II

NOTE: Answer any six questions. Question number 24 is compulsory. **6 x 2 = 12**

Q.NO	ANSWERS	MARKS
16	**Ectopic pregnancy:** 1. If the fertilized ovum is implanted outside the uterus it results in ectopic pregnancy. 2. About 95 % of ectopic pregnancies occur in the fallopian tube.	1 1 **Total- 2**
17	**Structure of matured spermatozoa:**  **Diagram – 1 Mark** **Parts – 1 Mark**	**Total- 2**
18	**Applications of DNA Finger printing** **(Any Two) 2 x1 = 2** **Forensic analysis:** 1. It can be used in the identification of a person involved in criminal activities 2. Identification for settling paternity or maternity disputes, 3. Determining relationships for immigration purposes. **Pedigree analysis:** 4. Inheritance pattern of genes through generations and for detecting inherited diseases. **Conservation of wild life:** 5. Protection of endangered species. By maintaining DNA records for identification of tissues of the dead endangered organisms. **Anthropological studies:** 6. It is useful in determining the origin and migration of human populations and genetic diversities.	**Total- 2**
19	**Major gases seem to be found in the primitive earth.** 1. Ammonia, 2. Methane, 3. Hydrogen and 4. Water vapour	½ ½ ½ ½ **Total- 2**
20	**Rearrange the descent in human evolution:** *1. Ramapithecus → Australopithecus → Homo habilis → Homo erectus → Homo sapiens*	2 **Total -2**
21	**How does saliva act in body defence?** 1. Lysozyme acts as antibacterial agent and cleaves the bacterial cell wall. **2.** Lysozyme is a secretion of saliva.	1 1 **Total -2**

22	**Give any two bioactive molecules produced by microbes and state their uses.** 1. Lipases - used in detergent formulations and are used for removing oily stains from the laundry. 2. Pectinase, protease and cellulose – used in clarify the Bottled juices. 3. Rennet - used to separate milk into solid curds for cheese making	**Any 2** **Total- 2**
23	**Acclimatisation:** 1. Animals are known to modify their response to environmental changes in a short time. This is known as Acclimatization.	**2** **Total- 2**
24	**Natality (Population increase):** 1. Birth rate 2. Populations increase because of natality. **Mortality (Population decrease):** 1. Death rate. **2.** Population decline factor and is opposite to natality.	½ **12** ½ ½ **Total- 2**

PART - III

NOTE: Answer any six questions. Question number 33 is compulsory. **6 x 3 = 18**

<table>
<tr><th>Q.NO</th><th>ANSWERS</th><th>MARKS</th></tr>
<tr><td>25</td><td>Fission and Fragmentation
<table>
<tr><th>Fission</th><th>Fragmentation</th></tr>
<tr><td>Fission is the division of the parent body into two or more identical daughter individuals</td><td>Fragmentation, the parent body breaks into fragments (pieces) and each of the fragment has the potential to develop into a new individual.</td></tr>
<tr><td>Ex:
• Binary fission – Amoeba Paramecium and Planaria Vorticella and Euglena.
• Multiple fission - Vorticella.
• Plasmotomy - Opalina and Pelomyxa
• Strobilation - Aurelia.
• Sporulation - Amoeba.</td><td>Ex:
• Pedal laceration - sea anemones
• Apolysis - Taenia solium</td></tr>
</table></td><td>1 + 1
½ + ½
Total -3</td></tr>
<tr><td>26</td><td>Expand the following.
1. ZIFT - Zygote Intra - Fallopian Transfer.
2. ICSI - Intra Cytoplasmic Sperm Injection.
3. IUT – Intra Uterine Transfer</td><td>1
1
1
Total -3</td></tr>
<tr><td>27</td><td>Criss – cross inheritance?
1. X- Linked traits are inherited from the male parent to his grandson through carrier daughter.
Ex: (Any two)
2. Red-green colour blindness or daltonism,
1. Haemophilia and
2. Duchenne’s muscular dystrophy</td><td>2
½
½
Total-3</td></tr>
<tr><td>28</td><td>The coding Sequence of DNA: 5' TGC ATG CAT GCA TGC ATG CAT GCA TGC 3'
1. The sequence of mRNA: 3’ACG UAC GUA CGU ACG UAC GUA CGU ACG 5’</td><td>3
Total-3</td></tr>
</table>

29

Diseases	Causative agent	Site of infection
Mumps	*Mumps virus (RNA virus), Paramyxo virus*	Salivary glands
Chicken pox	*Varicella -Zoster virus (DNA Virus)*	Respiratory tract, skin and nervous system
Dengue fever (Break bone fever)	*Dengue virus or Flavi virus (DENV 1-4 virus)*	Skin and blood.

1
1
1
Total-3

30

What is bioremediation? Mention its types.

1. The use of naturally occurring or genetically engineered microorganisms to reduce or degrade pollutants is called bioremediation. **2**

Types:

2. In situ bioremediation (treatment of contaminated soil or water in the site). **½**
3. Ex situ bioremediation (treatment of contaminated soil or water that is removed from the site and treated). **½**

Total-3

31

Gene therapy is an attempt to correct a Genetic defect by providing a normal gene into the individual. By this the function can be restored. An alternate method would be to provide gene product known as enzyme replacement therapy, which would also restore the function. Which in your opinion is a better option? Give reasons for your answer.

1. Though both Gene therapy and Enzyme replacement therapy helps to restore the genetic defects, Gene therapy is much better than Enzyme replacement therapy. **1**
2. Because, in Gene therapy once the defective gene is repaired using normal gene, the affected individual gains complete recovery. **1**
3. Whereas, in Enzyme replacement therapy, the respective enzyme or protein has to be provided periodically and does not offer a permanent cure. **1**

Total-3

32

How many hotspots are there in India? Name them.

1. There are Four hotspots are there in India **1**
2. Himalayas: The entire Indian Himalayan region. **½**
3. Western Ghats. **½**
4. Indo - Burma: includes entire North - eastern India, except Assam and Andaman group of Islands. **½**
5. Sundalands: Includes Nicobar group of Islands. **½**

Total-3

33

What are agrochemicals or agrichemicals?

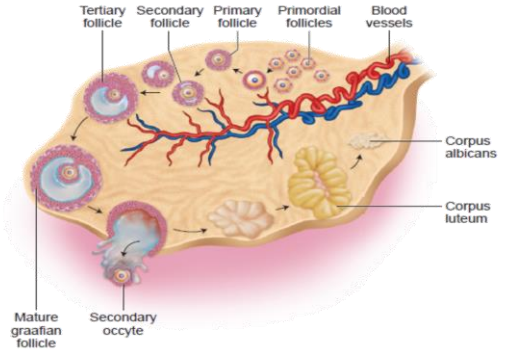
1. Chemicals which are used in agriculture for growth of plants and pest control are called agrochemicals or agrichemicals. **2**

Overuse of agrochemicals: **any 2 (2 x ½ = 1)**

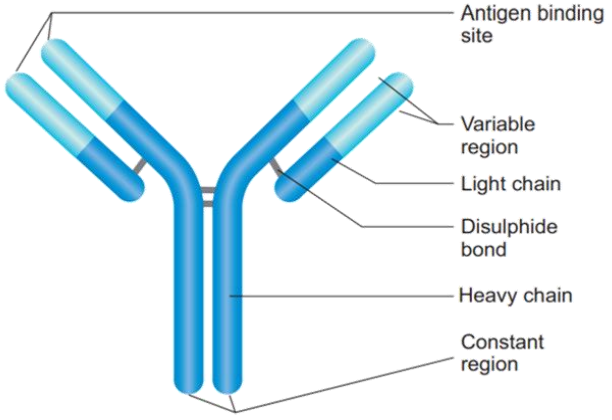
1. kill beneficial bacteria and soil organisms. **1**
2. Can cause eutrophication in water bodies.
3. Affect aquatic animals and their productivity.
4. Pesticide containing water, is unfit for human consumption.
5. Particles (aerosols) and residues of these chemicals cause air pollution.
6. Inhalation of contaminated air can cause respiratory problems.
7. Consumption can lead to poisoning, side effects and after effects. **Total-3**
8. Chemicals can cause skin rashes and irritation of eyes.
9. Many of these chemicals are reported to be carcinogenic.
10. They can trigger hormonal disorders and neurotoxicity.
11. Beneficial insects and animals can be affected.

PART - IV

Note: Answer all the questions. **5 x 5 = 25**

Q.NO	ANSWERS	MARKS
34. (a)	**Structure of Human ovary.** **Any 6 (6x ½ = 3)** 1. Ovaries are the **primary female sex organs**. 2. **Location:** Each side of the lower abdomen. 3. **Structure:** Elliptical 4. **Size:** 2 - 4 cm long. 5. The ovary remains attached to the pelvic wall and the uterus by an ovarian ligament called **mesovarium.** 6. **Covering of ovary:** Thin cuboidal epithelium (the germinal epithelium). 7. Below the germinal epithelium is a dense connective tissue, the tunica albuginea. 8. The stroma is differentiated as the outer cortex and inner medulla. 9. **Cortex:** Appears as dense and granular due to the presence of ovarian follicles in various stages of development. 10. **The medulla:** contains loose connective tissue with abundant blood vessels, lymphatic vessels and nerve fibres. **Diagram – 1 Mark** **Parts – 1 Mark**  	3 2 **Total-5**
34. (b)	**Explain the genetic basis of ABO blood grouping man.** 1. The basis of these chemical differences is due to the presence of antigens (surface antigens) on the membrane of RBC and epithelial cells, blood groups are classified. **<u>The genetic basis of ABO blood grouping in man:</u>** 2. Three autosomal alleles are on chromosome 9. 3. These alleles determine the blood group. 4. The gene for blood group is labelled as ''I'' (I - Isoagglutinogen - antigen) 5. I gene has 3 allelic forms I^A I^B I^O 6. I^A specifies A antigen, I^B for B antigen and I^O allele specifies no antigen. 7. The phenotypic combinations is –A, B, AB, and O. 8. The genotypes are I^A I^A, I^A I^O, I^B I^B, I^B I^O, I^A I^B, and I^O I^O. **(OR)** **Table 3 Mark** **<u>Chemical basis of ABO blood grouping:</u>** 1. Each allele (I^A and I^B) produces a transferase enzyme. 2. I^A allele produces N-acetyl galactose transferase and can add N-acetyl galactosamine (NAG) to the precursor. 3. I^B allele encodes for the enzyme galactose transferase that adds galactose to the precursor (i.e., H substances). **Table** **Genotype** | **ABO blood group phenotype** | **Antigens present on red blood cell** | **Antibodies present in blood plasma** I^AI^A | Type A | A | Anti -B I^AI^o | Type A | A | Anti -B I^BI^B | Type B | B | Anti -A I^BI^o | Type B | B | Anti -A I^AI^B | Type AB | A and B | Neither Anti-A nor Anti-B I^oI^o | Type O | Neither A nor B | Anti -A and anti - B	1 3 1 **Total-5**

35. (a)	**Rh incompatibility:** **6 x ½ = 3** 1. Mother is Rh negative and the foetus is Rh positive. 2. Usually, no effects are associated with exposure of the mother to Rh positive antigen during the first child birth. 3. Subsequent Rh-positive children carried by the same mother, may be exposed to antibodies produced by the mother against Rh antigen. 4. They are carried across the placenta into the foetal blood circulation. 5. This causes haemolysis of foetal RBCs resulting in haemolytic jaundice and anaemia. 6. This condition is known as **Erythoblastosis foetalis or Haemolytic disease of the new born (HDN).** **Prevention** 7. If the mother is Rh negative and foetus is Rh positive, anti D antibodies should be administered to the mother at **28th and 34th week** of gestation as a prophylactic measure. 8. If the Rh-negative mother delivers Rh positive child, **then anti D antibodies should** be administered to the mother soon after delivery.	**3** **1** **1** **Total-5**
35. (b)	**Extinction:** **<u>Species extinction:</u>** **1 ½ Mark** 1. It eliminates an entire species, Reasons: 2. Environmental event – flood 3. Biological event – disease 4. Non-availability of food resource half or more). **<u>Mass extinction:</u>** **1 ½ Mark** 1. It eliminates half or more species in a region or ecosystem. Reasons: 2. Volcanic eruption. 3. Five major mass extinction that occurred since the Cambrian period. **½ Mark** **<u>Global extinction:</u>** **1 ½ Mark** 1. It eliminates most of the species on a large scale or larger taxonomic groups in the continent or the Earth. Example: 2. Snow ball Earth and extinction following elevation in CO_2 levels.	**Total-5**
36 a	**Write the salient features of Human Genome Project.** 1. Although human genome contains 3 billion nucleotide bases, the DNA sequences that encode proteins make up only about 5% of the genome. 2. An average gene consists of 3000 bases, the largest known human gene being dystrophin with 2.4 million bases. 3. The function of 50% of the genome is derived from transposable elements such as LINE and ALU sequence. 4. Genes are distributed over 24 chromosomes. Chromosome 19 has the highest gene density. Chromosome 13 and Y chromosome have lowest gene densities. 5. The chromosomal organization of human genes shows diversity. 6. There may be 35000-40000 genes in the genome and almost 99.9 nucleotide bases are exactly the same in all people. 7. Functions for over 50 percent of the discovered genes are unknown. 8. Less than 2 percent of the genome codes for proteins.	**Any 5** **Total-5**

	9. Repeated sequences make up very large portion of the human genome. Repetitive sequences have no direct coding functions but they shed light on chromosome structure, dynamics and evolution (genetic diversity). 10. Chromosome 1 has 2968 genes, whereas chromosome 'Y' has 231 genes. 11. Scientists have identified about 1.4 million locations, where single-base DNA differences (SNPs – Single nucleotide polymorphism – pronounce as 'snips') occur in humans. Identification of 'SNIPS' is helpful in finding chromosomal locations for disease-associated sequences and tracing human history.	
36 b	**Prevention of alcohol and drug abuse.** 1. **Effectively dealing with peer pressure:** Have a better group of friends to avoid such harmful drugs and alcohol. 2. **Seeking help from parents and peers:** Help from parents and peer group. Help may even be sought from close and trusted friends. 3. **Education and counselling:** Education and counselling create positive attitude to deal with many problems and to accept disappointments in life. 4. **Looking for danger signs:** Teachers and parents need to look for sign that indicate tendency to go in for addiction. 5. **Seeking professional and medical assistance:** Assistance is available in the form of highly qualified psychologists, psychiatrists and de-addiction and rehabilitation programmes.	**1** **1** **1** **1** **1** **Total-5**
37 a	**Structure of immunoglobulin.** **Any 6 (6 x ½ = 3)** 1. In 1950s, Porter and Edelman revealed the basic structure of the immunoglobulin. 2. An antibody molecule is Y shaped structure. 3. Comprises of 4 four polypeptide chains. 4. Two identical light chains (L) of molecular weight 25,000 Da (214 amino acids). 5. Two identical heavy chains (H) of molecular weight 50,000 Da (450 amino acids). 6. The polypeptide chains are linked together by di-sulphide (S-S) bonds. 7. One light chain is attached to each heavy chain and 2 heavy chains are attached to each other to form a Y shaped structure. 8. Hence, an antibody is represented by $H_2 L_2$. 9. Terminals: They are C - terminal (Carboxyl) and amino or N-terminal. 10. Two regions: They have variable (V) region & (C) region at the other end.  **Diagram = 1 Mark** **Parts = 1 mark**	**3** **2** **Total-5**

37 b

Adaptations seen in terrestrial animals: **Any 5 (5 x 1 = 5)**

1. **Earthworms, land Planarians:** Mucus coating to maintain a moist situation for burrowing, coiling, respiration, etc.,
2. **Arthropods:** external covering over the body surfaces and well - developed tracheal systems for respiration.
3. **Vertebrate:** Skin with many cellular layers. The well protected respiratory surfaces that help in preventing loss of water.
4. **Some animals:** Obtain their water requirement from food as partial replacement of water lost through excretion.
5. **Birds:** Make nests and breed before the rainy season as there is availability of abundant food. But during drought birds rarely reproduce.
6. **Camels:** They are able to regulate water effectively for evaporative cooling through the skin and respiratory system and excrete highly concentrated urine, and can also withstand dehydration up to 25% of their body weight.

Any 5

Total-5

38 a

r selected and k selected species.

r selected species	k selected species
Smaller sized organisms	Larger sized organisms
Produce many offspring	Produce few offspring
Mature early	Late maturity with extended parental care
Short life expectancy	Long life expectancy
Each individual reproduces only once or few times in their life time	Can reproduce more than once in lifetime
Only few reaches adulthood	Most individuals reach maximum life span
Unstable environment, density independent	Stable environment, density dependent

Any 5

Total-5

38 b

i) Protected areas.

1. These are biogeographical areas where biological diversity along with natural and cultural resources is protected, maintained and managed through legal measures.
2. Protected areas include national parks, wild life sanctuaries, community reserves and biosphere reserves.
3. World Conservation monitoring centre has recognized 37,000 protected areas world-wide.
4. India has about 771 protected areas covering 162099 Km^2.
5. National Parks (104).
6. Wild Life Sanctuaries (544).
7. biosphere reserves (18) and
8. Several sacred groves.

2

ii) Wildlife sanctuaries:

1. Any area other than the area comprised with any reserve forest or the territorial waters can be notified by the State Government.
2. This constitutes as a sanctuary with adequate ecological, faunal, floral, geomorphological, natural or zoological significance.
3. This is for the purpose of protecting, endangered factual species.
4. Ecotourism is permitted, as long as animal life is undisturbed.
5. Wild life sanctuaries in India 544.
6. Wild life sanctuaries in India covering an area of 118,918 km^2.

2

	7. It is 3.62 % of the geographical area of the country (National Wildlife Database, 2017). 8. Sanctuaries are tracts of land where wild animals and fauna can take refuge without being hunted or poached. 9. Collection of forest products, harvesting of timber and private ownership of land also permitted. **iii) WWF** 1. World Wild Fund for Nature (WWF). 2. It is an international non-governmental charitable trust founded in 1961, 3. Headquarters at Gland, Vaud, Switzerland. 4. It aims at wildness preservation and the reduction of human impact on the environment. 5. It was formerly named the World Wildlife Fund. **The vision of WWF:** 6. To conserve nature and reduce the threats to the diversity. 7. Conserving the world's most ecologically important regions. 8. Protect and restore species and their habitats. 9. Strengthen local communities. 10. Ability to conserve the natural resources.	**1** **Total-5**

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