DIRECTORATE OF GOVERNMENT EXAMINATION, CHENNAI - 600006
HIGHER SECONDARY SECOND YEAR PUBLIC EXAMINATION, MARCH - 2025
ZOOLOGY – KEY ANSWER

TOTAL MARKS: 70

NOTE : 1) **Answer written only in BLACK or BLUE should be evaluated**
2) **Choose the correct answer and write the option code**

PART – I

Answer all the questions **15 x 1 = 15**

Q. No	option	TYPE - A	Q. No	option	TYPE - B	marks
1	c	Inflammation	1	a	Klinefelters' syndrome – XXY Female	1
2	a	UUU, Phenylalanine	2	d	Syphilis, chlamydiasis and gonorrhoea	1
3	a	Klinefelters' syndrome – XXY Female	3	a	Prolactin	1
4	c	1400 cc	4	d	Dobson units	1
5	d	Syphilis, chlamydiasis and gonorrhoea	5	d	Detection of pathogens	1
6	d	Detection of pathogens	6	b	Both Assertion and Reason are true and Reason explains Assertion correctly.	1
7	a	Prolactin	7	c	Inflammation	1
8	b	Both Assertion and Reason are true and Reason explains Assertion correctly.	8	c	1400 cc	1
9	b	Conformer Regulator Partial Regulator	9	a	Aspergillus niger	1
10	a	Conjugation	10	b	Conformer Regulator Partial Regulator	1
11	d	Chennai	11	a	UUU, Phenylalanine	1
12	c	Operons	12	a	A toxin from plasmodium species	1
13	a	Aspergillus niger	13	a	Conjugation	1
14	d	Dobson units	14	c	Operons	1
15	a	A toxin from plasmodium species	15	d	Chennai	1

PART - II

Answer any six questions
Question number 24 is compulsory

Q. NO	Answer	Marks 6x2=12
16	**Ectopic pregnancy :** The fertilized ovum is implanted outside the uterus it results in ectopic pregnancy.	2
17	**Human spermatozoan :** **Diagram – 1mark** **Parts – 1mark**	2
18	**Application of DNA finger printing:** 1. Forensic analysis 2. Pedigree analysis 3. Conservation of wild life 4. Anthropological studies **(Any 2 only)**	2
19	**List out the major gases seems to be found in the primitive earth:** Ammonia, methane, hydrogen and water vapour.	2
20	**Rearrange the descent in human evolution :** Ramapithecus →Austrolopithecus →Homo habilis → Homo erectus → Homo sapiens	2
21	**Saliva act in body defence :** Saliva contains Lysozyme. It acts as antibacterial agent and cleaves the bacterial cell wall.	2
22	**Any two bioactive molecules and their uses:** 1. Streptokinase - Clot buster 2. Cyclosporin A - Used in organ transplantation. It is also used for its anti-inflammatory, antifungal and anti-parasitic properties. 3. Statins - Lower blood cholesterol levels 4. Recombinant human insulin - Therapeutic use in human **(Any 2 only)**	2

23	**Acclimatization:** Animals are known to modify their response to environmental changes (stress) in reasonably short time spans. This is known as Acclimatization.	**2**
24	**Natality and Mortality:** The production of new individuals in the population by birth, hatching, germination (or) fission. Or $\text{Birth rate (b)} = \frac{\text{Number of birth per unit time}}{\text{Average population}}$ Mortality can be expressed as a loss of individuals in unit time or death rate. Or $\text{Death rate (d)} = \frac{\text{Number of Deaths per unit time}}{\text{Average population}}$	**1** **1**

PART – III

Answer any six questions

Question number 33 is compulsory

Q. NO	Answer	Marks 6x3=18
25	**Fission:** Fission is the division of the parent body into two or more identical daughter individuals. E.g. Amoeba, Paramecium, Ceratium, Vorticella and Euglena. **(Any 1 E.g)** **Fragmentation**: The parent body breaks into fragments (pieces) and each of the fragment has the potential to develop into a new individual. E.g. sea anemones, tapeworm. **(Any 1 E.g)**	**1** **½** **1** **½**

26	**Expand the following :** 1. ZIFT - Zygote Intra-Fallopian Transfer 2. ICSI - Intra-Cytoplasmic Sperm Injection 3. IUT - Intra Uterine Transfer	**1** **1** **1**
27	**Criss-cross inheritance:** The trait is inherited from the male parent to his grandson through carrier daughter. Ex:- Colour blindness. Haemophilia **(Any 1 E.g)**	**2** **1**
28	**Write down the sequence of mRNA :** 3' ACG UAC GUA CGU ACG UAC GUA CGU ACG 5'	**3**
29		

Disease	Causative agents	Site of Infection	
Mumps	Mumps virus (RNA virus) Paramyxo virus	Salivary glands	**1**
Chicken pox	Varicella Zoster virus (DNA virus)	Respiratory tract, skin and nervous system	**1**
Dengue fever	Dengue virus or Flavi virus or DENV 1-4 virus	Skin and blood	**1**

30	**Bioremediation and their types :** The use of naturally occurring or genetically engineered microorganisms to reduce or degrade pollutants is called bioremediation. **Types:** 1. In situ bioremediation 2. Ex situ bioremediation	**2** **1**
31	**Gene therapy and Enzyme replacement therapy:** 1. Gene therapy is better than Enzyme replacement therapy. 2. Gene therapy cure genetic disorder permanently. Enzyme replacement therapy cure temporarily.	**1** **2**

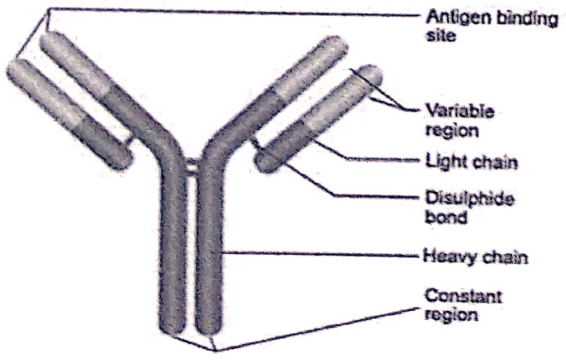
32	**Hotspots in India :** There are four Hotspots in India 1. Himalaya 2. Western Ghats 3. Indo-Burma 4. Sundalands	 **1** **2**
33	**Agrochemicals and its effects:** Chemicals which are used in agriculture for growth of plants and pest control are called agrochemicals or agrichemicals. **Effects** • May kill beneficial bacteria and soil organisms. • Can cause eutrophication in water bodies. • Affect aquatic animals and their productivity. • Pesticide containing water, even in trace quantities is unfit for human consumption. • Particles (aerosols) and residues of these chemicals cause air pollution. • Inhalation of contaminated air can cause respiratory problems. • Consumption can lead to poisoning, side effects and after effects. • Chemicals can cause skin rashes and irritation of eyes. • Many of these chemicals are reported to be carcinogenic. • They can trigger hormonal disorders and neurotoxicity. • Beneficial insects and animals can be affected. **(Any 2)**	 **1** **2**

PART - IV

Answer all the questions

<table>
<tr><th>Q. NO</th><th>Answer</th><th>Marks 5x5= 25</th></tr>
<tr><td>34 (a)</td><td>Ovaries are the primary female sex organs that produce the female gamete, ovum. The ovaries are located one on each side of the lower abdomen. The ovary is an elliptical structure about 2-4 cm long. Each ovary is covered by a thin cuboidal epithelium called the germinal epithelium which encloses the ovarian stroma. The stroma is differentiated as the outer cortex and inner medulla. Below the germinal epithelium is a dense connective tissue, the tunica albuginea. The cortex appears dense and granular due to the presence of ovarian follicles in various stages of development. The medulla is a loose connective tissue with abundant blood vessels, lymphatic vessels and nerve fibres. The ovary remains attached to the pelvic wall and the uterus by an ovarian ligament called mesovarium.
Explanation – 3 diagram - 2</td><td>5</td></tr>
<tr><td colspan="3">(Or)</td></tr>
<tr><td>34 (b)</td><td><u>Genetic basis of ABO blood grouping in man :</u>
Table
<table>
<tr><th>Genotype</th><th>ABO blood group phenotype</th><th>Antigens present on red blood cell</th><th>Antibodies present in blood plasma</th></tr>
<tr><td>$I^A I^A$</td><td>Type A</td><td>A</td><td>Anti – B</td></tr>
<tr><td>$I^A I^O$</td><td>Type A</td><td>A</td><td>Anti - B</td></tr>
<tr><td>$I^B I^B$</td><td>Type B</td><td>B</td><td>Anti - A</td></tr>
<tr><td>$I^B I^O$</td><td>Type B</td><td>B</td><td>Anti - A</td></tr>
<tr><td>$I^A I^B$</td><td>Type AB</td><td>A and B</td><td>Neither Anti – A nor Anti - B</td></tr>
<tr><td>$I^O I^O$</td><td>Type O</td><td>Neither A nor B</td><td>Anti – A and Anti - B</td></tr>
</table>
(or)
Genetic basis of ABO blood grouping in man - Explanation</td><td>5</td></tr>
<tr><td>35 (a)</td><td><u>Incompatibility of Rh Factor:</u>
• Rh incompatability has great significance in child birth.
• If a woman is Rh negative and the man is Rh positive, the foetus may be Rh positive having inherited the factor from its father.
• The Rh negative mother becomes sensitized by carrying Rh positive foetus within her body.
• Due to damage of blood vessels, during child birth, the mother's immune system recognizes the Rh antigens and gets sensitized.</td><td>3</td></tr>
</table>

	• The sensitized mother produces Rh antibodies. • The antibodies are IgG type which are small and can cross placenta and enter the foetal circulation. • By the time the mother gets sensitized and produce anti 'D' antibodies, the child is delivered. • Usually no effects are associated with exposure of the mother to Rh positive antigen during the first child birth, subsequent Rh positive children carried by the same mother, may be exposed to antibodies produced by the mother against Rh antigen, which are carried across the placenta into the foetal blood circulation. • This causes haemolysis of foetal RBCs resulting in haemolytic jaundice and anaemia. • This condition is known as Erythroblastosis foetalis or Haemolytic disease of the new born (HDN). **Prevention :** • 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. • If the Rh negative mother delivers Rh positive child then anti D antibodies should be administered to the mother soon after delivery. • This develops passive immunity and prevents the formation of anti D antibodies in the mothers blood by destroying the Rh foetal RBC before the mother's immune system is sensitized. • This has to be done whenever the woman attains pregnancy.	**2**
	(Or)	
35 (b)	**Explain the three level of impact of extinction of species:** 1. **Species extinction** eliminates an entire species, by an environmental event (flood etc.,) or by biological event (disease or non availability of food resource half or more). 2. **Mass extinction** eliminates half or more species in a region or ecosystem, as might occur following a volcanic eruption. Five major mass extinction that occurred since the Cambrian period. This mass extinction is often referred to as K-T extinction. Table 6.2 represents the K-T extinction. 3. **Global extinction** eliminates most of the species on a large scale or larger taxonomic groups in the continent or the Earth. Snow ball Earth and extinction following elevation in CO2 levels are example. Extinction events opens up new habitats and so can facilitate the radiation of organisms that survived the mass extinction.	1½ 2 1½

36 (a)	**Salient features of Human Genome Project:** 1. The human genome contains 3 billion nucleotide bases. 2. An average gene consists of 3000 bases, the largest known human gene being dystrophin with 2.4 million bases. 3. The chromosomal organization of human genes shows diversity. 4. Approximately 30,000 genes are present in human genome and almost 99.9 nucleotide bases are exactly the same in all people. 5. Functions for over 50 percent of the discovered genes are unknown. 6. Less than 2 percent of the genome codes for proteins. 7. 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). 8. Chromosome 1 has 2968 genes whereas chromosome Y has 231 genes. 9. 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. **(Any 5 points)**	**5**
	(Or)	
36 (b)	**Suggest some ways to prevent drug and alcohol abuse:** 1. Effectively dealing with peer pressure 2. Seeking help from parents and peers 3. Education and counselling 4. Looking for danger signs 5. Seeking professional and medical assistance **(with explanation)**	**1** **1** **1** **1** **1**
37 (a)	**Structure of Immunoglobulin**  **Explanation – 3 diagram - 2**	**5**

(Or)

37 (b) **List the adaptations seen in terrestrial animals:**

1. Earthworms and land Planarians secrete a mucus coating to maintain a moist situation for burrowing, coiling, respiration, etc.,
2. Arthropods have an external covering over the respiratory surfaces and well developed tracheal systems.
3. In vertebrate skin, there are many cellular layers besides 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 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 points) — **5**

38 (a) **Differences between r- selected and K selected species:**

R selected species (r – Reproductive capacity)	K selected species (k – Reproductive capacity)
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 reach adulthood	Most individuals reach maximum life span
Unstable environment, density independent	Stable environment density dependent.

(Any 5 Points) — **5**

(Or)

38 (b)	**1. Protected Areas:** • These are biogeographical areas where biological diversity along with natural and cultural resources is protected, maintained and managed through legal measures. • Protected areas include national parks, wild life sanctuaries, community reserves and biosphere reserves. • World Conservation monitoring centre has recognized 37,000 protected areas world-wide. • India has about 771 protected areas covering 162099 km2 comprising of National Parks (104), Wild Life Sanctuaries (544), biosphere reserves (18) and several sacred groves. **(Any 2 points)** **2. Wild Life Sanctuaries (WLS):** • Any area other than the area comprised with any reserve forest or the territorial waters can be notified by the State Government to constitute as a sanctuary if such area is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance. • This is for the purpose of protecting, endangered factual species. Some restricted human activities are allowed inside the Sanctuary area. **(Any 1 Points)** **3. WWF:** • World Wild Fund for Nature (WWF) is an international non-governmental charitable trust founded in 1961, with headquarters at Gland, Vaud, Switzerland. • It aims at wildness preservation and the reduction of human impact on the environment. • It was formerly named the World Wildlife Fund. The living planet report is being published every two years by WWF since 1998. • The vision of WWF is to conserve nature and reduce the most pressing threats to the diversity of life on Earth by conserving the world's most ecologically important regions, protect and restore species and their habitats, strengthen local communities' ability to conserve the natural resources they depend upon and to ensure that the value of nature is reflected in decision made by individuals, communities, governments and businesses. **(Any 2 Points)**	**2** **1** **2**