DIRECTORATE OF GOVERNMENT EXAMINATION, CHENNAI-6

HIGHER SECONDARY SECOND YEAR PUBLIC EXAMINATION- MARCH-2024

ZOOLOGY KEY ANSWER

PART- III ZOOLOGY **Maximum Marks: 70**

NOTE:

1. **Answer written only in BLACK or BLUE should be evaluated**
2. **Choose the correct answer and write the option code**
3. **If one of them (option or answer) is wrong, then award zero mark only**

PART– I

Answer all the questions. **15 × 1 =15**

Q. No	Opt.	TYPE - A	Opt.	TYPE - B	Mark
1	d	IgA	d	Transcription	1
2	b	U-V rays	d	IgA	1
3	c	Mesovarium	a	Molasses	1
4	c	Antigen	c	Convergent evolution	1
5	d	Transcription	b	U-V rays	1
6	a	120 – 160 beats/minute	c	Mesovarium	1
7	c	Convergent evolution	c	Antigen	1
8	a	Quaternary	a	Genetic Engineering Approval Committee	1
9	a	Molasses	d	Insects	1
10	a	Genetic Engineering Approval Committee	a	IUCN	1
11	b	(A)–(ii), (B)–(iv), (C)–(iii), (D)–(i)	a	120 – 160 beats/minute	1
12	d	Insects	b	Multiple alleles	1
13	b	Multiple alleles	a	Sexual	1
14	a	IUCN	b	(A)–(ii), (B)–(iv), (C)–(iii), (D)–(i)	1
15	a	Sexual	a	Quaternary	1

PART- II

Note:-Answer any six questions Q.No 24 is compulsory. **6 × 2 =12**

Q. No	ANSWERS	MARKS	
16	**Difference -External and Internal fertilization :** External Fertilization: The fusion of male and female gametes takes place outside the body of female organisms. Internal Fertilization: The fusion of male and female gametes takes place within the body of female organisms.	1+1	**2**
17	**Polyspermy - avoided in human :** Once Fertilization is accomplished, cortical granules from the cytoplasm of the ovum form a barrier called the Fertilization membrane around the ovum preventing further penetration of other sperms.Thus, polyspermy is prevented.		**2**
18	**Preventive measure of STDs** • Avoid sex with unknown partner/multiple partners. • Use condoms. • In case of doubt, consult a doctor for diagnosis **(Any Two)**	**2x1**	**2**
19	**Holandric genes**: The genes present in the differential region of Y chromosome are called Y- linked or holandric genes.		**2**
20	**The genetic code is universal**: All known living systems use nucleic acids and the same three base codons (triplet codon) direct the synthesis of protein from amino acids.		**2**
21	**Zymology :** It is an applied science which deals with the bio chemical process of fermentation and its practical uses.		**2**
22	**Three levels of biodiversity:** 1) Genetic diversity 2) Species diversity 3) Community/Ecosystem diversity		**2**
23	**Pedogenesis:** Soil is formed from rocks which are the parent materials of soil by weathering and is called embryonic soil. **(Or)** Formation of soil from rocks.	**2**	**2**
24	**Desired traits in animals by using modern technology:** i. Transgenesis ii. Genetically Engineered iii. DNA Manipulation **(Any One)** **Examples -** Mice, Rat, Rabbit, Pig, Cow,Goat,Sheep and Fish **(Any Two)**	**1** **1**	**2**

PART–III

Note:- Answer any six question.
Question no.33 is compulsory. **6 × 3 = 18**

25 **Parthenogenesis**:
1) Development of an egg into a complete individual without fertilization — **2**
2) Types
   - Natural parthenogenesis — **1**
   - Artificial parthenogenesis

3

26 **Difference between Spermiogenesis and Spermatogenesis:**

s.no	Spermiogenesis	Spermatogenesis
1	The spermatids are transformed into mature spermatozoa (sperms).	The sequence of events in the seminiferous tubules of the testes that produce the male gametes. **(Or)** The process of formation of gametes in the male.

1½ + 1 ½

3

27 **Amniocentesis and its statutory ban :**
- It is a prenatal technique used to detect any chromosomal abnormalities in the foetus. — **1**
- 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. — **2**

3

28 **Disproved Lamarck's Theory of Acquired characters :**
- August Weismann — **1**

Experiment :
- He conducted experiments on mice for twenty generations by cutting their tails and breeding them. All mice born were with tail. — **2**
- Changes in the somatoplasm will not be transferred to the next generation.

3

29 **Opsonisation:**
- Opsonisation **or** enhanced attachment is the process by which a pathogen is marked of ingestion and destruction by a phagocyte. — **1½**
- It involves the binding of an opsonin (i.e).,antibody, to a receptor on the pathogen's cell membrane. After opsonin binds to the membrane, phagocytes are attracted to the pathogen.This results in a much more efficient phagocytosis. — **1½**

3

30 **Advantages of biogas plant in rural areas:**
- Used for cooking — **1**
- Used for Lighting. — **1**
- The slurry drained from the biogas plant is used as fertilizer. — **1**

(Any Three) **3**

31 **The possible risks of GMOs :**
- Harming non-target species such as soil organisms, non-pest insects, birds and other animals.
- Disrupting biotic communities including agro ecosystems.
- Irreparable loss or changes in species diversity or genetic diversity within species.
- Creating risks for human health.

(Any Three) **3×1** **3**

32	**Drugs & Alcohol - Withdrawal symptoms:** ➢ Mild tremors to convulsions. ➢ Severe agitation and fits ➢ Depressed mood ➢ Anxiety ➢ Nervousness ➢ Restlessness ➢ Irritability ➢ Insomnia ➢ Dryness of throat **(Any Three)**	**3×1**	**3**
33	**Bergmann'srule :** ➢ Birds and mammals attain greater body size in colder regions than warmer regions.		**3**

PART – IV

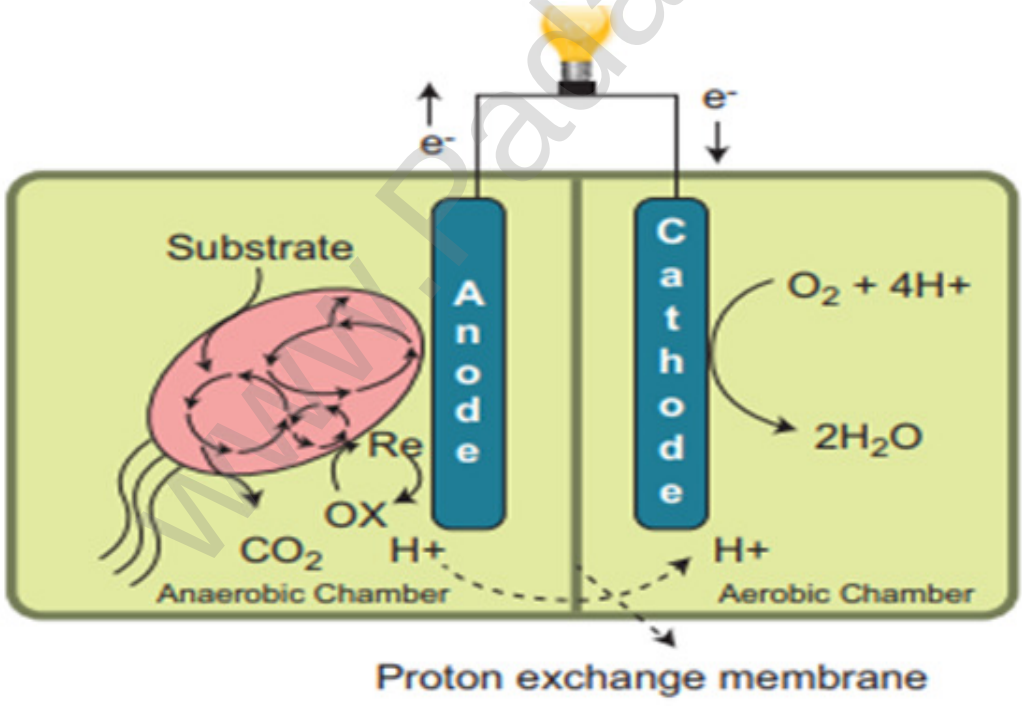
Note: - Answer all the questions **5×5 = 25**

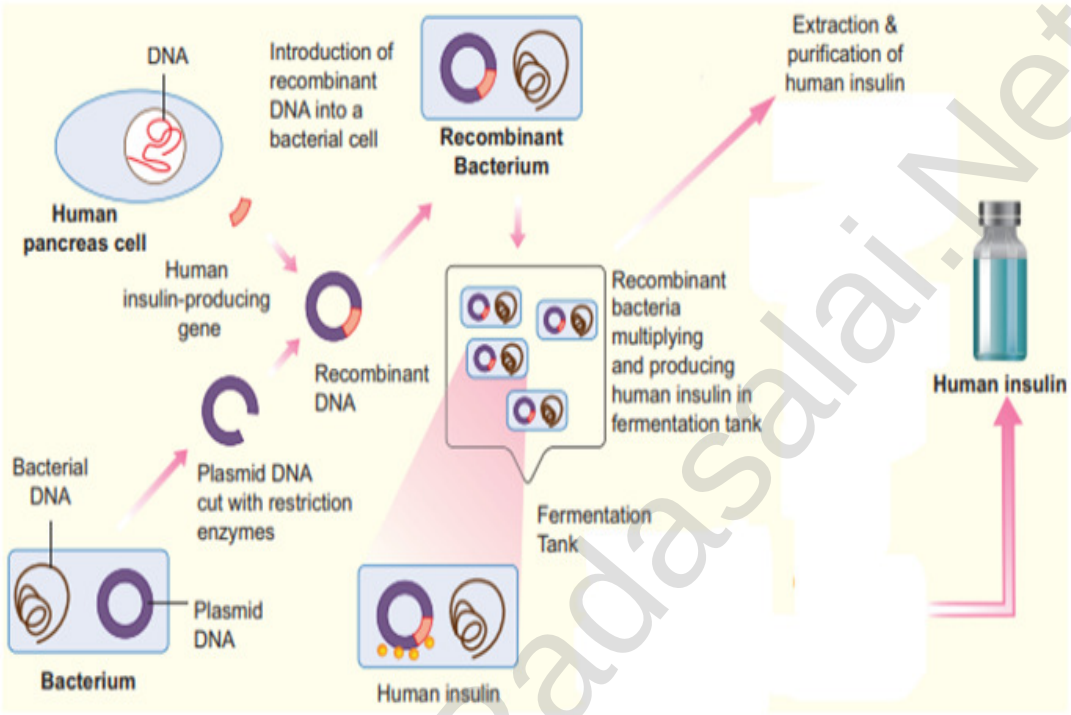
34 (a)	**Different kinds of syngamy** **(i). Autogamy** -The male and female gametes are produced by the same cell or same organism and both the gametes fuse together to form a zygote. **(ii). Exogamy -** The male and female gametes are produced by different parents and they fuse to form a zygote. So it is biparental. **(iii).Hologamy** - Lower organisms, sometimes the entire mature organisms do not form gametes but they themselves behave as gametes and the fusion of such mature individuals. **(iv).Paedogamy -**It is the sexual union of young individuals produced immediately after the division of the adult parent cell by mitosis. **(v). Merogamy-** The fusion of small sized and morphologically different gametes (merogametes) takes place. **(vi).Isogamy-** The fusion of morphological and physiological identical gametes (isogametes). **(vii). Anisogamy-** The fusion of dissimilar gametes. It occurs in higher animals. **(Any Five)**	**5×1**	**5**
	(OR)		
(b)	**Difference between active and passive immunity**	**5×1**	**5**

S.No	Active immunity	Passive immunity
i	It is produced actively by host's immune system.	It is received passively and there is no active host participation
ii	It is produced due to contact with pathogen or by its antigen	It is produced due to antibodies obtained from outside.
iii	It is durable and effective in protection	It is transient and less effective
iv	Immunological memory is present	No memory.
v	Booster effect on subsequent dose is possible.	Subsequent dose is less effective.
vi	Immunity is effective only after a short period.	Immunity develops immediately.

(Any Five)

35 (a)	**Application of DNA finger printing** ➢ **Forensic analysis** - used in the identification of a person involved in criminal activities, for settling paternity or maternity disputes and in determining relationships for immigration purposes. ➢ **Pedigree analysis** – inheritance pattern of genes through generations and for detecting inherited diseases. ➢ **Conservation of wild life** – protection of endangered species. By maintaining DNA records for identification of tissues of the dead endangered organisms. ➢ **Anthropological studies**–useful in determining the origin and migration of human populations and genetic diversities.	**2** **1** **1** **1**	**5**
	(OR)		
(b)	**Objections to Darwinism :** ➢ Failed to explain the mechanism of variation. ➢ Explains the survival of the fittest but not the arrival of the fittest. ➢ Focused on small fluctuating variations that are mostly non-heritable. ➢ He did not distinguish between somatic and germinal variations. ➢ 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.,	**5×1**	**5**
36 (a)	**Essential properties of water :** ➢ The main agents in Pedogenesis (soil formation). ➢ The medium for several different ecosystems. ➢ It is present as moisture in the atmosphere and the outer layers of the lithosphere and is uneven in distribution on the earth. ➢ It is heavier than air and imparts greater buoyancy to the aquatic medium. This enables organism to float at variable levels. ➢ It has high heat capacity and latent heat, due to which it can withhold large amounts of heat. Thus, oceans and lakes tend to maintain a relatively constant temperature, and the biosphere is relatively thermostable. ➢ It is physically unique because it is less dense as a solid (ice) than as a liquid. ➢ When water freezes (0ºC), it contracts. The maximum density of liquid water occurs at 4°C. Below that, it expands markedly. This enables ice to float on the top of water bodies. Hence, only the surface of water bodies will freeze, while below the surface, water will be in liquid form, sustaining life. ➢ It is considered as the Universal solvent. It has high surface tension. **(Any Five)** **(Any Relevant Answers may be given marks)**	**5×1**	**5**
	(OR)		

(b)	**Menstrual disorders:** ➢ **Amenorrhoea-** Absence of menstruation ➢ **Polymenorrhoea -** Menstrual cycle that is shorter than 21 days. ➢ **Dysmenorrhoea**- Pain associated with menstruation ➢ **Menorrhagia -** Heavy and prolonged menstrual period that disrupts a woman's normal activities ➢ **Oligomenorrhoea**- condition with infrequent menstrual periods. It occurs in women of child bearing age.	**5×1**	**5**
37 **(a)**	**Microbial Fuel Cell (MFC) :** **Definition:** A Microbial Fuel Cell is a bio-electrochemical system that drives an electric current by using bacteria and mimicking bacterial interaction found in nature Microbial Fuel Cells work by allowing bacteria to oxidize and reduce organic molecules. **Explanation:** (i) Bacterial respiration is basically one big redox reaction in which electrons are being moved around. A MFC consists of an anode and a cathode separated by a proton exchange membrane. (ii) Microbes at the anode oxidize the organic fuel generating protons which pass through the membrane to the cathode and the electrons pass through the anode to the external circuit to generate current. **(Or)** **Diagram**  	**2** **3** **3**	**5**
(OR)			

(b)	**Recombinant Human Insulin :** **(i)** Technique involved the insertion of human insulin gene on the plasmids of *E.coli*. (ii)The polypeptide chains are synthesized as a precursor called pre-pro insulin, which contains A and B segments linked by a third chain (C) and preceded by a leader sequence. (iii)The leader sequence is removed after translation and the C chain is excised, leaving the A and B polypeptide chains. **(Or)** **Diagram**  	1 2 2 5	5
38 **(a)**	**Methods of disposal of radioactive wastes :** ➢ **Limit generation** - It is the first and most important consideration in managing radioactive wastes. ➢ **Dilute and disperse** - For wastes having low radioactivity, dilution and dispersion are adopted. ➢ **Delay and decay** - It is frequently an important strategy because much of the radioactivity in nuclear reactors and accelerators is very short lived. ➢ **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.	1 1 1 2	5
	(OR)		

(b)	**Causes of biodiversity loss :** ➢ (Habitat loss, fragmentation and destruction (affects about 73% of all species) ➢ Pollution and pollutants (smog, pesticides, herbicides, oil slicks, GHGs) ➢ Climate change ➢ Introduction of alien/exotic species ➢ Over exploitation of resources (poaching, indiscriminate cutting of trees, overfishing, hunting, mining) ➢ Intensive agriculture and aquacultural practices ➢ Hybridization between native and non native species and loss of native species ➢ Natural disasters (Tsunami, forest fire, earth quake, volcanoes). ➢ Industrialization, Urbanization, Infrastructure development, Transport – Road and Shipping activity, communication towers, dam construction, ➢ Unregulated tourism and monoculture are common area of specific threats. ➢ Co-extinction **(Any Five)**	**5×1**	**5**