DEPARTMENT OF ZOOLOGY
Faculty of Biological Sciences
QUAID-I-AZA UNIVERSITY

Total Marks: 40 **Time: 1 hr.**

Name: _____ **Father Name: _____**

Roll No: _____ **Date: _____**

Field/Supervisor Name: _____ **(Please select from the "Fields" file)_____**

Note: Part A consists of 20 subject (Zoology) related multiple choice questions (MCQs), while part B consists of MCQs /short questions related to field of your interest.
The **details of each faculty member and field could be accessed from the Department website.**

Part A

Max Marks: 20 **Time: 20 Min**

Q.No.1: Encircle the correct answers **(20 × 1= 20)**

1. **Cell organelles involved in synthesis of protein hormones are ----------.**
   - **a.** Smooth endoplasmic reticulum
   - **b.** Mitochondria
   - **c.** Golgi bodies
   - **d.** None of above
2. **Cholesterol side chain cleavage reaction in the biosynthesis of steroid hormones occurs in----------**
   - **a.** Mitochondria
   - **b.** Endoplasmic reticulum
   - **c.** Golgi bodies
   - **d.** Secretory granules
3. **The hypothalamic magnocellular neurosecretary system secretes oxytoxin and vasopressin from the …… ……..**
   - **a.** Anterior pituitary
   - **b.** Posterior pituitary
   - **c.** Secondary plexus
   - **d.** Median eminence
4. **The androgens stimulate the Wollfian ducts to make the ----------.**
   - **a.** Oviduct, uterus and cervix

b. Epididymis, vas deferens and prostate
c. Seminal vesicle and prostate
d. Both b and c

5. **The regular periodicity of spermatogenic initiation is called----------**
   a. Spermatogenesis
   b. Spermatogenic wave
   c. Spermatogenic cycle
   d. None of the above

6. **The junction between A and B microtubule of one outer doublet of axoneme is strengthen by the protein known as----------.**
   a. Nexin
   b. Tektin
   c. Kinesin
   d. dynein

7. **A plant, bacterial or fungal cell that had its cell wall partially removed using either mechanical or enzymatic means is called**----------.
   a. Phragmoplast
   b. Mitoplast
   c. Protoplast
   d. Both b & c

8. **Connexins are a family of structurally related transmembrane proteins that assemble to form----------**
   a. Tight junction
   b. Gap junction
   c. Desmosomes
   d. lamellopodia

9. **Terrestrial reptiles are----------animals**.
   a. Ammonotelic
   b. Ureotelic
   c. Uricotelic
   d. Horotelic

10. **---------- an essential amino acid and must be provided in diet**.
    a. Alanine
    b. Glutamate
    c. Serine
    d. Methionine

11. A **strong acid has----------**
    a. Low pKa
    b. Low pH

c. Both a & b
d. High pKa

12. ----------is an extracellular layer surrounding the egg cell membrane and is often used in sperm recognition.
a. Fertilization envelope
b. Zona pellucida
c. Vitelline envelope
d. Both b & c

13. Sun-rays at equator strike----------.
a. Horizontally
b. Vertically
c. Uniformly
d. Obliquely

14. Bony fishes have a heart with --------- chambers.
a. One
b. **two**
c. four
d. Five

15. The highly modified bivalve gills are called ----------
a. Filibranch
b. Eulamellibranch
c. interfilamential
d. demibranch

16. Plasmodium belongs to ----------
a. Sarcodina
b. Ciliata
c. Flagrllata
d. Sporozoa

17. Transmural pressure gradient across the lung wall is equivalent to----------

a. intrapleural pressure plus atmospheric pressure
b. atmospheric pressure minus intrapleural pressure
c. intrapleural pressure and intra-alveolar pressure
d. intra-alveolar pressure minus intra-pleural pressure

.18. The oxygen carrying capacity is defined as----------
a. the combined volume of oxygen contained in the alveoli and anatomic dead space volume
b. the volume of oxygen contained in half saturated blood
c. the volume of oxygen that is actually exchanged at the level of alveoli
d. the volume of oxygen contained in a volume of oxygen saturated blood

19. Which of the statements is CORRECT:

a. At the *ABO* locus, there are three alleles. Alleles I^A and I^B are partial dominant to each other, but are completely dominant to *i* allele.

b. Allele I^A is dominant to allele *i* but is co-dominant to I^B.

c. Allele *i* is recessive to allele I^A while allele I^A and I^B are incompletely dominant.

d. Allele I^A is epistatic to the *i* allele but is co-dominant to the I^B allele

20. Which of the statement is CORRECT:

a. Aneuploidic chromosomal changes occur during gametogenesis and are a major cause of spontaneous abortions in humans.

b. Euploidic chromosomal changes are more common in animals compared to the plants.

c. Change in chromosome number is common in many species and various sub-populations exist which have different chromosomes.

d. After studying the chromosomes, Watson and Crick proposed their model of double helical structure of DNA.

Zoology disciplines advertised for semester Fall 2020

Sr.No.	**Field**	**Supervisor**
1.	Endocrinology	Prof. Dr. M. Shahab
2.	Physiology	Prof. Dr. Irfan Zia Qureshi
3.	Reproductive Physiology	Prof. Dr. Sarwat Jahan
4.	Human Genetics	Prof. Dr. Sajid Malik
5.	Fisheries & Aquaculture (Fish nutrition, behavior, toxicology, genetics, etc.	Dr. Amina Zuberi
6.	Parasitology and Entomology	Dr. Naveeda Akhtar
7.	Animal Microbiology	Dr. Saeed-ul-Hassan Khan
8.	Parasitology (Biology of Parasites, Host-Parasite Relationships, Parasitic Immunology-Vaccinology in the context of the medical and veterinary sciences.)	Dr. Kiran Afshan
9.	Molecular Biology	Dr. Sabika Firasat

Part B

Field:- Fisheries & Aquaculture

Max Marks: 20 **Time: 40 Min**

Applicant's Name _____ **Roll No._____**

Q.No.1: Encircle the correct answer **(10 × 1= 10)**

1. ----------lack a true acid-producing stomach.

a. Cyprinids **b.** Salmonids
c. a & b **d.** None of these

2. In fish healthy gills are ----------

a. Pale pink **b.** Pale tan
c. bright red **d.** light brown

3. Nitrogen cycle is a biological process that changes ----------

a. nitrite - nitrate- ammonia **b.** ammonia – nitrite - nitrate
c. ammonia – nitrate - nitrite **d.** Nitrate--ammonia—nitrite

4. Freshwater is defined as having salinity ---------- ppt.

a. ≥10 **b.** ≤ 5
c. ≤0.5 **d.** ≥ 20

5. ----------locomotive limb situated on the back of a fish.

a. Adipose fin **b.** Pelvic fin
c. Dorsal fin **d.** Pectoral fin

6. If in semi-intensive fish culture, production rate is 1.5 tons/ acres/year, then ---- acres water surface area is required for the production of 350 tons fish

a. 100 **b.** 150
c. 200 **d.** None of these

7. Lungfishes belong to subclass ----------.

a. Dipnoi. **b.** Osteichthyes
c. Chrondrichthyes **d.** Agnatha

8. In fishes----------ions are needed for the manufacture of gastric juice.

a. Magnesium **b.** Fluorine
c. Chlorine **d.** Phosphorus

9. **---------- must swim or use jaw and pharyngeal muscles to continuously pump water over their gills for gas exchange**

   a. Anglerfish **b.** sunfish
   c. lungfish **d.** sharks

10. **---------and ------ are planktophagous surface feeders**

   a. Silver carp---Grass carp **b.** Grass carp----Rohu
   c. Silver carp-- and *Catla catla* **d.** Grass carp-----common carp

Q.No.2. Mark the true statements (5)

i. Mostly cold water fish are less demanding of water quality conditions than warm water species.

ii. In Bony fishes the sinus venosus receives oxygenated blood from the body.

iii. All fish blood cells, including erythrocytes and thrombocytes are nucleated

iv. Oxygen's solubility in water decrease as water pH and temperature increases.

v. Carnivorous bony fish have well develop stomach and long intestines.

vi. Vitamin A and C are water soluble vitamin False

vii. Algal bloom can reduce the hardness of water.

viii. Mangla dam is on the Indus River .

ix. Plants cannot absorb nitrogen in elemental form.

x. Decomposition of organic matter is slow in acidic water than in neutral or alkaline water.

Q.No.3. Short Questions (5)

i. Briefly explain why the Fish requirement for energy is low as compared to land animals? (2.5)

ii. What necessary things you will consider before starting fish farm? (2.5)

Part B

Field:- Parasitology

Max Marks: 20 **Time: 40 Min**

Applicant's Name _____ **Roll No._____**

Q1a. Defining the following terms with examples? **2.5**

1. ParatenicHost
2. Protelean Parasites
3. Parasitoids
4. Facultative Parasite
5. Reservoir Host

b. Explain the cellular defenses of body against parasitic infections? 1

c. Discuss the differences between Trypanosomabrucei and causative agent of Chagas' disease in the following respects: vectors, disease caused and geographic distribution? **2**

d. Describe the main differences between distome, amphistome and monostome with respect to mouth location, and with respect to sucker location in digeneans? **1.5**

Q2a: Describe structural differences and similarities between nematodes and trematodes? **2**

b. Discuss why developments such as dams have an impact on the distribution of blood fluke infections? **1**

c. Distinguish between the three *Schistosoma* species that most commonly parasitize humans, using both structural and clinical observation. **1**

PART-B

Field: - Physiology

Max Marks: 20 **Time: 40 Min**

Applicant's Name _____ **Roll No._____**

Answer the following questions briefly, to the point not exceeding few lines. (20)

1. Describe the significance of $M = aW^b$?

2. Describe the role of breathing centers of brain?

3. Explain normal ECG.

4. Define homeostasis and, also explain which physiological functions are homeostatically controlled?

5. How is equation of Ohm's law appl;iable to several physiological principles?

6. Why would a person die if he drinks 1 liter of sea water?

7. Why is bleaching necessary for photoreception?

8. Why the sinus-nodal fibers are self-excitatory?

9. $J = D \frac{C1-C2}{x}$; Describe this equation and state what it demonstrates?

10. For how long Tubifex can tolerate without oxygen?

11. How does renal medullary interstitium gets hyperosmotic?

12. Why are catch bridges particularly useful in the typical functions of smooth muscles? Explain giving an example.

13. What role do synaptobrevins and syntaxin perform and where these proteins are located?

14. With reference to kidney, what is K_f, what is its significance in GFR?

15. With reference to gut, which produces which secretion?

Mucous cells	_____
Chief cells	_____
Parietal cells	_____
Eneterochromaffin cells	_____
G cells	_____

D cells _____

16. How would you differentiate between regional and temporal heterotherms?

17. How thermal gradients are achieved in ectothermic and endothermic vertebrates?

18. Calculate leverage factor for muscle using hypothetical load?

19. How is inspiration accomplished?

20. Which force or forces drive blood flow through the blood vessels?

PART-B

Field: - Human Genetics

Max Marks: 20 **Time: 40 Min**

Applicant's Name _____ **Roll No._____**

Multiple choice questions. Choose the best match for the statement.

1. It is a method in which a homozygous recessive individual is used to reveal an unknown genotype. _____
   A. First law of inheritance B. Second law of inheritance
   C. Punnett Square method D. Test cross

2. It is used to calculate expected genotypic and phenotypic ratios among progeny. ……_____
   A. First law of inheritance B. Monohybrid cross
   C. Punnett Square method D. Test cross

3. It yields a genotypic ratio of 1:2:1 and a phenotypic ratio of 3:1. ……_____
   A. Second law of inheritance B. Monohybrid cross
   C. Dihybrid cross D. Test cross

4. It is the unit of inheritance. …….._____
   A. Mendel B. Chromosome C. RNA
   C. DNA D. Gene E. Cell

5. Classical genetics deals with ……_____
   A. cell B. transmission C. DNA
   D. plants and animals E. gene expression F. gene mutation

Fill in the blanks with appropriate words. Cutting and over-writing is not allowed.

1. Genetics is the study of _____.

2. Human ABO blood group system is an example of _____ inheritance.
3. Flower color in four o'clock plant is an example of _____ .
4. _____ described the double helical structure of DNA in _____(year).
5. Human genome project was launched in _____ and finished in _____.

True / False. Write "T" if the statement is True, and "F" if the statement is False.

1. Mendel formulated laws of inheritance by studying the inherited characters that were discrete and constant. ……..……... .._____
2. More than two alleles on different loci represent multiple alleles. ……..._____
3. In meiosis but not in mitosis DNA synthesis takes place two times. ……..…..……..._____
4. Chromatids are made of chromatin and are attached by kinetochore. ……....……..._____
5. Polydactyly is a hereditary disease of limb, with autosomal dominant mode of inheritance and variable expressivity. …….....…….._____

Problems in Genetics.

1. Mendel crossed tall pea plants with dwarf ones. The F1 plants were all tall. When these F1 plants were selfed to produce the F2 generation, he got a 3:1 tall to dwarf ratio of offspring. Give the genotype and phenotypes of this experiment.

Short notes. Write brief answers in the given spaces.

1. What is neo-Darwanism?

2. Differentiate between blending theory and the particulate theory of inheritance.

3. What were the seven traits of pea plant studied by Mendel?

4. What is Second law of inheritance? Explain your result with one example.

5. What is linkage? Give one example from humans.

PART-B

Field: - Molecular Biology

Max Marks: 20 **Time: 40 Min**

Applicant's Name _____ **Roll No._____**

Q1: Answer the following questions: **10**

i. What is plasmid and how can it be used in genetic engineering?
ii. What are ribozymes?
iii. Define and draw an example of Palindromic sequence.
iv. What are transgenics?
v. What is cDNA?
vi. Write conserved nucleotide sequences present at the junctions of introns and exons?
vii. What is the basic principle of Sanger's sequencing?
viii. Define southern blotting?
ix. What is nucleolus?
x. Define retro-transposition?

Q2: Differentiate between: **10**

i. primer and promoter
ii. Nested gene/s and split gene/s
iii. transcription and translocation
iv. Integral membrane proteins and peripheral proteins
v. lysosome and Nucleosome

PART-B

Field: - Animal Microbiology

Max Marks: 20 **Time: 40 Min**

Applicant's Name _____ **Roll No._____**

1. Describe the process of transcription in detail? (6)
2. Describe different types of mutations that can affect the coding as well as non-coding regions of genome? (6)
3. Describe immune response to infection in detail? (8)

PART-B

Field: - Parasitology and Entomology

Max Marks: 20 **Time: 40 Min**

Applicant's Name _____ **Roll No._____**

Q.No. 1 write short answers **(6 × 2= 12)**

i. What are Parasites?
ii. What are signs and symptoms of malaria
iii. Name the causative agent and vector of Dengue fever.
iv. Do you know what are ticks? Name few diseases caused by ticks(any four)
v. What is the difference between Prevalence and Incidence
vi. What do you know about insect seeking behaviour?

Q.No. 2 Discuss different diagnostic techniques can be used to identify a protozoan (4)

Q.No. 3 Draw life cycle of *Trypanosoma brucei* and *Plasmodium* parasite (4)

PART-B

Field: - Endocrinology

Max Marks: 20 (Each question carries 2 marks) Time allowed: 40 min

Applicant's Name _____ **Roll No._____**

Give brief answers to following:

1- Give a comprehensive definition of endocrinology.

2- What are endocrine disruptors?

3- List general mechanisms that are operative in regulation of release of hormones?

4- What is hormonal resistance?

5- List current techniques that are used in study of secretion of hormones.

6- List five endocrine disorders.

7- What are different types of hormone receptors?

8- What are different steps in synthesis of steroid hormones and what are the cell organelles involved in it?

9- Draw a general model of mechanism of action of steroid hormones.

10- What are different modes of action of hormones?

PART-B

Field: - Reproductive physiology

Max Marks: 20 Time allowed: 40 min

Applicant's Name _____ **Roll No._____**

Q.1. Explain the following (10)

i. Spermatogenic cycle
ii. Sex differentiation:
iii. Functions of spermatogonial stem cells:
iv. Feedback control mechanism
v. Role of gonadotropins during follicular growth

Q.2. write down principle properties and receptors of the following. (10)

	Hormones	**Reproductive involvement**	**Receptor**
1	LH		
2	Prolactin		
3	FSH		
4	hCG		
5	Estradiol		
6	Testosterone		
7	Progesterone		
8	Insulin		
9	EGF		
10	GH		