

5(D) M.Sc/Sem-I/Zool/ZHT-101/DODL/18

2018

ZOOLOGY

Semester-I Examination (DODL)

Paper : ZHT-101

(Non Chordate & Insect Organization)

Full Marks : 60

Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

(Non Chordate)

1. Answer any **two** of the following: $2\frac{1}{2} \times 2 = 5$
 - a) Mention the types and functions of insect hemocytes.
 - b) What is Pellicle? How it protects the protozoan cell?
 - c) State the significance of light production in bioluminescent insect.
2. Answer any **three** of the following: $5 \times 3 = 15$
 - a) Describe the physiology of excretion and osmoregulation in insects.

[Turn over]

- b) Classify insect compound eye on the basis of the presence and nature of crystalline cone.
 - c) Describe the structure of a typical insect wing with proper diagram.
 - d) Classify protozoa on the basis of distribution of mastigoneme on flagella.
 - e) Describe the structure of contractile vacuoles in protozoa.
3. Answer any **one** of the following: $10 \times 1 = 10$
- a) Describe different types of taxis movement in protozoa. Explain different types of insect flight. $5 + 5 = 10$
 - b) Describe the ultrastructure of mitochondria in protozoa with suitable diagram. Write down the differences between passive diffusion, facilitated diffusion and active transport. $7 + 3 = 10$

(Insect Organization)

4. Answer any **two** of the following: $2 \frac{1}{2} \times 2 = 5$
- a) What is peritrophic membrane and mention its function.
 - b) Write down the major functions of integument in insects.

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- c) What are the differences between tracheae and tracheoles?

5. Answer any **three** of the following: $5 \times 3 = 15$

- a) Define ametabolous, hemimetabolous and holometabolous insects with proper examples.
- b) Write down the different types of modifications of legs in insects and give an example from each type.
- c) Classify insect based on the orientation of head.
- d) Discuss about the structure and modifications of trachea in insect.
- e) Describe the different components of mouth parts of an insect.

6. Answer any **one** of the following: $10 \times 1 = 10$

- a) Describe the structure of an insect leg. Elucidate the structure of generalized digestive tract of an insect. $5 + 5 = 10$

- b) Write down the interplay between ecdysone and juvenile hormone in insect metamorphosis. What are air sacs? State its significance in insects. $7 + 3 = 10$

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M.Sc/Sem-I/Zool/ZHT-102/DODL/18

2018

ZOOLOGY

Semester-I Examination (DODL)

Paper : ZHT-102

(Parasitology, Ecology and Environment)

Full Marks : 60

Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

(Parasitology)

1. Answer any **two** of the following: $2\frac{1}{2} \times 2 = 5$

- a) Mention the three species of *Plasmodium*.
- b) What do you mean by zoonotic disease?
- c) Highlight the differences between fluke and worm.

2. Answer any **three** of the following: $5 \times 3 = 15$

- a) Describe the life cycle of *Paragonimus westermani*.

[Turn over]

- b) State the clinical features and pathogenesis of diphyllbothriasis.
 - c) Distinguish between schizogony and sporogony.
 - d) What is amoebic dysentery? Mention the symptoms and prophylaxis of infection caused by *Entamoeba histolytica*.
 - e) Describe the life cycle of *Anguina* sp.
3. Answer any **one** of the following: $10 \times 1 = 10$
- a) Mention the clinical features of paragonimiasis. Describe the salient features of different morphological forms of *Entamoeba histolytica* with proper diagram. What is balantidiasis? $3+4+3=10$
 - b) Describe the asexual cycle of *Plasmodium vivax* with suitable diagram. Highlight the symptoms of trypanosomiasis. $7+3=10$

(Ecology and Environment)

4. Answer any **two** of the following: $2 \frac{1}{2} \times 2 = 5$
- a) What is competitive exclusion principle?
 - b) Define ecotone and edge effect.
 - c) What is resource partitioning?

5. Answer any **three** of the following: $5 \times 3 = 15$

- a) What is Gaia hypothesis? Illustrate it.
- b) Mention the difference between fundamental niche and realized niche. What is niche compression?
- c) Define bio-geochemical cycle. How does Nitrogen cycle start? What is stratification?
 $1+2+2=5$
- d) Write down the names of different layers of atmosphere. How temperature is fluctuated in troposphere and stratosphere? $2+3=5$
- e) Discuss the importance of organic farming and mention its different components.

6. Answer any **one** of the following: $10 \times 1 = 10$

- a) What is survivorship curve? Describe the different types of survivorship curve with proper example. Differentiate between r and k- selected species. What is keystone species?
 $2+4+2+2=10$

- b) Define green house effect. Discuss about the role of Montreal Protocol in controlling Ozone depletion. How ozone is depleted in the stratosphere? What is bad ozone?

$2+3+4+1=10$

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M.Sc/Sem-I/Zool/ZHT-103/DODL/18

2018

ZOOLOGY

Semester-I Examination (DODL)

Paper : ZHT-103

(Developmental Biology and Cytogenetics)

Full Marks : 60

Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

(Developmental Biology)

1. Answer any **two** of the following: $2\frac{1}{2} \times 2 = 5$
 - a) What do you mean by regional specification?
 - b) What are Micropyle and vitelline membrane?
 - c) Define Homeotic genes. Give two examples.
2. Answer any **three** of the following: $5 \times 3 = 15$
 - a) How thyroxine hormone control metamorphosis in toad?
 - b) Illustrate beta catenin dependent Wnt signaling pathway in vertebrate embryo.

[Turn over]

- c) Describe acrosome reaction in fertilization.
- d) What is spermiogenesis? Briefly describe the major events of spermiogenesis. $1+4=5$
- e) Define polar body. What are the role of Leydig cell and Sertoli cell in spermatogenesis?

$$1+2+2=5$$

3. Answer any **one** of the following: $10 \times 1 = 10$

- a) What is polyspermy? Define physiological polyspermy and pathological polyspermy. Describe fast and slow block of polyspermy in mammals with suitable diagrams.

$$1+2+7=10$$

- b) How the anterior and posterior part of *Drosophila* embryo is determined? Describe the cascade of gene expression in *Drosophila* embryo. What is the role of maternal effect gene in *Drosophila*?

$$5+3+2=10$$

(Cytogenetics)

4. Answer any **two** of the following: $2\frac{1}{2} \times 2 = 5$

- a) What is C-value Paradox?
- b) What are Okazaki fragments?
- c) Define macrosatellite and microsatellite.

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5. Answer any **three** of the following: $5 \times 3 = 15$

- a) What is transposable genetic element? Describe the mechanism of transposition of bacterial insertion sequence.
- b) Why p^{53} is called “guardian of the genome”?
- c) Mention the role of retinoblastoma gene in regulation of cell cycle.
- d) Differentiate semiconservative, conservative and dispersive mode of DNA replication.
- e) Classify chromosomes on the basis of the location of Centromere with diagrams.

6. Answer any **one** of the following: $10 \times 1 = 10$

- a) Write the difference between apoptosis and necrosis. Mention the significance of apoptosis. Briefly describe the intrinsic pathway of apoptotic cascade with proper diagram. $3+3+4=10$
- b) Write down the role of helicase and DNA ligase enzyme in DNA replication. What are the differences in DNA replication between leading strand and lagging strand? How replication termination occurs in prokaryotes? $4+3+3=10$

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M.Sc/Sem-I/Zool/ZHT-104/DODL/18

2018

ZOOLOGY

Semester-I Examination (DODL)

Paper : ZHT-104

(Animal Physiology, Biochemistry and
Metabolic Processes)

Full Marks : 60

Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.

*Candidates are required to give their answers in
their own words as far as practicable.*

(Animal Physiology)

1. Answer any **two** of the following: $2\frac{1}{2} \times 2 = 5$
 - a) Mention the difference between resting potential and action potential.
 - b) How the foetal hemoglobin differs from the adult hemoglobin?
 - c) What do you mean by 'T' and 'R' states of hemoglobin?
2. Answer any **three** of the following: $5 \times 3 = 15$
 - a) Highlight the functional differences between electrical and chemical synapse during propagation of a nerve impulse.

[Turn Over]

- b) Explain the role of calcium ion in synaptic transmission.
 - c) What is oxygen hemoglobin dissociation curve? Discuss Bohr effect. 2+3
 - d) Describe the sliding filament theory of muscle contraction with suitable diagram.
 - e) State four major types of respiratory pigments and their distribution in animal kingdom. Mention the role of 2, 3-BPG in oxygen dissociation curve.
3. Answer any **one** of the following: 10×1=10
- a) Describe the process of urine formation in human body. Mention the role of ADH in regulating the urine concentration and volume. 7+3
 - b) Describe the structure of a hemoglobin molecule. Elucidate the process of saltatory conduction in myelinated neuron. Briefly explain the role of calcium ion in muscle contraction. 4+4+2

(Biochemistry and Metabolic Processes)

4. Answer any **two** of the following: $2 \frac{1}{2} \times 2 = 5$
- a) What is signal peptidase? Mention its role in protein sorting.
 - b) Mention the role of pH on enzyme activity.
 - c) Define exergonic and endergonic reactions with examples.
5. Answer any **three** of the following: $5 \times 3 = 15$
- a) Describe the process of secretory pathway of protein sorting.
 - b) Explain the different modes of reversible inhibition of enzyme action.
 - c) Derive the Michaelis-Menten equation.
 - d) Name 4 protein complexes involved in Electron Transport chain in mitochondria. Name one inhibitor of electron transport chain.
 $4 + 1$
 - e) Who discovered Urea Cycle? How enthalpy, entropy and Gibbs free energy are correlated? Why glycolysis is called EMP pathway?
 $1 + 3 + 1$

6. Answer any **one** of the following: $10 \times 1 = 10$

- a) Explain different steps of Glycolysis. Why Polar amino acids are more soluble in water than non polar amino acids? How many ATPs are produced from one molecule of glucose in aerobic condition? $7+2+1$
- b) Discuss different levels of protein structure. How Squalene is synthesized from Isopentenyl Pyrophosphate? Define Glycogenolysis. $6+3+1$
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