

Roll No.

92274

**B. Sc. Bio-Technology 4th Semester
(New Scheme)**

Examination – July, 2022

ANIMAL DEVELOPMENTAL BIOLOGY

Paper : BT-403

Time : Three hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is compulsory. Attempt four more questions by selecting one question from each Unit. All questions carry equal marks.

1. Write the short notes on the following : $2 \times 4 = 8$

- (a) Structure of human sperm
- (b) Blastocoel cavity
- (c) Organogenesis
- (d) Role of stem cells in neurodegenerative diseases

UNIT - I

2. What is Developmental biology ? Describes the scope and historical perspective of development Biology in details. 8
3. Write the short notes on any *two* : $4 \times 2 = 8$
- (a) Spermatogenesis & Oogenesis
 - (b) Composition and function of yolk
 - (c) Types and mechanism of fertilization

UNIT - II

4. What are Fate maps ? How Fate mapping is significant for an embryologist ? 8
5. Write the short notes on any *two* : $4 \times 2 = 8$
- (a) Cleavage
 - (b) Mechanism of Blastulation
 - (c) Gastrulation

UNIT - III

6. Write the short note on : $4 \times 2 = 8$
- (a) Control of differentiation at the level of genome
 - (b) Animal model for developmental biology

7. What is the differentiation ? Describes the transcriptional and post-translational level control of the differentiation. 8

UNIT - IV

8. What is the placenta ? Describe the various functions of the placenta. 8
9. Write the notes on any *two* : $4 \times 2 = 8$
- (a) Neurulation
 - (b) Notogenesis
 - (c) Development of behavior : constancy & plasticity

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**B. Sc. Bio-Technology 4th Semester
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Examination – July, 2022

ANIMAL DIVERSITY

Paper : BT-401

Time : Three hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is compulsory. Attempt four more questions by selecting one question from each Unit. All questions carry equal marks.

1. Write the short notes on the following : $1 \times 8 = 8$

- (a) Herdmania
- (b) Scales in fish
- (c) Dinosaurs
- (d) Ornithology
- (e) Histology & anatomy

- (f) Evolutionary history
- (g) Fertilization
- (h) Cranial cavity

UNIT - I

- 2. What is Amphibia ? Detail description of the origin of Amphibia. 8
- 3. Write the notes on any *two* : 4 × 2 = 8
 - (a) Migration in Pisces
 - (b) Chordate
 - (c) Important characters of Branchiostoma

UNIT - II

- 4. Write the notes on any *two* : 4 × 2 = 8
 - (a) Origin of mammals
 - (b) Classification of Reptile
 - (c) Dentition in mammals

- 5. What is avian ? Describe their origin and flight-adaptations. 8

UNIT - III

- 6. Describes the comparative anatomy of respiratory systems of vertebrates. 8

- 7. Detailed describes of the comparative anatomy of various organs related to the digestive system of the vertebrates. 8

UNIT - IV

- 8. Describes the comparative anatomy of Heart and Aortic arches of vertebrates. 8
- 9. Write the short notes on the comparative anatomy of any *two* : 4 × 2 = 8
 - (a) Brain
 - (b) Ear of vertebrates
 - (c) Urinogenital system

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**B. Sc. Bio-Technology 4th Semester
(New Scheme)
Examination – July, 2022**

MAMMALIAN PHYSIOLOGY

Paper : BT-404

Time : Three hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting at least one question from each Unit. Question Number 1 is compulsory. All questions carry equal marks.

1. Write short notes on the following : $1 \times 8 = 8$

- (a) Diaphragm
- (b) Saliva
- (c) Heartbeat
- (d) Hemophilia
- (e) Muscular dystrophy

- (f) Micturition
- (g) Endocrine gland
- (h) Receptor

UNIT - I

2. Describe the mechanism of digestion, absorption and various functions of the carbohydrate in detail. 8
3. Write the notes on any *two* : 4 × 2 = 8
- (a) Mechanism of Respiration (human)
 - (b) Chloride shift
 - (c) Composition & function of Pancreatic juice

UNIT - II

4. Describe the mechanism of working of the human heart in details. 8
5. Write notes on any *two* : 4 × 2 = 8
- (a) Haemopoiesis
 - (b) Plasma proteins & their role
 - (c) Cardiac diseases

UNIT - III

6. What are similarities & differences between cardiac, smooth and skeletal muscle ? 8

7. Write notes on any *two* : 4 × 2 = 8
- (a) Modes of excretion
 - (b) Mechanism of urine formation
 - (c) Muscle contraction

UNIT - IV

8. Mechanism of action of insulin and various steroids hormones. 8
9. Write notes on any *two* : 4 × 2 = 8
- (a) Hypothalamus
 - (b) Pineal gland
 - (c) Thyroid gland
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**B. Sc. Bio-Technology 4th Semester
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MOLECULAR BIOLOGY

Paper : BT-402

Time : Three hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question No. 1 is compulsory. Attempt four more questions by selecting one question from each Unit. All questions carry equal marks.

1. Write the notes on following : 1 × 8 = 8

- (a) Replisome
- (b) Origin of Replication
- (c) Mutation
- (d) Gene
- (e) Intron & exon

- (f) tRNA
- (g) Stop codon
- (h) Operon

UNIT - I

2. What is replication ? What are the differences between the prokaryotic and eukaryotic DNA replication ? 8
3. Write the notes on any *two* : $4 \times 2 = 8$
 - (a) Type of DNA
 - (b) Function of DNA
 - (c) DNA polymerase

UNIT - II

4. What is the homologous recombination ? Describe models and mechanism for the homologous recombination. 8
5. Write the notes on any *two* : $4 \times 2 = 8$
 - (a) Photoreactivation
 - (b) Nucleotide & base excision repair
 - (c) Causes and types of DNA damage

UNIT - III

6. What are the differences between the prokaryotic and eukaryotic transcription ? 8

7. Write the notes on any *two* : $4 \times 2 = 8$
 - (a) Function of mRNA
 - (b) Eukaryotic transcriptional factors
 - (c) Post-transcriptional modifications

UNIT - IV

8. What is ribosome ? Describe the structure and functions of the ribosome. 8
9. Write the notes on any *two* : $4 \times 2 = 8$
 - (a) Regulation of gene expression in prokaryotic
 - (b) Translation in eukaryotic
 - (c) Inhibitor of translation

7. (a) How can you convert ? 3
(i) m-Dinitrobenzene to m-nitroaniline
(ii) Nitrobenzene to aniline
(b) Write two important methods of preparation of nitroalkanes. 2
(c) Describe the mechanism of nitration of benzene. 3

SECTION - D

8. (a) Explain Baeyer-Villiger oxidation. 2
(b) Describe the formation of carbonyl compound by oxidation of alcohols. 2
(c) Compare the following in carbonyl compounds :4
(i) $NaBH_4$ reductions
(ii) Clemmensen reductions
9. (a) Explain with mechanism : 6
(i) Aldol condensation
(ii) Benzoin condensation
(iii) Knoevenagel condensation
- (b) How can you convert a carbonyl compound into an alkene ? 2

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92277

**B. Sc. (Bio-Technology) 4th Semester
(New-Scheme)**

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ORGANIC CHEMISTRY

Paper : BT-406

Time : Three Hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory. All questions carry equal marks.

1. (a) Differentiate between rocking and wagging vibrations.
(b) What is finger print region in IR spectroscopy ?
(c) Why aliphatic amines are more basic than ammonia ?

- (d) What is ortho effect ?
- (e) Convert benzenediazonium chloride into phenol.
- (f) What is nitrating mixture ?
- (g) Out of $LiAlH_4$ and $NaBH_4$, which is stronger reducing agent ?
- (h) Why tetones are less reactive towards nucleophilic substitution reactions than aldehydes ? $1 \times 8 = 8$

SECTION - A

- 2. (a) How many fundamental vibrations are possible in IR spectrum of methane and carbon dioxide ? 3
- (b) Compare infra-red active and inactive vibrations by giving examples. 3
- (c) Explain the effect of hybridization on the stretching frequency of C-H bonds. 2
- 3. (a) Explain different types of bending vibrations. 4
- (b) Describe : 4
 - (i) Fermi resonance
 - (ii) Vibrational coupling

SECTION - B

- 4. (a) Explain azo dye test for primary aromatic amines. 2

- (b) Describe Hofmann bromamide reaction with mechanism. 3
- (c) Explain the separation of primary, secondary and tertiary amines by Hinsberg's method. 3
- 5. (a) Explain two important methods of preparation of aniline. 4
- (b) Give reason : 4
 - (i) p-Methoxyaniline is more basic than p-nitroaniline.
 - (ii) Secondary amines are stronger base than primary amines in aqueous medium.

SECTION - C

- 6. (a) Describe the mechanism of reaction of benzenediazonium chloride with : 4
 - (i) Phenol (pH 9-10)
 - (ii) Aniline (pH 4-5)
- (b) Describe : 4
 - (i) Balz-Schiemann reaction
 - (ii) Diazotisation

- (b) Describe : 4
(i) Activity and activity coefficient
(ii) Electrochemical series

SECTION - D

8. (a) What are concentration cell ? How they are classified into different types ? 4
(b) How can you determine the pH of a solution using glass electrode ? 4
9. Describe : 4, 4
(i) Liquid junction potential
(ii) Potentiometric titrations

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**B. Sc. (Bio-Technology) 4th Semester
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PHYSICAL CHEMISTRY

Paper : BT-405

Time : Three Hours]

[Maximum Marks : 40

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) Why entropy of universe is continuously increasing ?
(b) Why the efficiency of Carnot engine can not be equal to unity ?
(c) What is residual entropy ?

- (d) What is Helmholtz free energy ?
- (e) What is electrode potential ?
- (f) What are reference electrodes ? Give example.
- (g) What is salt bridge in electrochemical cell ?
- (h) Differentiate between electrode and electrolytic concentration cell. $1 \times 8 = 8$

SECTION - A

2. (a) Explain : 4
- (i) Thermodynamic scale of temperature
- (ii) Second law of thermodynamics
- (b) Describe Carnot cycle and derive an expression for efficiency of a heat engine. 4
3. (a) Explain : 4
- (i) Entropy
- (ii) Entropy as criteria of spontaneity
- (b) Derive an expression for entropy change of an ideal gas when temperature changes from T_1 to T_2 and volume changes from V_1 to V_2 . 4

SECTION - B

4. (a) Describe the physical significance of Gibbs free energy. 2
- (b) Explain third law of thermodynamics. 2
- (c) Derive Gibbs-Helmholtz equation. 4
5. (a) From third law of thermodynamics, how entropy of a gaseous substance can be calculated at temperature T starting from zero K. 4
- (b) Describe Nernst heat theorem. How does it lead to third law of thermodynamics ? 4

SECTION - C

6. (a) Describe : 4
- (i) Electrolytic cell
- (ii) Standard cell
- (b) Derive Nernst equation for measuring EMF of a cell. 4
7. (a) What are reversible electrodes ? Explain metal-metal insoluble salt-salt anion electrode. 4