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[This question paper contains 4 printed pages.]

Your Roll No.....

16/12/17

Sr. No. of Question Paper : 5520

H

Unique Paper Code : 216/223/385

Name of the Paper : MOLECULAR BIOLOGY – I
(MBHT-301)

Name of the Course : B.Sc. (Honours)

Semester : III

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all, including Question No. 1 which is compulsory.
3. Illustrate your answers with appropriate diagrams wherever necessary.

1. (a) Define the following terms :

(5)

(i) Chromatin

(ii) Tautomerism

(iii) Linking number

P.T.O.

(iv) DNA Denaturation

(v) Okazaki fragments

(b) Differentiate between the following : (10)

(i) Transitions and Transversions

(ii) Constitutive and Facultative heterochromatin

(iii) Nucleotide and Nucleoside

(iv) B-DNA and Z-DNA

(v) mRNA and rRNA

(c) State the function of the following : (3)

(i) DNA polymerase I

(ii) DNA gyrase

(iii) Primase

(d) Expand the following abbreviations : (4)

(i) mtDNA

(ii) T_m

(iii) NTP

(iv) hnRNA

(e) State contribution of the following scientists : (5)

(i) Roger Kornberg

(ii) Mary Lyon

(iii) Hershey and Chase

(iv) J.H. Taylor, P. Woods and W. Hughes

(v) Fraenkel Conrat

2. (a) Describe Griffith's experiment. What conclusions could be drawn from it? (6)

(b) Explain the characteristic features of Watson and Crick model of DNA. (6)

3. (a) With the help of suitable diagrams, describe DNA packaging in eukaryotes. (6)

(b) What is genetic code? Describe its salient features. (6)

4. (a) What do you understand by semi conservative nature of DNA replication? How it was experimentally proved? (6)

(b) Give structural details of clover-leaf model of tRNA (with diagram).

5. Elaborate steps of initiation of DNA replication in prokaryotes discussing the role of various enzymes involved. (12)
6. (a) How do base analogs and intercalating agents act as mutagens? (4)
- (b) What are the three biological repair mechanisms of errors in DNA replication? (8)
7. Write short notes on any **three** of the following :
- (a) θ replication
- (b) Topoisomerase
- (c) Organelle DNA
- (d) DNA replication at telomeres (3×4=12)

(10)

[This question paper contains 6 printed pages.]

4/12/17

Your Roll No.....

Sr. No. of Question Paper : 5828

H

Unique Paper Code : 223301

Name of the Paper : Animal Physiology & Functional Histology – I

Name of the Course : B.Sc. (H) Zoology

Semester : III

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt five questions in all.
3. Question No. 1 is Compulsory.
4. Make well labelled diagrams wherever necessary.

1. (a) Define the following :

(1×4=4)

(i) Thermogenesis

(ii) Tropic Hormone

(iii) Basement membrane

P.T.O.

(iv) Spatial summation

(b) Differentiate between the following : (2×4=8)

(i) Incomplete and Complete tetanus

(ii) Permissive effect and Synergistic effect

(iii) Tight and Gap junction

(iv) Interstitial and Appositional growth

(c) State whether True or False : (½×4=2)

(i) The period of lost excitability is known as latent period.

(ii) Delta cells of pancreas secrete pancreatic polypeptide.

(iii) Repolarization phase of action potential is due to opening of sodium channels.

(iv) Cones are receptors for colour vision.

(d) Fill in the blanks : (½×10=5)

(i) A _____ is an enzyme that phosphorylates other cellular proteins.

- (ii) _____ binds to Ca^{2+} enabling even more Ca^{2+} be sequestered as stored within the sarcoplasmic reticulum.
- (iii) The period of time when secondary sexual characteristics begin to develop and the potential for sexual reproduction is reached is called _____. The first menses is called _____, and the permanent cessation of menses is called _____.
- (iv) The serous membrane lining and covering the heart is known as _____.
- (v) _____ break down the bone matrix.
- (vi) The prominent clusters of rough endoplasmic reticulum in neuronal cell bodies are known as _____.
- (vii) _____ is the process by which graded potential are added together.
- (viii) The _____ of endometrium lines the uterine cavity and sloughs off during menstruation.

(e) Give reasons for the following : (1×4=4)

- (i) Presence of the hypothalamo-hypophyseal portal system.
- (ii) Muscles are in the state of rigidity after 3-4 hours of death and why this rigidity disappears after 24 hours.
- (iii) Why women under age 50 have a much lower risk of coronary artery disease than do men of comparable age?
- (iv) Synaptic transmission is faster at an electrical synapse.

(f) Expand the following abbreviations : ($\frac{1}{2} \times 4 = 2$)

- (i) CK
- (ii) GAG's
- (iii) DHT
- (iv) GABA

(g) Give exact location and function of the following :

($\frac{1}{2} \times 4 = 2$)

(i) Dihydropyridine receptor (DHP)

(ii) Connexons

(iii) Corona radiata

(iv) Bulbourethral glands

2. (a) Describe the process of signal transmission at a myoneural junction. (9)
- (b) How is the neurotransmitter removed from the synaptic cleft of this junction? (3)
3. (a) How do lipid-soluble and water-soluble hormones act on their target cells? (9)
- (b) What are paracrine and autocrine hormones? (3)
4. (a) Describe the structure and function of different types of epithelial tissues. (9)
- (b) Add a note on the general features of connective tissue. (3)
5. (a) Describe the hormonal regulation of female reproductive cycle. (9)

(b) Add a note on the histology of uterus. (3)

6. Describe the structure and function of the ear. (12)

7. Write short notes on **any three** :

(a) Hormones of anterior pituitary

(b) Blood - testes barrier

(c) Types of cell junctions

(d) Saltatory conduction (4×3=12)

- (b) Give the scientific names and classify the following animals upto order : 2×5
- (i) Acorn worm
 - (ii) Lamprey
 - (iii) Squirrel
 - (iv) Tree frog
 - (v) Owl.
- (c) Differentiate between the following : 2×4
- (i) Catadromous and Anadromous migration in fishes
 - (ii) Gliding and Soaring flight
 - (iii) Proteroglyphous and Opisthoglyphous
 - (iv) Progressive and retrogressive metamorphosis.
- (d) Name the zoogeographical regions to which the following animals belong to : 1/2×4
- (i) Ring tailed lemur
 - (ii) Anaconda
 - (iii) Echidna
 - (iv) Hippopotamus.
- (e) State whether the following statements are true or false : 1/2×4
- (i) Marsupials are mostly confined to Australian region.

- (ii) Eels are epic example of diadromous migration.
- (iii) Poison glands in snakes are the modified sweat glands.
- (iv) Tuatara are considered as living fossils which belongs to order Rynchocephala.
2. (a) Name the major Zoogeographical regions of the world.
Give an account of the mammalian fauna of the Neotropical and Australian region.
- (b) Discuss continental drift theory. 9,3
3. Describe migration in birds with suitable examples. 12
4. (a) Discuss the adaptive radiation in mammals with reference to locomotory appendages.
- (b) Discuss the affinities of Prototheria. 7,5
5. (a) Describe the poison apparatus in snakes. Add a short note on biting mechanism in snakes.
- (b) Briefly describe the affinities of *Sphenodon* and justify its systematic position. 8,4

6. (a) Briefly discuss the origin and evolution of tetrapods.
- (b) Explain the mode of osmoregulation in fresh water fishes. 7,5
7. Write short notes on any *three* of the following : 3×4
- (a) Retrogressive metamorphosis
- (b) Parental care in fishes
- (c) *Archaeopteryx*
- (d) Aganatha.

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Roll No.

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S. No. of Question Paper : 6734

Unique Paper Code : 32231302

HC

Name of the Paper : **Physiology : Controlling and
Coordinating System**

Name of the Course : **B.Sc. (Hons.) Zoology**

Semester : **III**

Duration : **3 Hours**

Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *five* questions in all.

Question No. 1 is compulsory.

1. (A) Define :

4

(i) Spermiation

(ii) Glial Cells

(iii) Negative feedback

(iv) Oxygen Debt.

- (B) Distinguish between : 5×2=10
- (i) Fused and Unfused tetanus
 - (ii) Electrical and Chemical synapse
 - (iii) Stratified and Pseudo-stratified epithelium
 - (iv) Osteoclasts and Osteoblasts
 - (v) Secondary and Graafian Follicle.
- (C) Expand the following : 3
- (i) DHT
 - (ii) ABP
 - (iii) ACTH
 - (iv) BMR
 - (v) GABA
 - (vi) CK.
- (D) Give the exact location and function : 4
- (i) $\text{Na}^+ - \text{K}^+$ ATPase pump
 - (ii) Titin
 - (iii) Principal Cells
 - (iv) Adipocytes.
- (E) Fill in the blanks : 4
- (i) Acetylcholine is degraded by
 - (ii) Thyroid hormones are stored as a colloid containing in the follicle.

- (iii) Hyposecretion of insulin causes
- (iv) Inability of a muscle to maintain its strength of contraction or tension during prolonged activity is called
- (v) Strongest type of cartilage is
- (vi) A TRIAD in a sarcomere consists of and
- (vii) is secreted by the placenta to stimulate development of mammary glands for lactation.

(F) Give reasons/physiological significance of (any two) : 2

- (i) Action potentials cannot be summed up
- (ii) Vibrations of the oval window are much more vigorous than in the tympanic membrane
- (iii) Blood-testes barrier.

2. (a) Give the histology of Hyaline and Elastic cartilage. 4
- (b) Enumerate the physiological actions of the various hormones secreted by the adrenal glands. 8
3. (a) Describe the process of oogenesis and follicular development in the ovary. 8
- (b) Give an account of the physiological actions of ovarian hormones. 4

4. (a) Describe the types of ion channels. 4
- (b) How do Na^+/K^+ channels contribute to the generation of an Action Potential ? 8
5. (a) How do water-soluble hormones act on their target cells ? 6
- (b) Describe the role of thyroid and parathyroid glands in calcium homeostasis. 6
6. (a) How does an action potential arriving at the sarcolemma result in muscle contraction ? 8
- (b) Describe the crossbridge cycle in detail. 4
7. Write short notes on any *three* of the following : $3 \times 4 = 12$
- (a) Bleaching and regeneration of Rhodopsin
- (b) Types of hormones on the basis of their chemical composition
- (c) Histology of compact bone
- (d) Hormonal regulation of male reproduction.

(13)

This question paper contains 4 printed pages]

16/12/17

Roll No.

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S. No. of Question Paper : 6735

Unique Paper Code : 32231303 HC

Name of the Paper : Fundamentals of Biochemistry

Name of the Course : B.Sc. Zoology

Semester : III

Duration : 3 Hours Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt five questions in all, including.

Question No. 1, which is compulsory.

Attempt various parts of a question at one place only.

Draw well labelled diagram wherever necessary.

1. (a) Define : 5
- (i) Isoelectric point
 - (ii) Mutarotation
 - (iii) Supersecondary Structures
 - (iv) Prions
 - (v) Glycoconjugates.

(b) Differentiate between :

5

- (i) Coenzyme and Isozyme
- (ii) Starch and Glycogen
- (iii) Amphipathic and Amphoteric molecules
- (iv) Phi (ϕ) and Psi (ψ) angle
- (v) K_m and V_{max} .

(c) Draw the structures of the following :

5

- (i) Cholesterol
- (ii) Phosphatidyl inositol
- (iii) Tryptophan
- (iv) Adenine
- (v) Chitin.

(d) Fill in the blanks :

5

- (i) The primary stabilizing force of protein secondary structure is
- (ii) The gap between the two nucleotides in DNA structure is nm.
- (iii) The imino acid found in protein structure is

(iv) and are epimers of glucose.

(v) amino acids are more likely to be found in a protein's interior.

(e) Give contributions of : 2

(i) Frederick Sanger

(ii) E. Fischer

(iii) B. Samuelsson and S. Bergström

(iv) Avery, McLeod and McCarty.

(f) Give reasons : 5

(i) Gelatin has less nutritional value as a protein.

(ii) Presence of proline residues in polypeptide chains produces kinks.

(iii) Lactose gives positive Benedict's test whereas sucrose doesn't.

(iv) Highly repetitive DNA has low melting temperature.

(v) MUFA and PUFA are better than saturated fatty acids.

2. (a) Describe reversible inhibition of enzymes and its effect on K_m and V_{max} using Lineweaver-Burk plot. 8

(b) Briefly discuss about allosteric enzymes. 4

3. (a) Describe the salient features of Clover leaf model of t-RNA. 6
- (b) Differentiate among the three types of DNA. 6
4. Give a detailed account of various carbohydrates along with their physiological importance. 12
5. (a) What are lipids? Describe in detail their classification with suitable examples. 8
- (b) Justify the statement that information of protein folding resides within the sequence of amino acids. 4
6. (a) Describe various types of secondary structure of protein taking suitable examples. 8
- (b) What are the factors responsible for stability of α helix. 4
7. Write short notes on the following (any *three*) : 12
- (i) Michealis-Menten constant
- (ii) Chaperons
- (iii) Cot curves
- (iv) Cofactors
- (v) Ramachandran Plot.