

Total No. of Questions : 8]

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**P750**

**[4031]-101**

**M.Sc. - I (Sem. - I)**

**ZOOLOGY (2005 Pattern)**

**ZY - 101 : Biochemistry**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt any four questions.*
- 2) *Figures to the right indicate full marks.*
- 3) *Draw diagrams wherever necessary.*

- Q1)** a) Discuss in detail the kinetics of bisubstrate reaction. **[8]**  
b) Give the following reactions in detail. **[12]**  
i) Isocitrate  $\rightarrow$   $\alpha$  - Ketoglutarate.  
ii) Succinate  $\rightarrow$  Fumarate  
iii) Malate  $\rightarrow$  Oxaloacetate.
- Q2)** a) Give the names and role of the components of the mitochondrial electron transport complex. **[10]**  
b) Explain the cooperative behavior of allosteric enzyme. **[10]**
- Q3)** a) State the importance of coenzyme. Give the role and structure of coenzyme of vit.B6. **[10]**  
b) Discuss the native confirmation of protein structure. **[10]**
- Q4)** Write notes on: **[20]**  
a) Immbilized enzymes.  
b) Storage polysaccharide  
c) Zymogen activation.  
d) Chemistry of triacyl glycerol.

**P.T.O.**

- Q5)** a) Discuss the process of transport of fatty acid across the mitochondria. [10]  
b) Describe the structure and function of pyruvate dehydrogenase complex. [10]
- Q6)** a) Describe in detail inosinic pathway. [10]  
b) Give the role and importance of branching and debranching enzyme in glycogen metabolism. [10]
- Q7)** a) Explain in detail the detoxification of  $\text{NH}_4^+$ . [10]  
b) Explain the process of  $\beta$ oxidation of fatty acid. [10]
- Q8)** Write notes on [20]  
a) Deamination of serine.  
b) Ketone bodies.  
c) Feed back inhibition.  
d) Phospholipids.



Total No. of Questions : 8]

[Total No. of Pages : 2

**P751**

**[4031]-102**

**M.Sc. (Sem. - I)**

**ZOOLOGY (2005 Pattern)**

**Zy - 102 : A) Genetics**

**B) English for Scientists**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Answers to the two sections should be written in separate answer books.*
- 2) *Attempt any two questions from each section.*
- 3) *All questions carry equal marks.*
- 4) *Use of calculator is allowed.*

**SECTION - I**

**A) Genetics**

**Q1)** Explain the organization and regulation of Lac operon. How does it differ from Arabinose operon?

**Q2)** What is recombinant DNA technology? Describe the essential steps for obtaining a clone of a specific fragment of DNA. Add a note on the practical applications of Recombinant DNA technology.

**Q3) a)** If the frequency of “L<sup>N</sup>” allele is 0.4, how many individuals have blood group ‘MN’ in a population of 1000? Calculate the percentage of ‘MM’ blood group persons for the same sample.

b) In a three - point test cross, F<sub>1</sub> Drosophila female  $\left( \frac{+ + +}{y \text{ ec } w} \right)$  is crossed

with yellow – bodied (y), echinus (ec), white - eyed (w) males (y ec w). The F<sub>2</sub> progeny obtained is

+	ec	w	=	20	+	ec	+	=	46
+	+	+	=	438	y	+	w	=	42
y	+	+	=	25	y	ec	w	=	429

construct a chromosome map for these genes.

**P.T.O.**

- Q4)** Write notes on any two of the following :
- a) Environmental influence on polygenic inheritance
  - b) Somatic cell hybridization
  - c) Dominant Epistasis

## **SECTION - II**

### **B) English for Scientists**

- Q5)** Write an essay on Genetic code as a simple language.
- Q6)** Explain how to write the “Observations and results” section of a scientific paper. Add a note on use of appropriate illustrations in this section.
- Q7)**
- a) How to write the “Introduction” for a scientific paper. What justification should be given in this section?
  - b) How to design a “Title for scientific paper”? Explain its significance in abstracting system.
- Q8)**
- a) Define the following terms with suitable examples.
    - i) Acronym
    - ii) Synonym
    - iii) Syntax
    - iv) Tautology
    - v) Jorgan
  - b) Give salient features of precis writing. Add a note on its usefulness in scientific writing.



Total No. of Questions : 8]

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**P752**

**[4031]-103**

**M.Sc. - I (Sem. - I)**

**ZOOLOGY (2005 Pattern)**

**Zy - 103 : A) Freshwater Zoology**

**B) Statistical Methods**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Answers to the two sections should be written in separate answer books.*
- 2) *Answer any two questions from each section.*
- 3) *Figures to the right indicate full marks.*
- 4) *Draw neat labelled diagrams wherever necessary.*

**SECTION - I**

**A) Freshwater Zoology**

- Q1)** Describe the different types of aquatic habitats and enlist their characteristic fauna. **[20]**
- Q2)** Give an account of Amphibians in Freshwater habitats. **[20]**
- Q3)** Describe heavy metals as important pollutant of aquatic ecosystems. **[20]**
- Q4)** Write notes on any four : **[20]**
- a) Protective adaptations in Rotifera.
  - b) General features of Anura & Urodela
  - c) Giant water bug
  - d) Aquatic adaptations in reptiles
  - e) Freshwater fishes.

***P.T.O.***



Total No. of Questions : 8]

[Total No. of Pages : 2

**P753**

**[4031]-201**

**M.Sc. (Sem. - II)**

**ZOOLOGY (2005 Pattern)**

**ZY- 201 : A) Developmental Biology**

**B) Comparative Animal Physiology**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Answers to the two sections should be written in separate answer books.*
- 2) *Attempt any two questions from each section.*
- 3) *All questions carry equal marks.*
- 4) *Draw neat labelled diagrams wherever necessary.*

**SECTION - I**

**A) Developmental Biology**

**Q1)** Explain the role of  $\beta$  - catenin and TGF -  $\beta$  proteins in *Xenopus* blastula.

**Q2)** Describe in detail the pattern formation in *Drosophila*.

**Q3)** Explain the process of oogenesis and comment on synthesis and storage of maternal transcripts.

**Q4)** Write notes on any two of the following :

- a) Organizers in frog.
- b) Fate maps in chick embryo.
- c) Regulation of sperm motility.
- d) Programmed cell death.

**P.T.O.**

## SECTION - II

### **B) Comparative Animal Physiology**

- Q5)** Explain the mechanism of thermo regulation in homeotherms.
- Q6)** Explain the various events of cardiac cycle. Add a note on neurogenic and myogenic heart.
- Q7)** a) What is respiration? Explain the gaseous exchange during pulmonary respiration.  
b) Explain the role of calcium ions in muscle contraction.
- Q8)** Write short notes on (any four):
- Types of reflexes.
  - Neurosecretion
  - Ureosmotic animals.
  - Dietary requirements of animals.
  - Excretion of urea.





Total No. of Questions : 8]

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**P754**

**[4031]-202**

**M.Sc. (Sem. - II)**

**ZOOLOGY (2005 Pattern)**

**ZY - 202 : A) Molecular Biology**

**B) Cell Biology**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Answer any two questions from each section.*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

**SECTION - I**

**A) Molecular Biology**

- Q1)** Distinguish between DNA Polymerase I, II, III and discuss the mechanism of prokaryotic DNA replication. **[20]**
- Q2)** What is post transcriptional modification? Explain in detail process of post transcriptional modification. **[20]**
- Q3)** a) Describe the secondary and tertiary structure of tRNA and its role in protein synthesis. **[10]**  
b) Describe organization of globin gene family. **[10]**
- Q4)** a) Explain the following: **[15]**  
i) Transposon  
ii) Cot value.  
iii) B DNA  
iv) Splicing  
v) Excision repair  
b) Write a note on organelle DNA. **[5]**

***P.T.O.***

**SECTION - II**

**B) Cell Biology**

- Q5)** What is cell cycle? Explain the various phases of cell cycle and add a note on its regulation. **[20]**
- Q6)** Explain the ultrastructure of nucleus, and add a note on nucleo-cytoplasmic interactions. **[20]**
- Q7)** a) Explain the gene insertion therapy and add a note on its applications. **[10]**  
b) Explain the various ion channels of plasma membrane. **[10]**
- Q8)** Write notes on : **[20]**
- a) Ultrastructure of centriole.
  - b) Structure and functions of ribosomes.
  - c) Functions of Golgi complex.
  - d) Synaptic transmission.



Total No. of Questions : 12]

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**P755**

**[4031]-203**

**M.Sc. (Sem. - II)**

**ZOOLOGY (2005 Pattern)**

**Zy - 203 : A) Biochemical Techniques**

**OR**

**A) Ichthyology**

**B) Endocrinology**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Answer any two questions from each section.*
- 2) *Answers to the two sections should be written in separate answer books.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Figures to the right indicate full marks.*

**SECTION - I**

**A) Biochemical Techniques**

- Q1)** Answer the following: **[20]**
- a) Define partition chromatography. Explain partition coefficient.
  - b) Explain in detail Isoelectric focusing.
  - c) Give the basic theory of sedimentation.
  - d) How you will you corelate the term absorbance and optical density.
- Q2)** a) Give the principle, working of column and application of gas chromatography **[10]**
- b) What is radioisotope? Explain the working of GM counter. **[10]**
- Q3)** a) Describe the methods for DNA sequencing. **[10]**
- b) Explain the working and application of Raman spectrophotometer. **[10]**
- Q4)** Write short notes (any four): **[20]**
- a) Manometric Technique.
  - b) Sedimentation
  - c) Zone electrophoresis.
  - d) Gel chromatography
  - e) Adsorption chromatography.

**P.T.O.**

OR

**A) Ichthyology**

- Q5)** What is migration? Describe different types of migrations occurring in fishes. [20]
- Q6)** Describe in details any four sense organs found in fishes. [20]
- Q7)** Describe various types of air bladders in fishes with reference to their structure and function. [20]
- Q8)** Write notes on any two of the following : [20]
- a) Endocrine control of osmoregulation in fishes.
  - b) Cranial nerves.
  - c) Cyclostomata.
  - d) Phylogeny of fishes.

**SECTION - II**

**B) Endocrinology**

- Q9)** Explain Signal transduction cascade with reference to hormone action. [20]
- Q10)** a) Explain the hormonal regulation of carbohydrate metabolism. [10]  
b) Explain the role of hormones in regulation of yolk synthesis. [10]
- Q11)** a) Explain various types of hormone receptors. [10]  
b) Explain the role of hormones in calcium metabolism. [10]
- Q12)** Write notes on : [20]
- a) Hypothalamic hypophysiotropins.
  - b) TSH
  - c) Renin angiotensin complex.
  - d) Gastrointestinal hormones.



Total No. of Questions : 8]

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**P756**

**[4031]-301**  
**M.Sc. - II (Sem. - III)**  
**ZOOLOGY (2005 Pattern)**  
**ZY - 311 : Entomology - I**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt any four questions.*
- 2) *Draw neat diagrams wherever necessary.*
- 3) *All questions carry equal marks.*

- Q1)** Write the distinguishing characters of class insecta - and secret of their dominance.
- Q2)** Discuss theories of insect cephalization - giving modification of head capsule in insects.
- Q3)** Explain the morphology of insect thorax. Add a note on thoracic appendages.
- Q4)** Give the distinguishing characters of following insect orders with atleast two examples from two families.
- |                 |                |
|-----------------|----------------|
| a) Collembola.  | b) Isoptera    |
| c) Thysanoptera | d) Lepidoptera |
| e) Odonata      |                |
- Q5)** Describe the structure of blood vessel in insect. Add a note on mechanism of blood circulation.
- Q6)** Describe the structure and give functions of - endocrine glands found in insects.
- Q7)** Describe the structure and give functions of central nervous system in class insecta.
- Q8)** Write short notes on (any four) :
- |                                    |                     |
|------------------------------------|---------------------|
| a) Modification of legs in insects | b) Proventriculus.  |
| c) Fat bodies                      | d) Eye of an insect |
| e) Malpighian tubules              |                     |



Total No. of Questions : 8]

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**P756**

**[4031]-301**  
**M.Sc. - II (Sem. - III)**  
**ZOOLOGY (2005 Pattern)**  
**ZY - 312 : Genetics - I**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt any four questions.*
- 2) *All questions carry equal marks.*
- 3) *Use of calculator is allowed.*

- Q1)** What are multigene families? Explain with suitable example the role of mutations in the evolutionary process of multigene families.
- Q2)** a) Describe the concept of assortative mating and mention how it is important in subdivision of population.  
b) What is genetic drift? Give its causes and importance.
- Q3)** Explain the terms fitness and coefficient of selection. Derive an equation for change in allelic frequency caused by natural selection against recessive trait and homozygous dominant.
- Q4)** “PCR” is a revolutionary technique that promises to replace gene cloning for realizing many of the objectives. Justify the statement with suitable examples.
- Q5)** What is gene therapy? Explain different strategies for a gene therapy.
- Q6)** Discuss how selection strategies involving heterozygote superiority can lead to balancing selection. Add notes on ‘selection coefficient’.
- Q7)** Explain the concept of phenotypic variance and its partitioning in different subcomponents. Mention its importance.
- Q8)** Explain the genetic basic of metric traits with suitable examples.



Total No. of Questions : 8]

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**P756**

**[4031]-301**  
**M.Sc. - II (Sem. - III)**  
**ZOOLOGY (2005 Pattern)**  
**ZY - 313 : Physiology - I**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt any four questions.*
- 2) *All questions carry equal marks.*
- 3) *Draw neat diagrams wherever necessary.*

- Q1)** What are biological rhythms? Explain any two in detail?
- Q2)** Explain the structure of luminiscent organ. Add a note on biochemical and molecular mechanism of bioluminescence.
- Q3)** Describe the structure of membrane and add a note on properties of membranes in relation to ionic transport.
- Q4)** a) Explain electrolyte balance in aquatic vertebrates.  
b) Explain the water balance strategies in birds & mammals.
- Q5)** a) Explain Du-Bios thermal balance & give its significance.  
b) Explain the structure and functions of electro receptors.
- Q6)** Write notes on:  
a) BMR  
b) Intracellular environment  
c) Homeotherms  
d) Hibernation.
- Q7)** a) Explain the structure & function of swim bladder in fish.  
b) Explain metabolism in relation to low oxygen level.
- Q8)** a) Explain the effects of high altitude on energy metabolism.  
b) Explain the role of supercooling and antifreeze substances in thermoregulation.



Total No. of Questions : 20]

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**P757**

**[4031]-302**

**M.Sc. - II (Sem. - III)**

**ZOOLOGY (2005 Pattern)**

**ZY - 321 : Immunology**

**ZY - 322 : Environmental Biology**

**ZY - 323 : Fundamentals of Systematics**

**ZY - 324 : Aquaculture**

**ZY - 325 : Insect Ecology**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt any two optional courses from ZY - 321 to ZY - 325.*
- 2) *Answers to the two courses should be written in separate answer books.*
- 3) *Attempt any two questions from each optional course.*
- 4) *Draw diagrams wherever necessary.*
- 5) *All questions carry equal marks.*

**SECTION - I**

**ZY - 321 : Immunology**

**Q1)** Explain the theories of antibody synthesis. Add a note on molecular basis of antibody diversity generation.

**Q2)** Write notes on (any two) :

- a) Allergy
- b) Immunoelectrophoresis
- c) T-cell activation

**Q3)** What is HLA? Explain HLA with reference to diseases associated with it.

**Q4)** Explain humoral immunity in detail. Add note on active and passive immunization.

***P.T.O.***



## **SECTION - II**

### **ZY - 322 : Environmental Biology**

- Q5)** Discuss the need and importance of Environmental management.
- Q6)** Describe the major environmental challenges caused by human activities.
- Q7)** Describe basic aspects of Sustainability. Add a note on energy crisis.
- Q8)** Write short notes on :
- Environmental education - need & importance.
  - Green house gases & their effect.
  - Human impact on climate
  - Concept of Environmental management.

## **SECTION - III**

### **ZY - 323 : Fundamentals of Systematics**

- Q9)** What is meant by nomenclature? Explain in detail “International code of Zoological nomenclature”.
- Q10)** What are the current approaches in taxonomy? Describe in brief.
- Q11)** Define the term species and describe in detail the concept of species.
- Q12)** Write short notes on (any four) :
- Different kinds of keys used in taxonomic work.
  - Taxonomic collection and identification.
  - Aristotles Natural system of classification.
  - Phylogeography
  - Morphotaxonomy.

**SECTION - IV**

**ZY - 324 : Aquaculture**

- Q13)* Describe the habit, habitat and culture methods of fresh water prawns.
- Q14)* Give various techniques applied for harvesting of fishes.
- Q15)* Explain the process of pearl formation. Add a note on composition & quality of pearls.
- Q16)* Write short notes on :
- a) Lobster fishery
  - b) Induced breeding.
  - c) Economics of aquaculture.
  - d) Culturing of crabs.

**SECTION - V**

**ZY - 325 : Insect Ecology**

- Q17)* Describe how biotic factors control insects population.
- Q18)* Write an essay on “host specificity” in phytophagous insects.
- Q19)* What is meant by entomophagy. Give an account of various entomophagous insects.
- Q20)* Write notes on :
- a) Monophagous insects.
  - b) Insects as agents of pollination.
  - c) Effect of humidity in insect development.
  - d) Intraspecific relationships in insects.



Total No. of Questions : 12]

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**P758**

**[4031]-303**

**M.Sc. - II (Sem. - III)**

**ZOOLOGY (2005 Pattern)**

**ZY - 331 : Parasitology**

**ZY - 332 : Insect Physiology and Biochemistry**

**ZY - 334 : Genetic Toxicology**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt any two sections.*
- 2) *Attempt any two questions from each section.*
- 3) *All questions carry equal marks.*
- 4) *Draw neat labelled diagrams wherever necessary.*
- 5) *Answers to the two sections should be written in separate answer book.*

**SECTION - I**

**ZY - 331 : Parasitology**

**Q1)** Describe the life cycle, pathogenicity, treatment and control measures of Leishmania sps. and Ancylostoma sps.

**Q2)** What is host parasite system? Give in detail preadaptations to infectiousness and transmission.

**Q3)** Define Immunodiagnostic assay. Explain the use of Immunodiffusion technique and indirect haemagglutination test.

**Q4)** Write notes on any two :

- a) Surface antigen diversity.
- b) Manipulation of host behaviour
- c) Interspecific and strain variation in plasmodium
- d) Schistosoma sps.

***P.T.O.***

## **SECTION - II**

### **ZY - 332 : Insect Physiology and Biochemistry**

- Q5)** Describe the retro cerebral complex of generalised insect. Enlist the hormones secreted by them. Add a note on mode of action of juvenile hormones.
- Q6)** What are flight muscles? Explain the biochemical & physiological events in them during flight.
- Q7)** a) Role of fat bodies in metabolic integration.  
b) Ultrastructure and functions of haemocytes.
- Q8)** Describe structure and function of malpighian tubule regarding water balance and nitrogen excretion in insects.

## **SECTION - III**

### **ZY - 334 : Genetic Toxicology**

- Q9)** What is Mutation? Explain the action of chemical agents in mutagenesis.
- Q10)** Explain the various Molecular methods used to detect the mutagenicity of a test compound.
- Q11)** a) Explain the micro-nucleus test and give its importance.  
b) Explain Drosophila test system to assess the genotoxic potential of a compound.
- Q12)** What is toxicology? Explain its various branches and comment on importance & scope of genetic toxicology.



Total No. of Questions : 8]

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**P759**

**[4031]-401**  
**M.Sc. - II (Sem. - IV)**  
**ZOOLOGY (2005 Pattern)**  
**ZY - 411 : Entomology - II**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt any four questions.*
- 2) *Neat labelled diagrams must be drawn wherever necessary.*
- 3) *All questions carry equal marks.*

**Q1)** What is gametogenesis? Describe the process of spermatogenesis in insects.

**Q2)** Define the term metamorphosis. Describe different types of metamorphosis found in insects.

**Q3)** What is gastrulation? Describe the various theories of gastrulation in insects.

**Q4)** Write notes on (any two)

- |                      |                                      |
|----------------------|--------------------------------------|
| a) Ageing in insects | b) Structure of polytrophic ovariole |
| c) Blastokinesis     | d) Types of larvae                   |

**Q5)** Write an essay on biological control of insects.

**Q6)** Give an account of pheromonal control of pests.

**Q7)** Discuss the importance of integrated pest management.

**Q8)** Write notes on (any two) :

- |                         |                              |
|-------------------------|------------------------------|
| a) Stomach poison       | b) Male sterile technique    |
| c) Pesticidal antidotes | d) Economics of pest control |



Total No. of Questions : 8]

[Total No. of Pages : 1

**P759**

**[4031]-401**  
**M.Sc. - II (Sem. - IV)**  
**ZOOLOGY (2005 Pattern)**  
**ZY - 412 : Genetics - II**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt any four questions.*
- 2) *All questions carry equal marks.*
- 3) *Neat labelled diagrams must be drawn wherever necessary.*

**Q1)** What are genetic markers? Add a note on their importance in genetics.

**Q2)** How mutations lead to formation of oncogene and thus development of cancer.

**Q3)** Write short notes on (any four):

- |                           |                    |
|---------------------------|--------------------|
| a) Down's syndrome        | b) Phenylketonuria |
| c) Klinefelter's syndrome | d) Albinism        |
| e) Turner's syndrome      |                    |

**Q4)** What are cytogenetic studies? How it can be used in genetic diagnosis of diseases.

**Q5)** What is karyotyping? How it is done? Explain in detail human karyotype.

**Q6)** How cell hybrids are used for generation of physical maps?

**Q7)** Explain methods of gene rearrangements in antibody gene?

**Q8)** What are Fab and iab regions in Drosophila homeotic genes? How these are involved in expression of gene?



Total No. of Questions : 8]

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**P759**

**[4031]-401**  
**M.Sc. - II (Sem. - IV)**  
**ZOOLOGY (2005 Pattern)**  
**ZY - 413 : Physiology - II**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt any four questions.*
- 2) *All questions carry equal marks.*
- 3) *Draw neat diagrams wherever necessary.*

- Q1)** Explain the molecular mechanism of blood clotting.
- Q2)** Explain transport of CO<sub>2</sub>. Add a note on neuronal control of respiration.
- Q3)** What is nutrition? Explain the components of digestive system. Add a note on mechanism of digestion.
- Q4)** Explain the structure of eye and give the details of physiology of vision.
- Q5)** What is neuron? Explain its structure and add a note on conduction of impulse through nerve fibre.
- Q6)** a) Explain the pathways of ATP formation during muscle contraction.  
b) Explain the cardiovascular response to exercise.
- Q7)** a) Explain the structure of chemoreceptors and add a note on mechanism of chemoreception.  
b) Explain the mechanical events of cardiac cycle.
- Q8)** Write notes on:  
a) Muscle twitch  
b) Neuropeptides  
c) Anatomy of respiratory system.  
d) Blood pressure.



Total No. of Questions : 20]

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**P760**

**[4031]-402**

**M.Sc. (Sem. - IV)**

**ZOOLOGY (2005 Pattern)**

**ZY - 421 : Animal Tissue Culture**

**ZY - 422 : Pollution Biology**

**ZY - 423 : Marine Biology**

**ZY - 424 : Bacterial and Phage Genetics**

**ZY - 425 : Medical Entomology**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt any two sections.*
- 2) *Attempt any two questions from each section.*
- 3) *All questions carry equal marks.*
- 4) *Answers to the two sections should be written in separate answer books.*

**SECTION - I**

**ZY - 421 : Animal Tissue Culture**

- Q1)** a) What is cell suspension culture? Explain batch and continuous culture. **[10]**
- b) Explain the characteristics of transformed cells. How karyotyping is used for characterisation of cell lines. **[10]**
- Q2)** a) What is Laminar air flow? Explain the working of LAF and give the importance HEPA filter. **[10]**
- b) What is organ culture? Explain different methods of it. **[10]**
- Q3)** a) Write an account on cell repositories. **[10]**
- b) Give the advantages and disadvantages of animal tissue culture. **[10]**
- Q4)** Write short notes : **[20]**
- a) CO<sub>2</sub> incubator.
  - b) Methods of tissue disaggregation.
  - c) Role of serum in media.
  - d) Insect cell line.

**P.T.O.**



## **SECTION - II**

### **ZY - 422 : Pollution Biology**

- Q5)** Elaborate on Radioactive pollution and its academic relevance in present times with suitable examples.
- Q6)** Discuss the various means of monitoring water pollution.
- Q7)** Describe Biosphere with special emphasis on Hydrosphere as life zone of biodiversity.
- Q8)** Write notes on :
- a) Climate change
  - b) Pollutants
  - c) Composition of atmosphere
  - d) Acid rain.

## **SECTION - III**

### **ZY - 423 : Marine Biology**

- Q9)** Give a detail account of profile of a sea floor.
- Q10)** Describe the subdivisions of a marine environment.
- Q11)** Describe the structure of an estuary. Add a note on the estuarine food web.
- Q12)** Write notes on :
- a) Control measures of boring Organism.
  - b) Primary production in a marine habitat.
  - c) Littoral Zone
  - d) Marine fauna

## SECTION - IV

### **ZY - 424 : Bacterial and Phage Genetics**

**Q13)** Explain following:

- a) Life cycle of T<sub>2</sub> Phage
- b) Conditional lethal mutants
- c) Generalised transduction and abortive transduction.
- d) Positive complementation.

**Q14)** Comment on :

- a) Salient features of nucleoid.
- b) Replication of  $\lambda$  genome.

**Q15)** Write notes on:

- a) Tra genes in F - Plasmids
- b) Cotransformation and co-transduction.

**Q16)** Write short notes on :

- a) Replication of retrovirusus.
- b) Regulation of copy numbers in transposons.

## SECTION - V

### **ZY - 425 : Medical Entomology**

**Q17)** Explain the role of insects Vis-a-Vis human health.

**Q18)** Describe the symptoms, Pathogenecity and Control measures of yellow fever and Dengue fever.

**Q19)** Describe the morphological features of Cat flea, Rat flea, Sand flies and Reduvid bugs. Add a note on their role as Vectors of several diseases.

**Q20)** Write notes on :

- a) House hold insect pests.
- b) Entomophagy
- c) Carrions disease
- d) Anopheles mosquito.



Total No. of Questions : 16]

[Total No. of Pages : 3

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**[4031]-403**

**M.Sc. (Sem. - IV)**

**ZOOLOGY (2005 Pattern)**

**ZY - 431 : Physiology of Mammalian Reproduction**

**ZY - 432 : Comparative Invertebrate Histology and Histochemistry**

**ZY - 433 : Biodiversity Assessment**

**ZY - 435 : Apiculture**

*Time : 3 Hours]*

*[Max. Marks : 80*

*Instructions to the candidates:*

- 1) *Attempt any two sections.*
- 2) *Answer any two questions from each section.*
- 3) *Answer to the two sections should be written in separate answer books.*
- 4) *All questions carry equal marks.*
- 5) *Neat diagrams must be drawn wherever necessary.*

**SECTION - I**

**ZY - 431 : Physiology of Mammalian Reproduction**

**Q1)** Describe the Oestrous cycle and add a note on its hormonal regulation.

**Q2)** Explain in detail the development of Mammary gland and add a note on Suckling reflex.

**Q3)** Explain the different types of placenta and comment on their function.

**Q4)** Write short notes on any two :

- a) Hormonal Control of Parturition.
- b) Testosterone.
- c) Artificial insemination.
- d) Menopause.

**P.T.O.**

## SECTION - II

### **ZY - 432 : Comparative Invertebrate Histology and Histochemistry**

- Q5)** What is histochemistry? Explain in detail the principle and procedure of histochemical detection of glycogen.
- Q6)** What is immunohistochemistry? Explain the principle and procedure of immunohistochemical staining.
- Q7)** Describe the method of preparation of permanent histological slide.
- Q8)** Write notes on :
- a) Epithelial tissue
  - b) Connective tissue.

## SECTION - III

### **ZY - 433 : Biodiversity Assessment**

- Q9)** What is adaptation? Write in details the adaptations for aquatic habitat with suitable examples.
- Q10)** Mention zoogeographical realms of species and population and explain the distribution of biotic community.
- Q11)** Classify onychophora with its characters. Write its affinities with other phyla.
- Q12)** Write short notes on :
- a) Keystone species.
  - b) Forest conservation
  - c) Monotremes
  - d) Ex-situ conservation.

**SECTION - IV**

**ZY - 435 : Apiculture**

**Q13)** Describe in detail the external morphology of worker bee that enable them to perform Colony functions.

**Q14)** Give an account of pests, Predators and Parasites of honey bees.

**Q15)** Describe the Composition and economic importance of Bee Venom and Royal Jelly.

**Q16)** Write notes on :

- a) Bee - plant relationship.
- b) Economics of Bee keeping.
- c) Honey extractor.
- d) Drone.

