Total No. of Questions - 9] [Total Pages : 3

(2081)

5855

M.Sc. (IInd Semester) Examination

BOTANY

(Cell and Molecular Biology)

(Common with Zoology)

Paper – V

(REGULAR)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Describe the structure and functions of Golgi apparatus.

(b) Describe various models of structure of Plasma membrane. (6,6)

2. With a well labelled diagram, describe the structure and genome organization of chloroplast. How does it differ from that of Mitochondrion? (12)

3. (a) Describe the structure of a Nuclear Pore and discuss its significance.

   (b) What are Nucleolar Organizer Regions? Describe the structure and functions of Nucleolus. (6, 6)

4. Discuss in detail the organization and role of various components of the cytoskeleton. (12)

5. What do you understand by Apoptosis? Describe the morphological, biochemical and chromosomal changes occurring in the cell during apoptosis. What is its significance? (12)

6. (a) Describe the structure of mRNA and tRNA.

   (b) Describe the structure of ribosomes and discuss their role in protein synthesis. (6, 6)

7. What are Inducible and Repressible Operons? Explain giving one example for each. (12)

8. Describe the biological mechanism of proteins targeting to different organelles. (12)

9. Differentiate between the following :

(a) Plasmodesmata and gap junctions.

(b) RNA polymerase of Prokaryotes and Eukaryotes.

(c) A, B and Z forms of DNA.

(d) Histone and Non-histone proteins. (3,3,3,3)

Total No. of Questions - 10] [Total Pages : 3

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5863

M.Sc. (IVth Semester) Examination

BOTANY

(Bio-Chemistry)

(Common with Zoology)

Paper – XIII

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Explain the following :

(a) Redox potential and its significance. 6

(b) Second law of thermodynamics and its relation with free energy. 6

2. Describe the following :

(a) Monosaccharides as structureal components. 6

(b) Classification and occurrence of carbohydrates. 6

3. Describe the following :

(a) Biosynthesis of unsaturated fatty acids. 6

(b) β-oxidation of unsaturated fatty acids. 6

4. Discuss the following :

(a) Nif genes.

(b) Non-symbiotic nitrogen fixation.

5. Describe the importance of :

(a) GS-GOGAT system. 6

(b) Lectins. 6

6. Discuss the following :

(a) Nucleic acid protein and nucleic acid ligand interactions. 6

(b) Enzyme inhibition. 6

7. Discuss the following :

(a) Salient features and types of genetic code. 6

(b) DNA polymorphism. 6

8. Describe the following :

(a) Biosynthesis and functions of flavonoids. 6

(b) Protein folding. 6

9. Describe the classification, biosynthesis and functions of alkaloids. 12

10. Comment on :

(a) pH and buffers. 6

(b) Isomerization. 6

Total No. of Questions – 10] [Total Pages : 3

(2031)

5389

M.Sc. (IInd Semester) Examination

ZOOLOGY

(Developmental Biology)

Paper–VIII

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks. Draw neat and well labelled diagrams where required.

1. (a) Describe the germ cell migration in mammals. (6)

(b) Write a note on differentiation of germ cells into sperm. (6)

2. Describe in detail the process of spermatogenesis in mammals. (12)

3. Describe the following :

(a) Gene transcription in oocyte.

(b) Acrosomal reaction. (6×2=12)

4. (a) What are the different types of cleavage? Mention important cleavage characteristics. (6)

(b) Describe in detail meroblastic cleavage. (6)

5. What is a fate map? Describe methods of obtaining fate maps and the significance of fate maps with reference to chick. (12)

6. (a) Give a detailed account of organisation of mesoderm and endoderm. (6)

(b) Discuss molecular mechanism of primary embryonic induction. (6)

7. (a) Give an account of development of ectoderm. (6)

(b) Discuss regional specificity of induction. (6)

8. Describe cellular interactions during development of heart. (12)

9. (a) Describe in detail types of placenta. (6)

(b) Give an account of development of placenta. (6)

10. Write notes on :

(a) Super-ovulation.

(b) Embryo transfer technology.

(c) Cell commitment. (4×3=12)

7. (a) What is a natural resource? Give an account of different natural resources with special reference to India.

(b) Write a note on biogeochemical cycling. (6+6=12)

8. (a) Describe the floristic regions of India.

(b) Write notes on :

(i) Keystone species.

(ii) Levels and measurements of biodiversity.

(iii) Biosphere reserves. (6+6=12)

9. (a) Define climate change. Give an account of causes and effects of climate change.

(b) What is convention on biological diversity? Write a short account of its key provisions. (6+6=12)

10. (a) Define pollution. Give an account of environmental pollutants.

(b) Explain :

(i) Bioremediation.

(ii) Good and bad ozone in the atmosphere.

(iii) Acid rains and its effects on ecosystem.

(6+6=12)

3. Describe briefly :

(a) Lateral line system of fishes.

(b) Jacobson's organ.

4. Define urinogenital system. Give a detailed account of the various types of kidneys in vertebrates?

5. Describe the structural changes in aortic arches of vertebrates during transformation from aquatic to terrestrial mode of life?

6. What is jaw suspensorium? Give a comparative account of jaw suspension in vertebrates?

7. What are accessory respiratory organ? Give an account of accessory respiratory organs in fishes?

8. Write short notes on :

(a) Concept of protochordata.

(b) Ruminant stomach.

9. Write short notes on :

(a) Various type of mammalian uteri.

(b) Polyphyodont and diphyodont dentition.

10. Describe the structure of mammalian ear with suitable diagram and discuss the physiology of hearing?

Total No. of Questions - 10] [Total Pages : 3

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5391

M.Sc. Examination

ZOOLOGY

(General Physiology)

Paper–XII

(Semester–III)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Briefly describe the digestion and absorption of fats and carbohydrates. 12

2. How will you describe the interrelationship of blood flow, pressure and resistance in an organism ? Mention the role of structure of blood vessels. 12

3. Enumerate various respiratory pigments and different types of buffer systems. Explain the role and importance of pigments and buffer system. 12

4. Write notes on the following :

(a) Functioning of ADH and aldosterone. 6

(b) Role of kidney in acid base balance. 6

5. Differentiate between skeletal, cardiac and smooth muscle. Give examples and their functional significance along with diagram. 12

6. Write notes on the following :

(a) Feedback inhibition. 6

(b) Pituitary gland. 6

7. Discuss the histophysiology of spermantogenesis. Give the name of hormones secreted by testis and highlight their role. 12

8. Describe the physiology of mechano-reception and equilibrium reception. 12

9. Write an essay on the components of environmental physiology. 12

10. What do you understand by following :

(a) Osmotic and ionic stress. 3

(b) Chloride shift. 3

(c) Peristalsis. 3

(d) Nephron. 3

5390

M.Sc. Examination

ZOOLOGY

(Applied Zoology)

Paper–XI

(Semester–III)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Define a pest. Discuss different pests and diseases of silkmoth. 12

2. Write notes on the following :

(a) Hive products.

(b) Bee keeping industry in India and its future. 5,7

3. (a) Give an account of pheromonal and hormonal control of pests.

(b) Write note on chemosterilants. 7,5

4. Write in detail biology and control measures of *Citrus psylla* and *Meladogyne* sp. 12

5. Write systematic position, biology and control of the following :
   (a) *Trichuris*.
   (b) *Trichomonas*. 6,6

6. Discuss the current status of malarial vaccine. 12

7. Describe the meaning and causes of wild species extinction. 12

8. (a) Write in detail about the technique of induced breeding.
   (b) Write note on fishing gears. 7,5

9. Give an account of the principles of management and drug treatment for the following :
   (a) Mechanical and chemical syndromes.
   (b) Focal muscle pain.
   (c) Cramps and contractures. 4,4,4

10. Write note on the following :
   (a) Ericulture.
   (b) Endocrine myopathy. 5+7

Total No. of Questions – 10] [Total Pages : 3

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5387

M.Sc. Examination

ZOOLOGY

(Biology of Parasites)

Paper–IV

(Semester–I)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks. Draw neat and labelled diagrams where required.

1. (a) Write an essay on parasitic adaptations.

   (b) Give an account of palaeoparasitology and discuss its significance.

2. (a) Discuss factors of survival of parasite in host.

   (b) Give a brief account of evolution of parasite in relation to host behaviour.

3. (a) Describe ecological factors influencing spread of human disease.

(b) Discuss relationship between human population growth and parasitic infection.

4. (a) Describe morphology and life cycle of *Giardia lamblia*.

(b) Discuss zoogeographical distribution and epidemiology of *Giardia lamblia*.

5. (a) Give a brief account of morphology and life cycle of *Taenia solium*.

(b) Comment upon neurocysticercosis.

6. (a) Describe morphology and life cycle of whip worm.

(b) Describe morphology and life cycle of pin worm

7. Write an essay on lymphatic filariasis.

8. (a) Give an account of morphology of *Polystoma* sp.

(b) Describe life history of *Polystoma* sp.

9. Give a detailed account of morphology, life cycle and pathology of *Macacanthorhynchus*.

10. Write notes on the following :

(a) Zoonosis.

(b) Xenodiagnosis.

(c) Spurious infection.

(d) Host.

Total No. of Questions – 10] [Total Pages : 3

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5468

M.Sc. (IVth Semester) Examination

BOTANY

(Ecology)

(Common with Zoology)

Paper : XIV

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Define Community. What are the concepts and perspectives of community?

(b) Define Biomes. Enlist major biomes of the world and describe major characteristics of any *two* of them.

(6+6=12)

2. (a) Define ecotone and discuss the characteristics of ecotone.

(b) Write a note on pollutants and trophic level. (6+6=12)

3. (a) Define Sustainability. What are the characteristics of sustainable ecosystem?

(b) Write note on ecosystem services and sustainable development. (6+6=12)

4. (a) What are the implications of degradation of forest ecosystem? Suggest measures to rejuvenate degraded forest ecosystem.

(b) Explain the mechanism of ecological adaptations in plants and animals. (6+6=12)

5. (a) What is Biodiversity? Discuss its role in ecosystem functions and stability.

(b) Describe the types and sources of Environmental Pollution. Suggest measures to control water and soil pollution. (6+6=12)

6. (a) What is the significance of Ozone Layer? Discuss global implications of ozone layer depletion.

(b) Write note on aquatic ecosystem. (6+6=12)

7. (a) What is the role of predation in nature? Explain by giving suitable examples.

(b) What is host-parasite interaction? Discuss by giving examples. (6+6=12)

8. (a) What is population dynamics in ecology? Explain with the help of a case study.

(b) Write a note on concepts and theory of ecological niche. (6+6=12)

9. (a) How do greenhouse gases contribute to climate change?

(b) Describe the effects of climate change on forest and agriculture ecosystem. (6+6=12)

10. (a) How can wasteland be made useful?

(b) Discuss core principles of ecosystem management. (6+6=12)

Total No. of Questions - 10] [Total Pages : 3

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5377

M.Sc. (IVth Semester) Examination

BOTANY

(Bio-Chemistry)

(Common with Zoology)

Paper : XIII

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Discuss :

(a) Laws of thermodynamics. 6

(b) Equilibrium constant in a chemical reaction. 6

2. Describe :

(a) Structure and importance of membrane lipids. 6

(b) Structure and significance of plant cell wall carbohydrates. 6

3. Discuss in detail the symbiotic nitrogen fixation. 12

4. Describe :

(a) Stereoisomerism. 4

(b) Resonance. 4

(c) Conjugate proteins. 4

5. Discuss :

(a) Origin and kinds of RNA. 6

(b) Role of RNA in protein synthesis and teminism. 6

6. Discuss :

(a) Acetyl CoA pathway and its significance. 6

(b) Weak bonds and stabilization of biomolecules. 6

7. Comment on :

(a) Protein-ligand, protein-protein interaction. 6

(b) Coenzymes and cofactors. 6

8. Describe :

(a) Reductive amination and transamination. 6

(b) Mode of action of enzymes. 6

9. Describe :

(a) Biosynthesis and functions of phenolics. 6

(b) Biosynthesis and functions of steroids and suberins. 6

10. Discuss :

(a) Classification of proteins according to solubility. 6

(b) V_{max} and Michaelis-Menten Constant. 6

Total No. of Questions - 10] [Total Pages : 4

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5370

M.Sc. (IInd Semester) Examination

BOTANY

(Biostatistics and Computer Application)

(Common with Zoology)

Paper–VI

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions are of equal marks.

1. (a) What are the points that must be considered while constructing graphs.

(b) Following are the marks (out of 100) obtained by 50 students in Statistics paper :

70	46	39	25	45	41	45	18	52	63
40	33	33	53	75	64	53	65	65	42
48	56	50	42	49	20	26	63	36	54

45	56	61	65	39	15	60	58	45	35
51	64	55	59	30	35	42	82	45	52

Make a frequency distribution taking class interbar of 10 marks.

2. (a) Find the value of mode for the following distribution :

X :	4	5	6	7	8	9	10	11	12
F :	15	18	12	30	27	40	20	20	12

(b) What do you understand by Dispersion ? Discuss the merits and demerits of various measures of dispersion.

3. (a) Calculate the correlation coefficient of the following data :

Husband age (X) :	23	27	28	29	30
Wife age (Y) :	18	20	22	21	29
Husband age (X) :	31	33	35	36	37
Wife age (Y) :	27	29	28	29	30

(b) Calculate Coefficient of Variation (C.V.) and Standard Deviation (S.D.) for the following data :

X :	5	15	25	35	45	55
F :	12	18	27	20	17	6

4. Explain the following with examples :

(a) Level of significance.

(b) Sampling techniques.

(c) Correlation.

5. (a) Explain the importance of I/O devices with some common devices used for it.

(b) State the importance of flow charts used in programming.

6. (a) Discuss the Simple Random Sampling alongwith their merits and demerits.

(b) State the importance of binary number system in digital computers.

7. (a) State the difference between flow-charts and an algorithm.

(b) Give any *five* statements used in Q basic with suitable examples.

8. (a) What is spreadsheet ? Explain the main features of any spreadsheet package.

(b) What do you understand from Word Processing ? Discuss the main features of any word processing package.

9. Explain the following :

(a) Internet.

(b) Data structures.

(c) Database concepts.

10. (a) State the use of Statistics in Bio-sciences. What do you understand by Bioinformatics ? Discuss it.

(b) Discuss the advantages of use of computers in Bio Sciences.

Total No. of Questions – 10] [Total Pages : 3

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5373

M.Sc. Examination

BOTANY

(Cytogenetic and Evolution)

(Common with Zoology)

Paper–IX

(Semester–III)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. What are Heterochromatin and Euchromatin? Describe chromosome banding techniques to differentiate these two types of chromatin. (12)

2. What do you understand by Dosage Compensation? Describe the sex determination mechanism and dosage compensation in *Drosophila melanogaster*. (12)

3. Give an account of the following :

(a) Epigenetic inheritance

(b) Extranuclear inheritance (6, 6)

4. What are aneuploidy and polyploidy'? Describe various types of variations in chromosome number and discuss their implications. (12)

5. What is an operon? Describe the mechanism of regulation of gene expression in inducible and repressible operons of Prokaryotes. (12)

6. Give various types of gene mutations and describe different mechanisms by which mutations are repaired. (12)

7. Write notes on the following :

(a) Concept of heritability.

(b) Quantitative traits. (6, 6)

8. Describe various factors which affect the allele frequencies in populations. (12)

9. What is Biological Species Concept? Describe the Gradualism and Punctuated equilibrium theories of evolution of species. (12)

10. Write notes on the following :

(a) Phylogenetic trees and their applications.

(b) Neutral theory of molecular evolution. (6, 6)

Total No. of Questions - 10] [Total Pages : 3

(1119)

4769

M.Sc. Examination

ZOOLOGY

(Biosystematics and Taxonomy)

Paper–I

(Semester–I)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. What is systematic zoology? Discuss its various components and characteristics useful in classification. (2+5+5)

2. Write down the rules for scientific nomenclature. Enlist the difficulties in classification of animals. (6+6)

3. Discuss the following in brief :

(a) Ecotaxonomy. 3

(b) Cytotaxonomy. 3

(c) Biochemical taxonomy. 3

(d) Numerical taxonomy. 3

4. Why are the scientific names necessary? Explain in detail the concept of bionomial nomenclature. (2+10)

5. What is speciation? Discuss the process of isolation of population. (4+8)

6. Explain the term 'hierarchial classification'. Give the hierarchial classification with suitable example of an insect (butterfly), bird (pigeon) and mammal (human). (3+9)

7. What do you understand by biodiversity? Discuss different achievements of conservation of diversity. (2+10)

8. Write notes on the following (any *two*) :

(a) Phyletic lineages.

(b) Typological species concept.

(c) Shannon-Wiener Index. (6+6)

9. Write in brief about International Code of Zoological Nomenclature (ICZN). What is preamble and important rules of nomenclature? (4+8)

10. (a) Discuss the collecting ways and data collection in taxonomic collection. 6

(b) Give the methods of identification in taxonomic collections. 6

Total No. of Questions – 10] [Total Pages : 3

(2031)

5384

M.Sc. Examination

ZOOLOGY

(Biosystematics and Taxonomy)

Paper–I

(Semester–I)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. What are the aims and objectives of taxonomy? How can we export taxonomic knowledge to other fields? (12)

2. Define Speciation and its various types? Explain the role of reproductive isolation in the process of Speciation. (12)

3. Discuss the following in brief with examples :

(a) Ruderal species. (3)

(b) Sibling species. (3)

(c) Cryptic species. (3)

(d) Umbrella species. (3)

4. Write a short note on :

(a) Cytotaxonomy. (4)

(b) Biochemical taxonomy. (4)

(c) Utility of Biosystematics. (4)

5. (a) Give a detailed account of kinds and components of Zoological classification.

(b) Define Phyletic lineages. (6+6)

6. What is the purpose of taxonomic keys? What role do they play in assessments of biodiversity and what types of keys are more suitable for amateurs? (12)

7. Define :

(a) Holotype. (2)

(b) Syntype. (2)

(c) Allotype. (2)

(d) Beta taxonomy. (2)

(e) Polymorphism (2)

(f) Lineage. (2)

8. (a) Discuss types of taxonomic publications.

(b) What is curation and what is its significance in preserving natural history collections? (6+6)

9. Discuss levels of Biodiversity? How biodiversity could be conserved with the aid of taxonomic knowledge? (12)

10. What is the role of ICZN in maintaining stable Nomenclature of Linnean categories? (12)

Total No. of Questions – 10] [Total Pages : 3

(2031)

5369

M.Sc. (IInd Semester) Examination

BOTANY

(Cell and Molecular Biology)

(Common with Zoology)

Paper–V

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Describe the structure and functions of Plasmodesmata. How do they differ from gap junctions?

(b) Describe the structure of Lysosomes and discuss their functions. (6, 6)

2. (a) Describe the structure of mitochondrion with a well labelled diagram and discuss the process of gene expression in it.

(b) Give an account of nucleo-chloroplastic interactions. (7, 5)

3. (a) Describe the structure and functions of nucleus.

(b) What is nucleosome? Describe its chemistry and organization. (6, 6)

4. Give an account of

(a) Organization of microtubules.

(b) Flagellar movements and their implications. (6, 6)

5. What is cell cycle? Discuss in detail the regulation of cell cycle. (12)

6. (a) Describe various methods to repair DNA damage.

(b) Explain the process of replication in Eukaryotes. (6, 6)

7. Give the structure of an Optimal Promoter in Prokaryotes. Describe the mechanism of transcription in Prokaryotes. (12)

8. What are negative and positive control of gene expression? Explain with *one* example for each in Prokaryotes. (12)

9. What is protein sorting? Discuss the mechanism of protein targeting to different organelles. (12)

10. Write notes on :

(a) Hormonal control of gene expression in eukaryotes.

(b) Tonoplast membrane.

(c) A, B and Z forms of DNA. (4, 4, 4)

Total No. of Questions – 10] [Total Pages : 3

(2080)

4884-A

M.Sc. (IVth Semester) Examination

BOTANY

(Ecology)

(Common with Zoology)

Paper : XIV

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Explain the theory of population growth. How far this is applicable to real population growth in nature.

(b) Discuss various factors that regulate the population growth. (6+6=12)

2. (a) What is symbiosis? Give a broad outline of various types of positive interactions among organisms.

(b) Write notes on :

(i) Commensalism.

(ii) Antagonism.

(iii) Allelopathy. (6+6=12)

3. (a) Give an account of role of edaphic factors in distribution of plants.

(b) Describe briefly the factors that affect soil formation. (6+6=12)

4. (a) Write a brief account of phytosociological classification of biotic communities.

(b) Write notes on :

(i) Ecotone

(ii) Phenology

(iii) Ecological Niche. (6+6=12)

5. (a) Give an account of status of waste lands in India.

(b) Write short note on rejuvenation of waste lands with special reference to Himalayan region. (6+6=12)

6. (a) Define ecosystem. Explain structure and function of an ecosystem.

(b) Explain the primary and secondary production. Enlist the factors that affect net primary production in plants. (6+6=12)

Total No. of Questions - 10] [Total Pages : 2

(2080)

4879

M.Sc. Examination

BOTANY

(Cytogenetic and Evolution)

(Common with Zoology)

Paper : IX

(Semester-III)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Describe the process of DNA replication. 6

(b) Explain dosage compensation in *Drosophila.* 6

2. Write notes on :

(a) Epigenetic inheritance. 6

(b) Maternal effect. 6

3. Discuss the cytogenetic implications and consequences of inversions and translocations. 12

4. Compare and contrast the process of transcription in prokaryotes and eukaryotes. 12

5. Write notes on : 6

   (a) Causes of gene mutations. 6

   (b) Consequences of mutations.

6. Explain with examples the phenomenon of polygenic inheritance. 12

7. Describe Hardy Weinberg equilibrium alongwith the conditions for its operations. 12

8. Explain :

   (a) Biological species concept. 6

   (b) Neo-Darwinism. 6

9. Discuss the role of molecular drive in evolution of species. 12

10. Give an account of Giant Chromosomes. 12

5388

M.Sc. (IInd Semester) Examination

ZOOLOGY

(Comparative Anatomy of Vertebrates)

Paper–VII

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Describe structure and function of various gland associated with alimentary canal in vertebrates?

2. Write the short notes on :
   (a) Hard derivatives of integuments in vertebrates.
   (b) Types of receptors.

Total No. of Questions – 10] [Total Pages : 3

(2080)

4883

M.Sc. (IVth Semester) Examination

BOTANY

(Bio-chemistry)

(Common with Zoology)

Paper–XIII

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Write short notes on the following :

(a) Laws of Thermodynamics.

(b) Redox Potential. (2×6=12)

2. Define carbohydrates. What are their function. Write about different hexanes and pentanes. Draw their formula. (12)

3. Write detailed notes on the following :

(a) Biosynthesis of Fatty acids.

(b) Polyunsaturated fatty acids and their importance. (2×6=12)

4. Write in detail about nitorgen fixation. (12)

5. Write in detail about protein synthesis. (12)

6. Write notes on the following :

(a) Michaelis-Menten Constant.

(b) Enzyme inhibition. (2×6=12)

7. Write notes on the following :

(a) Genetic Code.

(b) DNA polymorphism. (2×6=12)

8. Write notes on the following :

(a) Phenolies.

(b) Terpenoids.

(c) Alkaloids.

(d) Steroids. (4×3=12)

9. Write about role of acetyl CoA and shikimic acid in intermediary metabolism. (12)

10. Write notes on the following :

(a) Free energy.

(b) Buffers.

(c) Resonance. (4×3=12)

Total No. of Questions – 10] [Total Pages : 2

(2080)

4891

M.Sc. Examination

ZOOLOGY

(Structure and Functions of Invertebrates)

Paper : II

(Semester–I)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks. Draw neat and well labelled diagrams where required.

1. Describe locomotion in protozoa. (12)

2. Give an account of :

(a) Filter feeding in Mollusca.

(b) Hydrostatic movement in Annelida. (6×2=12)

3. Describe the following :

(a) Gills in Crustacea.

(b) Respiratory pigments. (6×2=12)

4. (a) Describe the structure and function of nephridia and malpighian tubules. (6)

(b) Differentiate between excretion and osmoregulation. (6)

5. (a) Give an account of the nervous system in Crustacea. (6)

(b) Discuss trends in neural evolution. (6)

6. (a) What are minor phyla? Discuss concept and significance of minor phyla. (6)

(b) Discuss taxonomic importance of Onycophora. (6)

7. Write notes on :

(a) Psedocoelomates.

(b) Deuterostomia. (6×2=12)

8. (a) Describe larval forms of parasites. (6)

(b) Discuss evolutionary significance of larval forms. (6)

9. What are the patterns of feeding and digestion in lower metazoan? Describe mode of feeding in Porifera. (12)

10. (a) Describe in detail mechanism of respiration. (6)

(b) What is primitive nervous system? Give example. (6)

Total No. of Questions - 9] [Total Pages : 2

(2080)

4875

M.Sc. (IInd Semester) Examination

BOTANY

(Cell and Molecular Biology)

(Common with Zoology)

Paper : V

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Compare and contrast structure of Chloroplast and mitochondrion. 12

2. Compare and contrast the roles of the following :

   (a) Microtubules and Microfilament.

   (b) Extra Cytoplasmic Matrix (ECM). (6+6)

3. Comment upon structure and functions of the following :

(a) Plasmodesmata in plant cells.

(b) Golgi apparatus.

(c) Nuclear Pores. (4+4+4)

4. How proteins are targetted to various cellular organelles. 12

5. Comment upon regulation of gene expression in eukaryotes. 12

6. Compare and contrast molecular mechanism of transcription in prokaryotes and eukaryotes. 12

7. Briefly explain structure and functions of the following :

(a) Ribosomes.

(b) t-RNA.

(c) r-RNA biosynthesis. (4+4+4)

8. Briefly explain molecular mechanisms of different DNA repair systems. 12

9. What are inducible and repressible operons ? Give suitable examples of each in *E.Coli.* 12

Total No. of Questions - 10] [Total Pages : 2

(2080)

4901

M.Sc. Examination

ZOOLOGY

(Molecular Physiology)

Paper : XV-(vi)

(Semester–IV)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Comment upon physiological aspects of Nutritional disorders. 12

2. Discuss physiological regulatory mechanisms of respiration. 12

3. Discuss briefly cardiac conduction system and its control. 12

4. A major component of excretory physiology involves reabsorption of different electrolytes and other molecules. Discuss. 12

5. Briefly explain structure of smooth muscle cell. What do you mean by slow and fast muscles ? 12

6. What are different types of reflexes ? Comment upon reflex mechanism. 12

7. What is a hormone ? Comment on the mechanisms of action of different structural types of hormones. 12

8. Comment upon hormonal regulation of Spermatogenesis. Or Oogenesis. 12

9. Give salient features of the physiological adaptations of deep sea animals. 12

10. Comment upon the roles of hormones in parturition and lactation. 12

Total No. of Questions - 10] [Total Pages : 2

(2080)

4880

M.Sc. Examination

BOTANY

(Immunology and Biotechnology)

(Common with Zoology)

Paper : X

(Semester-III)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt *five* questions in all, selecting atleast *two* questions from each Section.

SECTION–I

1. Write about primary and secondary lymphoid organs. 12

2. Draw the label the structure of an immunoglobulin molecule. Classify immunoglobulins and write their functions in brief. 12

3. Write in detail about classical complement pathway and functions of complement. 12

4. Write in detail about the following techniques.

   (a) Radio immunoassay.

   (b) ELISA. (2×6=12)

5. Write about production, Isolation and characterization of monoclonal antibodies and their uses. 12

SECTION–II

6. Define biotechnology. Write about significance and scope in modern times. 12

7. Write about the technique of plant and animal cell cultures and their applications. 12

8. Write about the principle and technique of Recombinant DNA and its uses. 12

9. Write notes on the following :

   (a) Genomic libraries.

   (b) PCR.

   (c) DNA finger printing. (3×4=12)

10. Write in detail about fermentation technology and its benefits. 12

Total No. of Questions – 10] [Total Pages : 3

(2080)

4884-A

M.Sc. (IVth Semester) Examination

BOTANY

(Ecology)

(Common with Zoology)

Paper : XIV

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Explain the theory of population growth. How far this is applicable to real population growth in nature.

(b) Discuss various factors that regulate the population growth. (6+6=12)

2. (a) What is symbiosis? Give a broad outline of various types of positive interactions among organisms.

(b) Write notes on :

(i) Commensalism.

(ii) Antagonism.

(iii) Allelopathy. (6+6=12)

3. (a) Give an account of role of edaphic factors in distribution of plants.

(b) Describe briefly the factors that affect soil formation. (6+6=12)

4. (a) Write a brief account of phytosociological classification of biotic communities.

(b) Write notes on :

(i) Ecotone

(ii) Phenology

(iii) Ecological Niche. (6+6=12)

5. (a) Give an account of status of waste lands in India.

(b) Write short note on rejuvenation of waste lands with special reference to Himalayan region. (6+6=12)

6. (a) Define ecosystem. Explain structure and function of an ecosystem.

(b) Explain the primary and secondary production. Enlist the factors that affect net primary production in plants. (6+6=12)

7. (a) What is a natural resource? Give an account of different natural resources with special reference to India.

(b) Write a note on biogeochemical cycling. (6+6=12)

8. (a) Describe the floristic regions of India.

(b) Write notes on :

(i) Keystone species.

(ii) Levels and measurements of biodiversity.

(iii) Biosphere reserves. (6+6=12)

9. (a) Define climate change. Give an account of causes and effects of climate change.

(b) What is convention on biological diversity? Write a short account of its key provisions. (6+6=12)

10. (a) Define pollution. Give an account of environmental pollutants.

(b) Explain :

(i) Bioremediation.

(ii) Good and bad ozone in the atmosphere.

(iii) Acid rains and its effects on ecosystem.

(6+6=12

Total No. of Questions – 10] [Total Pages : 2

(2080)

4894

M.Sc. (IInd Semester) Examination

ZOOLOGY

(Comparative Anatomy of Vertebrates)

Paper–VII

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Trace the evolution of heart in various groups of vertebrates with the help of suitable diagram.

2. Explain the succession of kidney in vertebrates. Support your answer with well-labelled diagrams.

3. Describe briefly :
   (a) Structure and functions of air sacs in birds.
   (b) Ruminant Stomach.

4. What is aortic arch? Discuss the evolution of aortic arches in vertebrates.

5. Describe the major evolutionary steps in the progression from protochordate ancestors to the first vertebrates.

6. What is integument? Give the comparative account of integument in reptiles, birds and mammals.

7. Describe an outline classification of vertebrates.

8. Write an account of comparative anatomy of alimentary canal of vertebrates.

9. Differentiate between the following :
   (a) Monocondylic and dicondylic skulls.
   (b) Internal and External respiratory tissue.
   (c) Pharynx and Larynx.
   (d) Mullerian duct and Wolffian duct.

10. Write short notes on any *two* of the following :
   (a) Jaw suspensorium.
   (b) Cranial nerves of mammals.
   (c) Classification of receptors.

Total No. of Questions – 10] [Total Pages : 2

(2080)

4895

M.Sc. (IInd Semester) Examination

ZOOLOGY

(Developmental Biology)

Paper–VIII

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks. Draw suitable diagrams where required.

1. (a) What is the difference between developmental biology and embryology? Write a note on the applications of developmental biology.

(b) Describe developmental patterns in protosomes and deutosomes. (6+6)

2. (a) Give an account of germ cell migration in mammals.

(b) Discuss gene expression during sperm development. (6+6)

[P.T.O.

3. (a) Give a detailed account of spermatogenesis in mammals.
   (b) Discuss role of progesterone in oogenesis. (8+4)

4. Write descriptive notes on the following:
   (a) Contact recognition between sperm and egg.
   (b) Acrosomal reaction. (6+6)

5. What are the various patterns of cleavage? Describe spiral holoblastic cleavage in detail. (12)

6. What is a fate map and what is its significance? What are the methods for making fate maps? Describe fate map of chick. (12)

7. (a) Discuss regional specificity of induction.
   (b) What is the molecular nature of organiser 1-IV? (6+6)

8. Give an account of neurulation and development of ectoderm. (12)

9. (a) Discuss cellular interactions during development of eye.
   (b) What is the chemical basis of differentiation? (6+6)

10. Write notes on :
   (a) Embryotransplant technology.
   (b) *In-vitro* fertilization. (6+6)

Total No. of Questions - 10] [Total Pages : 3

(2080)

4876

M.Sc. (IInd Semester) Examination

BOTANY

(Biostatistics and Computer Application)

(Common with Zoology)

Paper–VI

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions are of equal marks.

1. (a) Following is the 'data' regarding the number of children in 50 families in a locality. Prepare a frequency distribution.

3	2	0	4	4	6	5	0	2	1
4	3	1	5	4	4	6	5	2	4
2	0	2	3	0	3	6	2	2	2
0	5	2	2	1	2	0	2	1	1
5	4	1	3	5	2	2	1	2	5

(b) Construct a histogram from the following data :

Marks :	10-19	20-29	30-39	40-49	50-59
No. of students :	15	20	35	10	4

2. (a) What is meant by 'central tendency'? Discuss the various methods of measuring it and also point out the usefulness of each method.

(b) What is dispersion ? Discuss it and also explain its various types with suitable examples.

3. (a) Calculate the standard deviation from the followii data :

Marks :	10	20	30	40	50	60
No. of students :	9	12	20	10	7	3

(b) Define correlation coefficient. State its limits. Discuss the effect of change of using in and scale on it.

4. Explain the following with examples :

(a) t-test.

(b) Statistical hypothesis.

(c) Sampling error.

(d) Linear regression.

5. (a) Draw a block diagram of a digital computer and explain the functions of its components in brief.

(b) Describe the various symbols used in drawing flow charts.

6. (a) What is meant by "sampling" ? Explain it and also its objects.

(b) Write the rules of binary abolition with examples.

7. (a) State the difference between low and high level languages.

(b) Give any *five* statements used in Q basic.

8. (a) Discuss the formation of a spread shut alongwith its uses.

(b) What is mail merge ? Discuss it and also its advantages.

9. (a) Define internet and its effects on education system.

(b) Discuss the various data structures and thei applications.

10. Write short notes on the following :

(a) Bioinformatics.

(b) Use of statistics in Bio-Sciences.

(c) Use of computers in Botany.

Total No. of Questions - 10] [Total Pages : 3
(2080)

4890

M.Sc. Examination

ZOOLOGY

(Biosystematics and Taxonomy)

Paper–I

(Semester–I)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) What is the difference between taxonomy and systematics? Emphasize their importance for a zoologist. 3+3

(b) Why the scientific names are given to the organisms ? Discuss the binomial nomenclature and support your answer with few examples. 6

2. Write down the rules for scientific nomenclature. Enlist the difficulties in classification of animals. 6+6

3. (a) Discuss in brief the kinds and components of classification. 6

(b) Explain in brief the theories of biological classification. 6

4. (a) What do you understand by taxonomic hierarchy? Give the taxonomic categories of the following organisms:

(i) Earthworm.

(ii) Housefly.

(iii) Honeybee. 3+3

(b) Explain the role of museums and zoological parks as taxonomic aids. 6

5. Write notes on the following :

(a) Biological species concept 4

(b) Evolutionary species concept 4

(c) Polytypic and monotypic species. 4

6. Give methods of identification and problems encountered during identification of animals. Also write about the importance of taxonomy. 12

7. What are operative principles of nomenclature? Discuss binomial system of nomenclature and its significance. 5+4+3

8. What are four types of biodiversity ? Write short note on the various types of diversity losses. 6+6

9. Explain in brief Shannon-Wiener index and dominance index for evaluation of biodiversity. 12

10. Write short notes on the following :

(a) Monographs. 4

(b) Speciation. 4

(c) Different forms of taxonomic publications. 4

Total No. of Questions - 10] [Total Pages : 3

(2080)

4897

M.Sc. Examination

ZOOLOGY

(General Physiology)

Paper–XII

(Semester–III)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Give an account of various enzymes produced in the digestion of carbohydrates, proteins and nucleic acids. Mention the organ and side of release. 12

2. (a) What do you understand by vital capacity and total lung capacity. Explain with examples and significance. 6

(b) Write notes on oxygen equilibrium curve and Hamburges's phenomenon. 6

3. Write an essay on different types of body fliuds, their importance and mechanism of regulation. 12

4. Write notes on :

(a) Antidiuretic hormone. 4

(b) Nephron. 4

(c) Urine formation. 4

5. (a) Write the mechanism of contraction of skeletal muscle. 6

(b) What is the actomyosin ATPase biochemistry. 6

6. Write an essay on structure and functional organization of pituitary gland. 12

7. Draw a well labelled diagram of T.S. of testis and ovary. 12

8. Write notes on :

(a) Equilibrium reception. 4

(b) Photoreception. 4

(c) Phono reception. 4

9. What is physiological adaptation explain in reference to osmotic and ionic stress. 12

10. Briefly explain :

(a) Feedback mechanism. 4

(b) Vascular distensibility. 4

(c) Carbon monoxide poisoning. 4

Total No. of Questions – 10] [Total Pages : 2

(2080)

4896

M.Sc. Examination

ZOOLOGY

(Applied Zoology)

Paper : XI

(Semester-III)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Give examples of social insects. Elaborate on apiculture and crop pollination.

2. Write short notes on any *two* of the following :

(a) Enemies and diseases of honey bees.

(b) Pheromonal and hormonal control of pests.

(c) Fish diseases and their control.

3. Give the mode of transmission, brief epidemiology and control of Small pox and Cholera.

[P.T.O.

4. Define aquaculture. Give the importance of inland and integrated fish culture in the State.

5. Give an account of objectives and strategies of wildlife conservation.

6. (a) Compare and contrast : Biosphere Reserve and National Park.

   (b) Discuss and protected areas in relation to wild animals, and their management in India.

7. Give the biology and control of any *two* of the following agricultural pests :

   (a) Mango mealy bug.

   (b) Cotton white fly.

   (c) Citrus pyrilla.

8. Give an account of any *three* of the following :

   (a) Fishing gears.

   (b) Biology and control of *Trichomonas*.

   (c) Current status of malarial vaccine.

   (d) Non-mulberry sericulture.

9. Write a note on the major food related metabolic disorders.

10. Explain integrated pest management. What are parasitoids?

Total No. of Questions - 10] [Total Pages : 2
(1118)

4511

M.Sc. Examination

ZOOLOGY

(Structure and Functions of Invertebrates)

Paper : II

Semester-I

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. What is embryogeny ? Discuss its use in detail in taxonomy. 12

2. Discuss homaxial apolar symmetry and monaxial hetero polar symmetry with examples. 12

3. What is hydrostatic Skeleton of Hydra ? Discuss how hydrostatic pressure mechanism help in locomotion in Echinoderms ? 12

4. Draw labelled diagram of Paramecium and explain feeding mechanism and process of digestion in it. 12

5. What is excretion and excretory system ? Discuss excretory system in Platyhelminthes. 12

6. Define Crustacean. Give detail account of Crustacean laruae. 12

7. Discuss nervous system in Pila. Draw labelled diagram of nerve system in star fish. 6+6

8. Describe the mode of feeding in Molluscus. Draw suitable diagram also. 12

9. Differentiate between :

   (a) Excretion and osmoregulation.

   (b) Protostomia and Deuterostomia.

   (c) Collentrates and Echinodermates. 4+4+4

10. Write short note on :

   (a) Sol-gel theory.

   (b) Kebers organs and Coelomocytes.

   (c) Nauplius. 4+4+4

Total No. of Questions - 10] [Total Pages : 2
(1118)

4514

M.Sc. Examination

ZOOLOGY

(Applied Zoology)

Paper–XI

(Semester–III)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Give examples of social insects. Elaborate on how honey bees play a significant role in agriculture.

2. Write short notes on any *two* of the following :

(a) *Trichonomas.*

(b) The Lions of Gir.

(c) White fly of cotton.

3. Give the mode of transmission and brief epidemiology of Filariasis and AIDS.

4. Explain integrated fish farming. Give the importance of inland fisheries in the State.

5. Write an essay on the economic importance of domesticated mammals.

6. Differentiate between Wild Life Sanctuary, National Park and Biosphere Reserve. Discuss the relation and importance of biodiversity and human civilization.

7. Explain integrated pest management. What are parasitoids? Explain the role of pheromones in pest control.

8. Give the biology and control of any *two* of the following pests of agricultural importance :

   (a) Castor hairy caterpillar.

   (b) Mango mealy bug.

   (c) Phytoparasitic nematode *Meliodogyne* sp.

9. Write short notes on any *three* of the following :

   (a) Fishing gears.

   (b) Vaccination.

   (c) Congenital myopathies.

   (d) Sericulture Industry in India.

10. Write a note on the metabolic disorders with regard to major food stuff absorption.

Total No. of Questions - 10] [Total Pages : 2

(1118)

4510

M.Sc. Examination

ZOOLOGY

(Biosystematics and Taxonomy)

Paper–I

(Semester–I)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Write note on :

(a) Stages in taxonomy. 6

(b) Role of taxonomy. 6

2. (a) Discuss the various aspects covered in biochemical taxonomy. 6

(b) Write a note on cytotaxonomy. 6

3. What is the different species concept? Give their merits and demerits. 12

4. Explain various theories of biological classification. 12

5. Explain in detail the collection and preservation of taxonomic material. 12

6. How are taxonomic keys useful in identifying an organism ? Discuss their different types. 12

7. Discuss various theories of biodiversity. Also give future directions for conserving biodiversity from various threats. 12

8. (a) What are monographs ? 6

   (b) Write the process of preparation of a taxonomic paper. 6

9. When was ICZN adopted? Write the preamble and important rules of ICZN. 12

10. How would you evaluate biodiversity indices using Shannon-Weinner index and dominance index ? 12

Total No. of Questions - 10] [Total Pages : 2

(1118)

4506

M.Sc. Examination

BOTANY

(Cytogenetics and Evolution)

(Common with Zoology)

Paper : IX

(Semester–III)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Explain the concept of DNA packaging in chromosomes. 6

(b) Write an explanatory note on Chromosome banding. 6

2. Write a brief account of the following :

(a) Sex determination in *Drosophila*. 6

(b) Dosage compensation in Humans. 6

[P.T.O.

3. Explain with a suitable example the extranuclear inheritance patterns. 12

4. Give a comprehensive note on implications and consequences of variation in chromosomes number. 12

5. Describe the regulation of gene expression in eukaryotes.

6. (a) Describe base substitution mutation. 6

   (b) Explain nuclease excision repair mechanism. 6

7. Explain the polygenic inheritance and its significance. 12

8. Discuss the factors that change the allele frequency in the population. 12

9. Write a note on the following :

   (a) Allopatric and sympatric speciation. 4

   (b) The Shifting-Balance Theory of Evolution. 4

   (c) Neo-Darwinism. 4

10. Explain briefly Natural Theory of Molecular Evolution and Phylogenetic trees. (6+6)

Total No. of Questions - 10] [Total Pages : 2

(1118)

4513

M.Sc. Examination

ZOOLOGY

(Biology of Parasites)

Paper–IV

(Semester–I)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks given in parenthesis. Support your answer with neat labelled diagrams whenever needed.

1. What is difference between parasite and pathogen? Write a note on origin and evolution of parasitism. (12)

2. Differentiate the following on the basis of peculiar morphological characters :

(a) *Ascaris* and *Trichinella.*

(b) *Necator* and *Ancylostoma.* (2×6 = 12)

3. Write detail account on morphology, life cycle and pathogenesis of any one species of *Trypanosoma* studied by you. (12)

4. Write short notes on the following :

   (a) *Hymenolepis.*

   (b) *Dipillidium.* (2×6=12)

5. What is echinococcosis? Write a note of prevalence and disease caused by *Echinococcus* and prevention on global prospects. (12)

6. Differentiate the following :

   (a) *Fasciola* and *Fasciolopsis.*

   (b) *Scistosoma japonicum* and *Schistosoma mansoni.*

   (2×6=12)

7. Write on morphology, life cycle and prophylaxis of *Macracanthorhynchus.* (12)

8. Describe the morphology, life cycle, pathogenecity and prophylaxis of *Enterobius.* (12)

9. Write short note on : (2×6=12)

   (a) *Necator.*

   (b) *Wucheria.*

10. Write on morphology, pathogenecity and prophylaxis of *Paragonimus westeramani.* (12)

Total No. of Questions - 10] [Total Pages : 2

(1069)

4517

M.Sc. IV Semester Examination

ZOOLOGY

(Molecular Physiology)

Paper–XV

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Comment upon the Protein metabolism with regulatory pathways involved in the same. 6

(b) Describe Neural and hormonal control of Gastro-intestinal movements. 6

2. (a) Describe various nutritional disorders. 6

(b) Comment upon Humoral regulation of respiration. 6

3. (a) Discuss Counter-current mechanism of concentration of Urine. 6

(b) Comment upon Rennin-Angiotensin system. 6

4. (a) Distinguish between Parasympathetic and Non-parasympathetic system of regulation of heart. 6

(b) Describe Frank-Stirling law. 6

5. (a) Comment upon the types of reflexes. 6

(b) Describe functional compartmentalization of brain and hierarchy of control. 6

6. (a) Describe the functioning of human-heart with the help of schematic diagram. 6

(b) Comment upon the effects of alveolar PO_2 at different elevations. 6

7. (a) Describe the process of lactation and its regulation. 6

(b) Explain the structure and functions of Sertoli cells. 6

8. (a) Comment upon Nitrogen necrosis and Oxygen toxicity. 6

(b) Describe Angular acceleratory forces and their effects. 6

9. (a) Describe the effects of centrifugal accleratory forces on the body of man during aviation. 6

(b) Discuss enzymatic digestion of Proteins. 6

10. (a) Explain the hormonal regulation of Oogenesis. 6

(b) Discuss acclimatization to low O_2. 6

Total No. of Questions - 10] [Total Pages : 2

(1117)

4540

M.Sc. Examination

ZOOLOGY

(Insect Diversity and Physiology)

Paper : III

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks. Support your answer with suitable diagrams wherever needed.

1. Give a detailed classification of Class Hexapoda upto orders with suitable examples. 12

2. (a) Describe typical Insect leg. Discuss modifications in Insect leg with examples.

   (b) What is Wing coupling? Describe in detail. (6+6=12)

3. Describe the following :

(a) Types of respiratory system based on the number of functional spiracles.

(b) Types of ovarioles in Female reproductive sysem.

(6+6=12)

4. Give a detailed account of Diapause in insects. 12

5. Mouth parts of insects are adapted to their feeding habits. Explain. 12

6. Discuss role of insects in Forensic Science. 12

7. What is Biological control? Give an account of agents of biological control. 12

8. Describe the following :

(a) Types of lac.

(b) Honey bee products.

(6+6=12)

9. Write descriptive notes on the following :

(a) Digestion of Cellulose in insects.

(b) Mechanoreceptors.

(6+6=12)

10. Discuss Metamorphosis in insects. 12

11

Total No. Questions - 10] [Total Pages : 2

(1117)

4539

M.Sc. Examination

ZOOLOGY

(Structure and Function of Invertebrates)

Paper : II

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. What is symmetry ? Explain in detail different types of symmetry with examples. 12

2. Define contraction theory. Discuss contraction theory of amoeboid movement. 12

3. Differentiate in Tabular form in between :

   (a) Holozoic and holophytic nutrition. 6

   (b) Schizocoelom and enterocoelom. 6

[P.T.O.

4. Explain in detail the structure and role of muscles in locomotion. 12

5. Define respiratory pigments with examples. Discuss the physiology of respiratory pigments in invertebrates. 12

6. Describe excretory organs in Phyllum Arthropoda with suitable diagram. 12

7. Discuss in detail the evolutionary significance of invertebrate larval forms. 12

8. Define ciliary feeding. Discuss ciliary feeding in detail in polychaet worms. 12

9. Describe the fate of blastopore, draw suitable diagrams. 12

10. Write short note on the following :

(a) Saprozoic nutrition.

(b) Tracheal respiration.

(c) Deuterostome. (4+4+4=12)

Total No. of Questions - 10] [Total Pages : 2

(1117)

Sem I
Dec 2012
Paper-I

4538

M.Sc. Examination

ZOOLOGY

(Biosystematics and Taxonomy)

Paper–I

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Define Biosystematics. Discuss the role of biosystematics in different branches of biology. 12

2. List the conventional and newer trends in Biosystematics. Which one is better and why ? 12

3. (a) Discuss biological species concept. Give its merits and demerits. 6

(b) Differentiate between species and subspecies. 6

[P.T.O.

4. Explain different kinds and components of cl[illegible]ification. 12

5. Write note on the following :

(a) Important features of Linnean hierarchy.

(b) Phylectic lineages.

(c) Interspecific groups.

(d) Cryptic species. (4×3=12)

6. Mention the steps involved in preserving and curating of taxonomic material. 12

7. (a) What is character weighing ? Differentiate between high weight and low weight characters. 6

(b) Write a note on Dichotomous keys. 6

8. Discuss the operative principles and important rules of ICZN. 12

9. What are the different forms of taxonomic publications. 12

10. Write note on the following :

(a) Shannon-Weinner index. 6

(b) Importance of Latin words and Linnean signs in zoological nomenclature. 6

Total No. of Questions - 10] [Total Pages : 3

(1118)

4512

M.Sc. Examination

ZOOLOGY

(Insect Diversity and Physiology)

Paper–III

(Semester–I)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks. Draw neat and labelled diagrams where required.

1. (a) List the apterygote orders of insects. Give distinguishing features and suitable examples.

(b) Classify the following upto orders :

(i) Flea

(ii) Earwig

(iii) Termite

(iv) Red cotton bug. (6+6)

2. Describe in detail the types of antennae found in insects. (12)

3. Describe the following with respect to the digestive system of insects :

   (a) Peritrophic membrane.

   (b) Digestion of Cellulose. (6+6)

4. (a) Classify respiratory system on basis of number of functional spiracles.

   (b) Describe types of spiracles present in insects. (6+6)

5. What is metamorphosis? What are the types of metamorphosis? Discuss hormonal regulation of metamorphosis. (12)

6. Give an account of economic importance of Diptera as vectors of human disease. (12)

7. (a) Describe non-mulberry silks.

   (b) Give an account of post cocoon processing in sericulture. (6+6)

Give an account of the agents of biological control. What are the advantages and disadvantages of biological control? (12)

9. (a) Comment on the role of insects in forensic science with suitable examples.

(b) Describe insecticides of plant origin. (12)

10. Write notes on :

(a) Sponging mouth parts.

(b) Female genitalia of honey bee.

(c) Factors influencing diapause. (4×3=12)

Total No. of Questions - 10] [Total Pages : 2

(1069)

4501

M.Sc. (IInd Semester) Examination

BOTANY

(Cell and Molecular Biology)

(Common with Zoology)

Paper–V

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Briefly explain Plasma membrane pumps, channels and ion carriers. 12

2. Discuss the functions of Endoplasmic reticulum and Golgi bodies. 12

3. Briefly comment upon the following :

(a) Nucleochloroplastic interactions.

(b) Gap functions and Plasmodesmata. (6+6)

4. Explain the functions of Microtubules and Microfilaments.

5. Comment upon the role of Cyclins and Cyclin dependent kinases (CDKs) in cell cycle. 12

6. Briefly explain Eukaryotic gene promoter and transcription factors for core and regulatory parts of promoter. 12

7. Illustrate initiation and elongation of protein synthesis in prokaryotes. 12

8. Briefly comment upon negative and positive control of gene regulation in Lac operon. 12

9. Comment upon the structure of B and Z-DNA. 12

10. Explain targeting of proteins to organelles. 12

Total No. of Questions - 10] [Total Pages : 2

(1069)

4505

M.Sc. (IVth Semester) Examination

BOTANY

(Bio-chemistry)

(Common with Zoology)

Paper–XIII

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Comment on "ATP as main carrier of free energy". (12)

2. Describe the following :

(i) Glycosidic bond. (6)

(ii) Carbohydrates of plasma membrane. (6)

3. Write short notes on the following :

(i) β-oxidation of fats. (6)

(ii) Gluconeogenesis. (6)

[P.T.O.

4. Write in detail the Symbiotic and Non-symbiotic nitrogen fixation. (12)

5. Write notes on the following :

   (a) Structure of Protein. (6)

   (b) Peptides and Polypeptides. (6)

6. (a) Discuss the kinetics of enzymatic reaction. (8)

   (b) Describe the functions of Ribonuclease. (4)

7. Describe the following :

   (a) Synthesis of Pyrimidine. (4)

   (b) DNA polymorphism. (4)

   (c) Semi-conservative replication of DNA. (4)

8. What are Secondary metabolites? Write down the biosynthesis and functions of Flavanoids and Terpenoids? (12)

9. Write short notes on the following :

   (a) Resonance. (4)

   (b) Isomerisation. (4)

   (c) pH of biological systems. (4)

10. Discuss the structure and synthesis of alkaloids and suberins. (12)

Total No. of Questions - 10] [Total Pages : 3

(1069)

4502

M.Sc. (IInd Semester) Examination

BOTANY

(Biostatistics and Computer Applications)

(Common with Zoology)

Paper–VI

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Construct a histogram from the following data :

Marks :	10-19	20-29	30-39	40-49	50-59
No. of students :	15	20	35	10	4

(b) Also find the Cummulative frequency.

2. (a) Find the Median from the frequency distribution given below :

x :	0	1	2	3	4	5	6
f :	5	9	10	12	6	4	2

(b) What are the various measures of Central Tendency ? Explain them.

3. (a) Find the SD and CV for the following data

4, 6, 10, 12, 18.

(b) Calculate the Coefficient of Correlation for the following data :

A	:	15	25	14	20	10	20
B	:	10	30	16	25	20	15

4. Explain the following with examples :

(a) Linear Regression.

(b) Test of Significance.

5. Explain the following :

(a) CPU and ALU.

(b) Low level and High level languages.

(c) Binary number systems.

6. (a) Explain the various symbols used in drawing flow-charts.

(b) Give any *four* statements in QBasic of your choice with suitable examples.

7. (a) Define Internet, and also discuss its importance in educational field.

(b) Define Database, and also discuss its importance.

8. (a) What are the components of MS-Office ? And also explain the use of MS-PowerPoint.

(b) State the advantages of Spreadsheets.

9. (a) Define Sampling and also discuss its errors.

(b) Write about the uses of Computers in Bio-Sciences.

10. Write short notes on the following :

(a) t-test.

(b) Biostatistics.

(c) Variance.

Total No. of Questions - 10]
(1069)

[Total Pages : 3

4506

M.Sc. (IV Semester) Examination

BOTANY

(Ecology)

(Common with Zoology)

Paper–XIV

Time : Three Hours]

[Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. Be brief and to the point in your answers. All questions carry equal marks.

1. Enumerate various climatic factors that affect the growth and development of vegetation on the earth. Describe the influence of temperature and moisture on the biome types. (2+5+5=12)

2. (a) Give an account of the concept and analytical characteristics of community.

(b) Write an explanatory note on mineral cycles in terrestrial and aquatic ecosystems. (6+6=12)

3. (a) Give an account of the dynamics and models of population growth.

(b) Write an explanatory note on spacing systems and 'Y' and 'K' selection. (6+6=12)

4. Give an account of the principle, concept and components of Ecosystem. How does human intervention influence the natural balance in the Ecosystem ? (6+6=12)

5. Write short explanatory notes on the following :

(a) Food web.

(b) Energy dynamics in Ecosystem.

(c) Role of Predation in nature. (3×4=12)

6. Define Biodiversity. Discuss the concept and levels of biodiversity and its role in ecosystem functions and stability. (2+5+5=12)

7. Define Pollution. What are various sources of Air pollution ? Name the major pollutants and analyse their impact on the global environment. Briefly discuss various strategies for prevention of air pollution. 12

8. Write short notes on the following :

(a) Types and Theories of Competition.

(b) Niche theory.

(c) Terrestrial biodiversity hot spots. (3×4=12)

9. Name the major Green house gases which can be traded in the carbon markets. Give the warming potential of each such gas. Discuss the role of these green house gases in global warming. 12

10. Discuss different aspects of Ecosystem degradation. Give an account of regeneration of waste lands and aquatic ecosystems. (6+6=12)

Total No. of Questions - 10] [Total Pages : 3

(1069)

4575

M.Sc. Examination

ZOOLOGY

(Biosystematics and Taxonomy)

Paper–I

(Semester-I)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Describe various stages of taxonomy. Emphasize its importance for a zoologist. 6

(b) Why the scientific names are given to the organisms. Discuss the binomial nomenclature and support your answer with few examples. 6

2. Discuss the modern trends in biosystematics with suitable examples. Enlist the aims and tasks of a taxonomist. 6+6

3. (a) Discuss in brief the kinds and components of classification. 6

(b) Explain in brief the theories of biological classification. 6

4. (a) What do you understand by taxonomic hierarchy? Give the taxonomic categories of the following organisms:

(i) Earthworm.

(ii) Housefly.

(iii) Honeybee.

(iv) House sparrow. 2+4

(b) Explain the role of museums and zoological parks as taxonomic aids. 6

5. Write note on the following :

(a) Biological species concept. 4

(b) Evolutionary species concept. 4

(c) Polytypic and monotypic species. 4

6. Give methods of identification and problems encountered during identification of animals. Also write about the importance of taxonomy. 12

7. What are operative principles of nomenclature? Discuss binomial system of nomenclature and its significance. 5+4+3

8. What is biodiversity? Explain the concept and scope of biodiversity. Write short note on the various types of diversity losses. 2+6+4

9. Explain in brief Shannon-Wiener Index and dominance index for evaluation of biodiversity. 12

10. Write short note on the following :

(a) Ecotaxonomy. 4

(b) Speciation. 4

(c) Different forms of taxonomic publications. 4

Total No. of Questions - 10] [Total Pages : 3

(1069)

4513

M.Sc. (IInd Semester) Examination

ZOOLOGY

(Developmental Biology)

Paper–VIII

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks. Draw suitable diagrams where required.

1. (a) Give an account of developmental patterns in metazoa.

(b) Describe germ cell migration in birds. (6+6)

2. (a) Describe the following :

(i) Vitellogenesis.

(ii) Maturation of oocyte in amphibians.

(b) What is Spermateleosis? Describe in detail. (4+4+4)

[P.T.O.

3. Give an account of

(a) Gametic binding and fusion.

(b) Activation of egg. (6+6)

4. (a) Describe in detail the process of gastrulation in amphibians.

(b) What is Stereoblastula? Give example. (8+4)

5. What is Primary embryonic induction? Give the molecular mechanism of primary embryonic induction. (12)

6. Describe organisation of mesoderm and endoderm during early vertibrate development. (12)

7. Describe the following :

(a) Cellular interactions during development of heart.

(b) Cell commitment and differentiation. (6+6)

8. Give an account of types of placenta, placental development and placental hormones. (12)

9. Write notes on

(a) Cryopreservation.

(b) Superovulation. (6+6)

10. Discuss the following :

(a) Devlopment of rudimentary organs in amphibians.

(b) Paternal effect genes. (6+6)

Total No. of Questions - 10] [Total Pages : 4

(1068)

June 2018

4711

M.Sc. Examination

BOTANY

(Biostatistics and Computer Applications)

(Common with Zoology)

Paper–VI

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Explain the various types of measures of dispersion with examples.

(b) Draw the histogram for the following data :

Age (in years):	2-5	5-11	11-12	12-14	14-15	15-16
No. of Boys :	6	6	2	5	1	3

2. (a) What are the various measures of central tendency of frequency distribution ? Explain with the examples.

(b) Calculate the mean, median and mode for the following data :

Marks :	0-20	20-40	40-60	60-80	80-100
Frequency :	3	17	27	20	9

3. (a) Calculate the variance and standard deviation of the following data :

Age (in years):	20-25	25-30	30-35	35-40	40-45	45-50
No. of Persons :	170	110	80	45	40	35

(b) Calculate the coefficient of correlation from the following data :

X :	1	2	3	4	5	6	7	8	9
Y :	9	8	10	12	11	13	14	16	15

4. Explain the following with examples :

(a) Statistical hypothesis and level of significance.

(b) F and t-test.

(c) Chi-square test.

5. (a) Draw a block diagram of a digital computer and also explain the function of each of its components in brief.

(b) Explain the Binary number system with examples.

(c) Differentiate between low-level and high-level languages.

6. (a) What is Flow-Chart ? Also discuss the various symbols used in flow-chart. Also discuss its uses.

(b) Explain any six statements in Q-BASI with examples.

7. (a) Define a data, data structure and data base with their applications.

(b) What do you mean by Internet ? Also discuss its importance and impact on various fields.

8. Explain the main features of the following and their importance :

(a) MS-Office.

(b) Spread-Sheet.

(c) Any presentation package.

9. Write short notes on the following :

(a) Uses of computer in Botany.

(b) Uses of statistics in Botany.

(c) Various programming techniques.

10. Explain the following with examples :

(a) Bio-information.

(b) Various sampling techniques.

(c) Linear-Regression.

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1068)

Total No. of Questions - 10] [Total Pages : 2

(1068)

4721

M.Sc. Examination

ZOOLOGY

(Comparative Anatomy of Vertebrates)

Paper : VII

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. What is chordata ? Give detailed account of general characters of chordata.

2. Write an essay on evolutionary history of vertebrates.

3. Write notes on the following :

(a) Hornes.

(b) Dermal scales.

4. What is vertebra ? Give a detailed account of developme of vertebra.

5. Write notes on the following :

   (a) Gizzard.

   (b) Ruminent Stomach.

   (c) Teeth.

6. Describe briefly :

   (a) External and internal gills.

   (b) Swim Bladder.

   (c) Lungs.

7. Define blood. Give various functions of blood. Describe various formed elements of blood.

8. What do you mean from central nervous system ? Give detailed account of development of central nervous system.

9. Give a comparative account of olfactory organs of various vertebrates.

10. What is migration ? Give a detailed account of Piscine migration.

Total No. of Questions - 9] [Total Pages : 2

(1068)

4710

M.Sc. Examination

BOTANY

(Cell and Molecular Biology)

(Common with Zoology)

Paper–V

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Describe the structure of Cell wall and discuss its functions.

   (b) Describe the structure and functions of Golgi apparatus. (6,6)

2. Describe the genome organization of Chloroplast and Mitochondria and discuss gene expression in them. (12)

3. Give a detailed account of structure of Nucleus and describe the structure and functions of nuclear pore. (12)

4. Describe the structural organization and role of microtubules. (12)

5. What is cell cycle? Discuss various checkpoints in the control of cell cycle and discuss the role cyclins and cyclin-dependent kinases. (12)

6. Describe the RNA polymerases of Eukaryotes. Give in detail the Promoters and Transcription factors for RNA polymerase I and III and discuss their mechanism of transcription. (12)

7. Describe the structure of tRNA and ribosomes and discuss their role in translation. (12)

8. Describe positive and negative regulation of gene expression giving with one example of each in Prokaryotes. (12)

9. Give an account of protein sorting and targeting to various organelles of the cell. (12)

Total No. of Questions - 10] [Total Pages : 2

(1119)

4770

M.Sc. Examination

ZOOLOGY

(Structure and Functions of Invertebrates)

Paper : II

(Semester–I)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks. Support your answer with suitable diagrams wherever needed.

1. (a) Define coelom. Differentiate between Protosomia and Deuterostomia with examples.

(b) Describe organisation of pseudocoel. (8+4)

2. (a) Discuss ciliary locomotion in Protozoa.

(b) Describe locomotion in Annelida. (6+6)

3. Describe feeding and digestion in lower metazoa. (12)

4. Discuss mechanism of respiration in the context of structure of gills. (12)

5. Give a detailed account of the organs of excretion met with in invertebrates. (12)

6. (a) What is primitive nervous system? Explain with examples and suitable diagrams.

   (b) Describe nervous system in Mollusca. (8+4)

7. Give an account of the larvae of parasites. (12)

8. Write notes on :

   (a) Trachea.

   (b) Filter feeding in Echinoderms. (6+6)

9. Describe the following :

   (a) Osmoregulation.

   (b) Significance of larval forms. (6+6)

10. List the various minor phyla. Give salient features and economic importance of Ctenophora and Rorifera. (12)

Total No. of Questions - 10] [Total Pages : 2
(1119)

Total No. of Questions - 10] [Total Pages : 2
(1069)

4512

M.Sc. (IInd Semester) Examination
ZOOLOGY
(Comparative Anatomy of Vertebrates)
Paper–VII

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks. Draw neat and lebelled diagrams wherever required.

1. Define Protochordates. Give a general comparative account of three groups of protochordates.

2. How does the respiratory system of birds differ from mammals? Give a comparative description.

3. Write notes on the following :
   (a) Types of Scales.
   (b) Distinguish features of Chordates.
   (c) Epidermal glands.
   (d) Tetrapoda.

3. Describe feeding and digestion in lower metazoa. (12)

4. Define Appendicular skeleton. Compare the skeleton of the forelimbs of vertebrates.

5. Describe Avian female urinogenital system, and compare it with the urinogenital system of a reptile.

6. What is Aortic arch ? Give a comparative description of aortic arches in reptiles, birds and mammals.

7. Compare the structure and function of Alimentary canal in vertebrates.

8. Describe briefly the structure and function of Brain of a reptile and compare it with that of a mammal.

OR

Describe the structure of a neuron. Give the conduction mechanism of a nerve impulse.

9. Define Sense organs. Describe the classification and functions of various sense organs present in vertebrates.

10. What is Organic evolution? Describe the process of evolution in man.

Total No. of Questions - 10] [Total Pages : 2
(1119)

Total No. of Questions - 10] [Total Pages : 2
(1069)

4501

M.Sc. (IInd Semester) Examination

BOTANY

(Cell and Molecular Biology)

(Common with Zoology)

Paper–V

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Briefly explain Plasma membrane pumps, channels and ion carriers. 12

2. Discuss the functions of Endoplasmic reticulum and Golgi bodies. 12

3. Briefly comment upon the following :

   (a) Nucleochloroplastic interactions.

   (b) Gap functions and Plasmodesmata. (6+6)

4. Explain the functions of Microtubules and Microfilaments.

5. Comment upon the role of Cyclins and Cyclin dependent kinases (CDKs) in cell cycle. 12

6. Briefly explain Eukaryotic gene promoter and transcription factors for core and regulatory parts of promoter. 12

7. Illustrate initiation and elongation of protein synthesis in prokaryotes. 12

8. Briefly comment upon negative and positive control of gene regulation in Lac operon. 12

9. Comment upon the structure of B and Z-DNA. 12

10. Explain targeting of proteins to organelles. 12

Total No. of Questions - 10]

Total No. of Questions - 10] [Total Pages : 3

(1069)

4502

M.Sc. (IInd Semester) Examination

BOTANY

(Biostatistics and Computer Applications)

(Common with Zoology)

Paper–VI

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Construct a histogram from the following data :

Marks :	10-19	20-29	30-39	40-49	50-59
No. of students :	15	20	35	10	4

(b) Also find the Cummulative frequency.

2. (a) Find the Median from the frequency distribution given below :

x :	0	1	2	3	4	5	6
f :	5	9	10	12	6	4	2

(b) What are the various measures of Central Tendency ? Explain them.

3. (a) Find the SD and CV for the following data

4, 6, 10, 12, 18.

(b) Calculate the Coefficient of Correlation for the following data :

A	:	15	25	14	20	10	20
B	:	10	30	16	25	20	15

4. Explain the following with examples :

(a) Linear Regression.

(b) Test of Significance.

5. Explain the following :

(a) CPU and ALU.

(b) Low level and High level languages.

(c) Binary number systems.

6. (a) Explain the various symbols used in drawing flow charts.

(b) Give any *four* statements in QBasic of your choice with suitable examples.

7. (a) Define Internet, and also discuss its importance in educational field.

(b) Define Database, and also discuss its importance.

8. (a) What are the components of MS-Office ? And also explain the use of MS-PowerPoint.

(b) State the advantages of Spreadsheets.

9. (a) Define Sampling and also discuss its errors.

(b) Write about the uses of Computers in Bio-Sciences.

10. Write short notes on the following :

(a) t-test.

(b) Biostatistics.

(c) Variance.

Total No. of Questions - 10] [Total Pages : 3

1119)

4769

M.Sc. Examination

ZOOLOGY

(Biosystematics and Taxonomy)

Paper–I

(Semester–I)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. What is systematic zoology? Discuss its various components and characteristics useful in classification. (2+5+5)

2. Write down the rules for scientific nomenclature. Enlist the difficulties in classification of animals. (6+6)

3. Discuss the following in brief :

(a) Ecotaxonomy. 3

(b) Cytotaxonomy. 3

(c) Biochemical taxonomy. 3

(d) Numerical taxonomy. 3

4. Why are the scientific names necessary? Explain in detail the concept of bionomial nomenclature. (2+10)

5. What is speciation? Discuss the process of isolation of population. (4+8)

6. Explain the term 'hierarchial classification'. Give the hierarchial classification with suitable example of an insect (butterfly), bird (pigeon) and mammal (human). (3+9)

7. What do you understand by biodiversity? Discuss different achievements of conservation of diversity. (2+10)

8. Write notes on the following (any *two*) :

(a) Phyletic lineages.

(b) Typological species concept.

(c) Shannon-Wiener Index. (6+6)

9. Write in brief about International Code of Zoological Nomenclature (ICZN). What is preamble and important rules of nomenclature? (4+8)

10. (a) Discuss the collecting ways and data collection in taxonomic collection. 6

(b) Give the methods of identification in taxonomic collections. 6

Total No. of Questions - 10] [Total Pages : 3

(1119)

4759

M.Sc. Examination

BOTANY

(Immunology and Biotechnology)

(Common with Zoology)

Paper–X

(Semester–III)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt *five* questions in all, selecting at least *two* questions from each section. All questions carry equal marks.

SECTION–A

1. Write detailed notes on the following :

   (a) Cellular immunity.

   (b) Humoral immunity. (2×6=12)

2. Differentiate between the terms Antigen and Immunogen. Write about the physical and chemical properties of antigens. 12

3. Write about classes and subclasses of human immunoglobulin and their functions. 12

4. Write the principle of antigen-antibody precipitation reaction. Write about Double immunodiffusion and Single radial immunodiffusion. 12

5. Write in detail about Hybridoma technology and its benefits. 12

SECTION–B

6. Write about the uses and benefits of microbes and microbial system and their improvement for biotechnological use. 12

7. Write about the principle and technique of Plant cell culture and its benefits. 12

8. Write detailed notes on the following :

(a) Plant recombinant DNA technology.

(b) Transgenics. (2×6=12)

9. Write notes on the following :

(a) PCR and its uses.

(b) DNA finger-printing and its uses.

(c) c-DNA libraries. (3×4=12)

10. Write how fermentation technology is used to produce various products for human use. 12

Total No. of Questions - 10] [Total Pages : 2

(1119)

4758

M.Sc. Examination

BOTANY

(Cytogenetics and Evolution)

(Common with Zoology)

Paper : IX

(Semester-III)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Describe the organization and role of centromere, kinetochore and telomere. 6

(b) Describe the structure and functions of polytene chromosomes. 6

2. Describe Lyon hypothesis. 12

3. Describe mendelian inheritance and its modifications. 12

4. Discuss cytogenetic implications and consequences of polyploidy and Anenploidy. 12

5. Compare and contrast translation in prokaryotes and eukaryotes. 12

6. Describe different mechanism of DNA repair. 12

7. Write notes on the following :

   (a) Heritability. 6

   (b) Quantitative traits. 6

8. Describe the role of genetic drift and natural selection in changing allele frequencies in populations. 12

9. Describe various modes of speciation giving examples. 12

10. Write notes on the following :

   (a) Phylogenetic trees. 6

   (b) Molecular drive. 6

Total No. of Questions - 10] [Total Pages : 2

(1119)

4776

M.Sc. Examination

ZOOLOGY

(General Physiology)

Paper–XII

(Semester–III)

Time : Three Hours] [Max. Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. Draw diagram where necessary. Be brief and legible.

1. Describe digestion and absorption of proteins in gastrointestinal tract. 12

2. Write notes on the following :

(a) Vascular compliance. 6

(b) Interstitial fluid. 6

3. What do you understand by Carbon dioxide poisoning and Respiratory quotient ? Give example. 12

4. Give functional anatomy of human kidney and nephron.

5. Write about the following :

   (a) Isometric *vs.* Isotomic contraction.

   (b) Fast *vs.* Slow muscle fibres.

   (c) Diastole *vs.* Systole.

6. Describe the different types of hormone receptors and their activation process. 12

7. Explain the details of Female hormonal system. 12

8. Write notes on the following :

   (a) Photo-reception. 4

   (b) Phono-reception. 4

   (c) Equilibrium reception. 4

9. Discuss the physiology of adaptation to high altitude and osmotic stress. 12

10. Write notes on the following :

   (a) Minerals. 4

   (b) Cardiac output. 4

   (c) Feedback inhibition of hormones. 4

[Total Pages : 3

Total No. of Questions - 10]

(1119)

4775

M.Sc. Examination

ZOOLOGY

(Applied Zoology)

Paper : XI

(Semester III)

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Give the principles and practices of pest control. Describe organochloride insecticides.

2. Write short notes on any *two* of the following :

   (a) Essentials for starting a bee hive.

   (b) Fish diseases and their control.

   (c) Biology and control of any two phytoparasitic nematodes.

3. Give the systematics. biology and control of Malaria and Dengue fever.

4. Define aquaculture. Give the importance of inland fisheries in the State, with special emphasis on integrated fisheries in the State.

5. Write an essay on the special projects for endangered species.

6. (a) Compare and contrast: Biosphere Reserve and National Park.

   (b) Discuss the effect of human progress on biodiversity

7. Give the biology and control of any *two* of the following agricultural pests:

   (a) Castor hairy caterpillar. 4

   (b) Cabbage caterpillar.

   (c) Mango mealy bug. 4

8. Give an account of any *three* of the following :

   (a) Sericulture industry in India.

   (b) Immunization, Vaccination and different kinds of vaccines. 13/4

   (c) Wildlife Protection Act in India. 2

   (d) Congenital myopathy. 3

9. Write a note on the metabolic disorders with regard to major food stuff absorption.

10. Principles of management of painful muscle syndrome.

Total No. of Questions - 10] [Total Pages : 2

(1119)

4776

M.Sc. Examination

ZOOLOGY

(General Physiology)

Paper–XII

(Semester–III)

Time : Three Hours] [Max. Marks : 60

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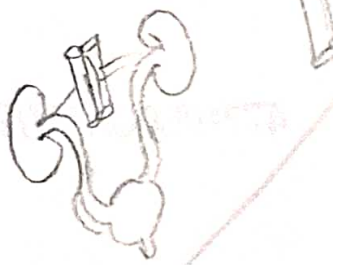
(c) Feedback inhibition of hormones. 4



Total No. of Questions - 10] [Total Pages : 3

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4762

M.Sc. (IVth Semester) Examination

BOTANY

(Bio-chemistry)

(Common with Zoology)

Paper–XIII

Time : Three Hours] [Maximum Marks : 60

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Attempt any *five* questions. All questions carry equal marks.

1. Explain :

(a) Equilibrium constant in a chemical reaction. (6)

(b) First law of thermodynamics. (6)

2. Discuss :

(a) Major energy storage polysaccharide. (6)

(b) Carbohydrates as structural components of plant cells. (6)

3. Comment briefly :

(a) Triacylglycerols. (4)

(b) Sphingolipids. (4)

(c) Phospholipids. (4)

4. Write in detail the symbiotic and non-symbiotic nitrogen fixation. (12)

5. Describe :

(a) Structure of haemoglobin. (6)

(b) Acidic and basic properties of amino acids. (6)

6. (a) Describe the functions of ribonuclease. (4)

(b) Explain various types of "enzyme inhibition". (4)

(c) Discuss the Michaelis-menten equation. (4)

7. Discuss the acetate shikimate pathway for synthesis of secondary metabolites ? (12)

8. Describe :

(a) Nucleotide components and salvage pathway. (4)

(b) DNA polymorphism. (4)

(c) Semi conservative replication of DNA. (4)

9. Write a note on steroids and suberins. (12)

10. Write a short note on :

(a) Buffers. (4)

(b) Free energy. (4)

(c) Isomerisation. (4)

Total No. of Questions - 10] [Total Pages : 3

(1119)

4759

M.Sc. Examination

BOTANY

(Immunology and Biotechnology)

(Common with Zoology)

Paper–X

(Semester–III)

Time : Three Hours] [Maximum Marks : 60

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