Total No. of Questions : 8] **[Total No. of Pages : 2**

P649

[3824] - 101
M.Sc. - I
ZOOLOGY
ZY - 101 : Biochemistry
(Sem. - I)

Time : 3 Hours] ***[Max. Marks :80***

Instructions to the candidates:

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

Q1) a) Derive Michaleis. Menten equation. Give its importance to understand enzyme kinetics. **[8]**

b) Give the following reactions in detail: **[12]**

i) Glucose $\rightarrow$ Glucose - 6 - phosphate.

ii) Glyceraldehyde - 3 - phosphate $\rightarrow$ glycerate 1,3 biphosphate.

iii) Phosphoenol pyruvate $\rightarrow$ pyruvate.

Q2) a) What is uncoupler? Give the structure and action of any two uncouplers of oxidative phosphorylation. **[10]**

b) Predict the number of fragments of following peptide when subjected to the action of Trypsin and chymotrypsin separately. **[10]**
Val - Ile - Tyr - Arg - Gly - Trp - Lys - Asn - Tyr - Gln.

Q3) a) Define co-enzyme. Give its role and mention the coenzyme of vit.B_1. **[10]**

b) Describe the regular repeating structure of protein. **[10]**

Q4) Write notes on: **[20]**

a) Enzyme Isoform.

b) Salvage pathway.

c) Carnetine shuttle.

d) Fate of pyruvate.

Q5) a) Define the term allosteric enzyme. Discuss the co-operative behaviour of allosteric enzyme with suitable example. **[10]**

b) Describe in detail orotidylic pathway. **[10]**

Q6) a) Describe the oxidation of saturated fatty acid. **[10]**

b) Write an account on transamination and deamination. **[10]**

P.T.O

Q7) Discuss in detail TCA. cycle. Explain the amphibolic nature of this cycle. **[20]**

Q8) Write note on: **[20]**

a) Glyoxalate cycle.

b) N Terminal determination.

c) Clinical application of enzyme.

d) Redox potential.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P650

[3824] - 102
M.Sc. (Sem. - I)
ZOOLOGY
ZY - 102 : A) Genetics
B) English for Scientists

Time : 3 Hours] ***[Max. Marks :80***

Instructions to the candidates:

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

SECTION - I

A) Genetics

Q1) Describe the technique of somatic cell fusion and the development of hybridoma clones. Explain the significance of hybridization technique.

Q2) What is operon? Explain the organization and regulation of Arabinose operon. How do negative and positive control work on 'Arabinose' operon?

Q3) a) If the frequency of "t" allele is 0.56. Findout the number of heterozygous taster persons in a sample of 500 Mizos in India.

b) A three-point cross involved three recessive linked genes, approximated - vein (app), curled wing (cu) and striped-thorax (sr). The progeny obtained in a mating of F_1 female $\frac{+\ +\ +}{app\ cu\ sr}$ with $\frac{app\ cu\ sr}{+\ +\ +}$ male in drosophila is as follows:

+ + + = 337	+ + sr = 55
app cu sr = 348	app cu + = 48
+ cu sr = 58	+ cu + = 03
app + + = 49	app + sr = 02

Deduce a linkage map for these loci.

Q4) Write notes on any two of the following:

a) PCR amplification.
b) Types of plasmids.
c) Recessive Epistasis.

P.T.O

SECTION - II

B) English for Scientists

Q5) a) Explain the importance of 'Materials and Methods' section.

b) What are "offprints"? Explain the method of proof correction using appropriate symbols in your own sentences.

Q6) a) Explain the IMRAD format of Brandford Hill for writing science paper.

b) Write a note explaining the contents of an 'abstract'.

Q7) a) How to write 'Discussion' section of a scientific paper? Explain the style and purpose of this section.

b) What are the qualities of a good 'title' for a scientific paper? Explain with the help of suitable examples.

Q8) a) Write a letter to the Editor of a journal, - requesting for publishing a research paper.

b) What is syntax? Give its significance in scientific writing.

Total No. of Questions : 8] **[Total No. of Pages : 2**

P651

[3824] - 103
M.Sc. - I (Sem. - I)
ZOOLOGY
ZY - 103 : A) Freshwater Zoology
B) Statistical Methods

Time : 3 Hours] ***[Max. Marks :80***

Instructions to the candidates:

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

SECTION - I
A) Freshwater Zoology

Q1) Describe the protective adaptations, food and feeding habits of Protozoa. **[20]**

Q2) Discuss the significance of Major Physical Properties of water that enable life in freshwater. **[20]**

Q3) Describe Sewage induced Pollution and its effect on aquatic life forms. **[20]**

Q4) Write notes on any four: **[20]**

a) Lotic biome.
b) Ratifera.
c) Crocodile farming.
d) Ecological Significance of Tadpoles.
e) Aquatic Birds.

SECTION - II
B) Statistical Methods

Q5) a) Explain the following with suitable illustrations. **[6]**

i) Intersection of two events.
ii) Mutually exclusive events.
iii) Exhaustive events.

P.T.O

b) A scientist reported that a sample of 10 male albino rats had iron content (mg/kg) under 10 different diets as given below.
18; 22; 28; 32; 90; 87; 83; 35; 25; 30.
Find mean; median and standard deviation. **[10]**

c) Define Karl Pearson's coefficient of correlation and state its any two properties. **[4]**

Q6) a) Explain the following terms. **[6]**
i) Null hypothesis.
ii) Alternative hypothesis.
iii) Level of significance.

b) Thirty microgram of Vitamin B_{12} were given intramuscularly every fourth week to 6 patients of pernicious anemia during period of remission. The results are given below.

Individual No.	:	1	2	3	4	5	6
Before theorapy	:	12.2	11.3	14.7	11.4	11.5	12.7
After 3 months theorapy	:	13.0	13.4	16.0	13.6	14.0	13.8

Do the data indicate real improvements in haemoglobin level at 5% l.o.s.? **[10]**

c) Explain in brief confidence limits. **[4]**

Q7) a) The population density (per cubic mm) and binary division rate (per thousand) for 6 samples is given below.

Population Density (X):	250	350	500	650	400	750
Binary Division Rate(Y):	12	13	18	20	16	21

Fit a regression equation of Y on X and estimate binary division rate when population density is 900. **[10]**

b) Explain chi-square test of goodness of fit. **[10]**

Q8) a) The following data relate to the heights (in cms) of the two different varieties of wheat plants.

Variety A:	92	94	96	100	102	102
Variety B:	75	76	90	80	82	100

Compute coefficient of variation each and comment it. **[10]**

b) Explain large sample test for testing two population means. **[10]**

Total No. of Questions : 8] **[Total No. of Pages : 2**

P652

[3824] - 201
M.Sc. (Sem. - II)
ZOOLOGY
ZY-201 : A) Developmental Biology
B) Comparative Animal Physiology

Time : 3 Hours] ***[Max. Marks :80***

Instructions to the candidates:

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

SECTION - I
A) Developmental Biology

Q1) Explain the role of Bicoid, Nanos & Hunchback genes in early embryogenesis in Drosophila.

Q2) Explain the role of cortical granules in fertilization and add a note on species-specificity of fertilization.

Q3) Explain the regulation of sperm motility and role of pH & divalent cations in it.

Q4) Write notes on any two of the following:

a) Lens development.

b) Molecular signalling during neural induction.

c) Mesoderm induction in Xenopus.

d) Synthesis & storage of maternal transcripts.

SECTION - II
B) Comparative Animal Physiology

Q5) With the help of DuBios thermal balance; explain the thermoregulation in homeotherms.

Q6) Explain the process of urine formation in mammalian kidney.

P.T.O

Q7) a) Explain the mechanism of hormonal action.

b) Describe the respiratory pigments in animals.

Q8) Write short notes on the following (any four):

a) Types of Reflexes.

b) Biokinetic zone.

c) Proteins of myofilament.

d) Gill respiration.

e) Feed back mechanism

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Total No. of Questions : 8] **[Total No. of Pages : 2**

P653

[3824] - 202

M.Sc.

ZOOLOGY

ZY-202 : a) Molecular Biology

b) Cell Biology

Time : 3 Hours] ***[Max. Marks :80***

Instructions to the candidates:

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

SECTION - I

ZY - 202 : a) Molecular Biology

Q1) a) Describe the formation initiation complex during translation. **[10]**

b) Describe the process of replication in prokaryotes. **[10]**

Q2) a) Explain the promotor region recognised by RNA polymerase in protein. **[10]**

b) Role and application of reverse transcription. **[10]**

Q3) a) Explain structure and organisation of transposable elements. **[10]**

b) Explain Physico-chemical properties of DNA. **[10]**

Q4) Write notes on any two: **[20]**

a) Causes of DNA damage.

b) Properties of genetic code.

c) RNA splicing.

SECTION - II

ZY - 202 : b) Cell Biology

Q5) Describe structure and function of ribosomes. **[20]**

Q6) a) Explain role of receptors in signal transduction. **[10]**

b) Explain the ultrastructure of mitochondria. **[10]**

P.T.O

Q7) Write short notes on any four: **[20]**

a) Ultra structure of cilium.

b) Mitotic Spindle.

c) Fluid mosaic model.

d) Nucleo-cytoplasmic interaction.

e) Polymorphism in Lysosomes.

f) Fatty acid metabolism in glyoxisomes.

Q8) a) Explain the role of cell micro-injection in cell engineering. **[10]**

b) Describe different phases of cell cycle. **[10]**

Total No. of Questions : 12] **[Total No. of Pages : 2**

P654

[3824]-203
M.Sc.
ZOOLOGY
Zy - 203 : A) Biochemical Techniques
OR
A) Ichthyology
B) Endocrinology

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

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

SECTION - I

A) Biochemical Techniques

Q1) Explain the following : **[20]**

a) Partition coefficient.

b) Cation exchanger.

c) Gel loading buffer.

d) Packing of column.

e) Half life.

Q2) a) Give the process and application of electrophoresis. **[10]**

b) Explain the construction and working of GM counter. **[10]**

Q3) a) What is manometry? Explain the working Warburg's apparatus. **[10]**

b) Discuss working and application of UV-Visible spectrophotometer. **[10]**

Q4) Write notes on : (any two) **[20]**

a) Gel chromatography.

b) Protein sequencing.

c) Application of ultra centrifugation.

P.T.O.

OR

A) Ichthyology

Q5) Give a detail account of phylogeny of fishes.

Q6) Describe the typical structure of telecost gill and add a note on adaptations for air breathing in fishes.

Q7) Describe the pituitary and thyroid glands in fishes.

Q8) Write short notes on :

a) Cyclostomata.

b) Swim bladder.

c) Cranial nerves.

d) Anadromous migration.

SECTION - II

B) Endocrinology

Q9) What are hormones? Explain various types of hormone receptors. **[20]**

Q10) a) Explain the role of pituitary and pineal body on control of chromatophores. **[10]**

b) Describe the role of various hormones involved in regulation of protein metabolism. **[10]**

Q11) Write an account on adenohypophysiotropins. **[20]**

Q12) Write short notes on : (any two) **[20]**

a) X and Y organ in crustacean.

b) Role of hormones in phosphorus metabolism.

c) TSH.

d) Role of ADH in osmoregulation.

Total No. of Questions : 8] **[Total No. of Pages : 1**

P655

[3824]-301
M.Sc. - II (Sem. - III)
ZOOLOGY
ZY - 311 : Entomology - I

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

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

Q1) Write an account of interrelationship of insects with other arthropods.

Q2) Describe the structure of mouthparts of a typical insect. Add a note on its modifications.

Q3) Write the distinguishing characters of the following insect orders with atleast two examples from two families (any four) :

a) Thysanura.
b) Dermaptera.
c) Lepidoptera.
d) Orthoptera.
e) Hemiptera.

Q4) Describe the morphology and histology of alimentary canal of a generalised insect.

Q5) Give an account of hypothetical wing veination of insect wing. Add a note on wing modification and wing coupling mechanism.

Q6) Describe the structure and function of endocrine glands of insect.

Q7) Write on the structure and mechanism of respiratory system in insect.

Q8) Write short notes on (any four) :

a) Fat bodies.
b) Histology of malpighian tubule.
c) Structure and function of haemocytes.
d) Histology of polytrophic ovariole.
e) Pulsatile organs.

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Total No. of Questions : 8] **[Total No. of Pages : 1**

P655

[3824]-301
M.Sc. - II (Sem. - III)
ZOOLOGY
ZY - 312 : Genetics - I

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

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

Q1) Why do researchers use molecular information in understanding phylogenetic relationships? What are the advantages in using either amino-acid sequences or nucleic acid sequences for phylogenetic studies?

Q2) How would you support the argument that a very small number of founders ("founder effect" and "bottle neck effect") can cause a radical change in genotype in a new population?

Q3) State Hardy-Weinberg law and derive genetic equation for changes in Allelic frequency caused due to mutations and migrations.

Q4) Explain the following and write their applications.

a) FACs.
b) DNA microarrays.
c) SSLP's.

Q5) Define 'Gene therapy'. Explain 'Ex-vivo' and 'In-vivo' methods of gene therapy.

Q6) On which populations do 'r' and 'k' selection strategies operate. Distinguish the characteristics of the two strategies.

Q7) Explain the genetic basis of phenotypic variance generally found associated with quantitative traits. How can one determine the extent of role played by genes and the contribution of environmental factors? Add a note on heritability?

Q8) Describe the genetic basic of metric traits. Explain how does metric traits differ from non-metric traits with suitable examples.

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Total No. of Questions : 8] **[Total No. of Pages : 1**

P655

[3824]-301
M.Sc. - II (Sem. - III)
ZOOLOGY
ZY - 313 : Physiology - I

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

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

Q1) Give an account of physiological and biochemical aspects of thermal acclimation in homeotherms.

Q2) What is biological rhythm? Explain different kinds of rhythms.

Q3) Explain the concept of action potential. Add a note on various ion channels.

Q4) a) Explain the structure and function of electric organ in Torpedo.
b) Explain the structure, biochemical and molecular mechanisms of luminiscent organs.

Q5) Write notes on :
a) Swim bladder.
b) Gas float.
c) Membrane structure.
d) Moist skinned animals.

Q6) a) Explain osmoregulation in terrestrial vertebrates.
b) Explain deep sea hydrothermal vents.

Q7) a) Explain the thermoregulatory mechanism in poikilotherms.
b) Write a note on energy cost of locomotion.

Q8) a) Explain metabolic rate in relation to body size in mammals.
b) What is excretion? Explain ureotelism with suitable examples.

Total No. of Questions : 20] **[Total No. of Pages : 3**

P656

[3824]-302
M.Sc. - II (Sem. - III)
ZOOLOGY
ZY - 321 : Immunology
ZY - 322 : Environmental Biology
ZY - 323 : Fundamentals of Systematics
ZY - 324 : Aquaculture
ZY - 325 : Insect Ecology

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

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

SECTION - I

ZY - 321 : Immunology

Q1) What is complement fixation? Explain the classical and alternative cascades in detail.

Q2) Write notes on (any two) :

a) ELISA.

b) Vaccines.

c) Immune deficiency.

Q3) What are antibodies? Explain the structure of antibody molecule and comment on classes and subclasses of immunoglobulins.

Q4) What is immunity? Explain the cellular basis of immunity in detail.

SECTION - II

ZY - 322 : Environmental Biology

Q5) What is wildlife? Describe importance and means of wildlife conservation.

P.T.O.

Q6) What do you mean by anthropogenic activities? Explain major anthropogenic global environmental problems.

Q7) Discuss the role of pesticides and fertilizers in environmental degradation.

Q8) Write short notes on :

a) Hydrological and carbon cycle.

b) Agencies involved in Environmental education.

c) Natural resource and their types.

d) Effects of water pollution.

SECTION - III

ZY - 323 : Fundamentals of Systematics

Q9) What is ICZN? Explain the rules applied in nomenclature.

Q10) What are the characteristics of a good key? Explain different kinds of keys.

Q11) a) Explain the concept of molecular systematics.

b) What is systematics? Explain the theories of classification.

Q12) Write short notes on (any four) :

a) Taxonomic hierarchy.

b) Preservation and curetting process.

c) Species concept.

d) Origin and development of systematics.

e) Merits and demerits of taxonomic keys.

SECTION - IV

ZY - 324 : Aquaculture

Q13) Describe various techniques applied in the harvesting of the fishes.

Q14) Give an account of various fish diseases with appropriate examples.

Q15) Give a comparitive account of crab and lobster fisheries.

Q16) Write short notes on :

a) Types of aquaculture.

b) Edible fresh water fishes.

c) Natural breeding in fishes.

d) Harvesting of pearls.

SECTION - V

ZY - 325 : Insect Ecology

Q17) Describe impact of physical factors on insect populations.

Q18) Explain how insects are related with vascular plants.

Q19) Write an essay on entomophagus insects.

Q20) Write notes on :

a) Aquatic insects.

b) Insect scavengers.

c) Insect parasites of vertebrates.

d) Insect ecology-definition and concept.

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Total No. of Questions : 12] **[Total No. of Pages : 2**

P657

[3824]-303
M.Sc. (Sem. - III)
ZOOLOGY
ZY - 331 : Parasitology
ZY - 332 : Insect Physiology & Biochemistry
ZY - 334 : Genetic Toxicology

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

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

SECTION - I

ZY - 331 : Parasitology

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

Q2) Describe with appropriate examples, parasitic effects benefitting the host.

Q3) Give an account of the diploid and sexual stage in Trypanosoma.

Q4) Write notes on any two :

a) Parasitism and Altruism.

b) Interspecific and strain variation in Taenia.

c) Immunodiffusion.

d) Life cycle of Echinococcus sps.

SECTION - II

ZY - 332 : Insect Physiology & Biochemistry

Q5) Describe the physico-chemical properties of insect plasma.

Q6) Describe the microsomal enzymes involved in insecticide degradation and detoxification.

P.T.O.

Q7) Describe the structure of insect integument. Add a note on pathways of sclerotization.

Q8) a) Describe digestion and absorption of carbohydrates in insects.

b) Role of moulting hormones during the development of insects.

SECTION - III

ZY - 334 : Genetic Toxicology

Q9) What is toxicology? Explain the various subdivisions and scope of toxicology. Comment upon the importance of genetic toxicology.

Q10) What are mutagenic agents? Explain the action of any four mutagenic agents.

Q11) What are chromosomal aberrations? Explain the different types of chromosomal aberrations.

Q12) Enlist the current techniques for detecting mutations. Add a note on Ame's test.

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Total No. of Questions : 8] **[Total No. of Pages : 1**

P658

[3824]-401
M.Sc. - II
ZOOLOGY
ZY - 411 : Entomology - II
(Old & New)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

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

Q1) Describe gastrulation. Add a note on different theories of gastrulation.

Q2) Give a detail account of unusual type of development in insects.

Q3) Describe in detail post embryonic development in Holometabolous insects.

Q4) Write notes on <u>any two</u> of the following :

a) Types of ovary.
b) Ageing in insects.
c) Structure of spermatozoa.
d) Vitellogenesis.

Q5) Describe the 3rd and 4th generation pesticides with significance.

Q6) What are fumigants? Elaborate on types of fumigants and the circumstances in which they are used.

Q7) a) Give a brief account of Economics of Pest Control.
b) Elaborate on reasons that compel an organism become pest.

Q8) Write notes on <u>any two</u> of the following :

a) 4th generation insecticide.
b) Pesticide antidote.
c) Insect repellants.
d) Autocidal techniques.

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Total No. of Questions : 8] **[Total No. of Pages : 1**

P658

[3824]-401
M.Sc. (Sem. - IV)
ZOOLOGY
ZY - 412 : Genetics - II
(Old & New)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

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

Q1) Describe the preparation and analysis of human karyotype.

Q2) What are autosomal recessive disorders? Explain how pedigree analysis is important while diagnosing these disorders.

Q3) Explain the use of various genetic markers in gene localization.

Q4) What is inborn errors of metabolism? Discuss any four matabolic pathways, where blocks due to inherited defects.

Q5) Explain in brief :

a) Banding techniques.
b) Use of somatic cell hybridization technique in physical mapping.

Q6) Explain the genetic basis of 'Antibody diversity'.

Q7) The P^{53} protein can influence multiple pathways involved in Tumour formation. Explain.

Q8) Explain in brief :

a) QTL Analysis.
b) Circadian rhythms.

Total No. of Questions : 7] **[Total No. of Pages : 1**

P658

[3824]-401
M.Sc.
ZOOLOGY
ZY - 413 : Physiology - II
(Old & New)

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

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

Q1) What is Blood Pressure? Explain hypotension and hypertension; comment on role of blood vessels in distribution of cardiac output and venous return.

Q2) Explain in detail cardiodyanamics and add a note on neuronal and hormonal control of heart.

Q3) Comment and compare between nutrition and digestion, add a note on calorimetry and BMR and factors affecting it.

Q4) What is synapse? Explain the mechanism of synaptic transmission and impact of drugs on it.

Q5) Explain the anatomy of respiratory system? Add a note on gas exchange across the pulmonary and systemic capillaries.

Q6) Explain the mechanism of muscle contraction, add a note on role of ca^{++} ions and ATP in muscle contraction.

Q7) Write notes on :

a) Physiology of hearing.
b) Olfactory receptors.
c) Anatomy of heart.
d) Metabolism of neurotransmitters.

Total No. of Questions : 20] **[Total No. of Pages : 3**

P659

[3824]-402
M.Sc.
ZOOLOGY
(Old & New)
ZY - 421 : Animal Tissue Culture
ZY - 422 : Pollution Biology
ZY - 423 : Marine Biology
ZY - 424 : Bacterial and Phage Genetics
ZY - 425 : Medical Entomology

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

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

SECTION - I

ZY - 421 : Animal Tissue Culture

Q1) a) Give an account of limits of cleanliness, washing and packing of glasswares.

b) What is primary cell culture? Give the method of establishing it.

Q2) What is animal cell culture? Explain in detail the various applications of animal cell culture.

Q3) a) Comment on the procedures of generating animal cell subculture.

b) Discuss the importance of Karyotype analysis and its importance in animal tissue culture.

Q4) Write notes on any two :

a) Cell repositories.

b) Biochemical characterization of cell lines.

c) Lymphocyte culture.

SECTION - II

ZY - 422 : Pollution Biology

Q5) Define pollution. Describe in detail characteristics, source and effect of sound pollution.

P.T.O.

Q6) a) Explain Biosphere and add a note on Lithosphere.
b) Give an account of composition of Atmosphere.

Q7) Give an account of Food Chain and productivity in an Ecosystem. Add a note on Energy flow in ecosystem.

Q8) Write notes on :
a) Biomagnification.
b) Algal bloom.
c) Biofouling.
d) Hydrosphere.

SECTION - III

ZY - 423 : Marine Biology

Q9) Describe the profile of a sea and sediments present on sea floor.

Q10) Give an account of fouling and boring organisms. Add a note on its economic impact and control measures.

Q11) Describe a typical Indian estuary with suitable example.

Q12) Write notes on :
a) Algal resource.
b) Food chain.
c) Marine animal diversity.
d) Marine zones.

SECTION - IV

ZY - 424 : Bacterial and phage genetics

Q13) Explain the following :
a) Jumping genes.
b) Complementation groups.
c) Genetic map.
d) T. Phages.

Q14) a) Describe the general structure and life cycle of a single stranded RNA phage.
b) Define mutation. Explain the various mutagenic agents.

Q15) Discuss in brief the gene transfer process which is chromosomally controlled.

Q16) Write notes on (any two) :

a) Fluctuation test.

b) Bacteriophage MU.

c) 3 factor genetic cross.

SECTION - V

ZY - 425 : Medical Entomology

Q17) Describe arthropod borne diseases in man with reference to their life cycle, pathogenicity and control measures of following :

a) Pneumonic plague.

b) Yellow fever.

c) Tuleramia.

d) Trypanosomiasis.

Q18) a) Explain the role of veternary pests as disease spreading agent.

b) Describe the vector biology of Hemipterean insects.

Q19) Describe household insects in relation to human health.

Q20) Write short notes on :

a) Black flies.

b) Culex.

c) Tabanus sps.

d) Hippobosca sps.

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Total No. of Questions : 16] **[Total No. of Pages : 3**

P660

[3824]-403
M.Sc.
ZOOLOGY
(Old & New)

ZY - 431 : Physiology of Mammalian Reproduction
ZY - 432 : Comparative Invertebrate Histology and Histochemistry
ZY - 433 : Biodiversity Assessment
ZY - 435 : Apiculture

Time : 3 Hours] ***[Max. Marks : 80***

Instructions to the candidates:

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

SECTION - I

Zy - 431 : Physiology of Mammalian Reproduction

Q1) Give an account on various ovarian and uterine changes occuring during menstrual cycle.

Q2) a) Explain reproductive patterns in mammals and add a note on various factors influencing reproduction in mammals.

b) Explain in brief methods useful in increasing reproductive potential in organism.

Q3) a) Explain the role of pituitary and hypothalamus in controlling testicular function.

b) Explain climactric phase in male and female reproduction.

Q4) Write short notes on any two :

a) Puberty.

b) Induced breeding.

c) Hormones in pregnancy.

d) Contraceptive devices.

P.T.O.

SECTION - II

Zy - 432 : Comparative Invertebrate Histology and Histochemistry

Q5) Explain the methods of tissue embedding and sectioning. Comment on the problems during sectioning.

Q6) Explain the characters and types of connective tissues and add a note on the different cells of the connective tissue.

Q7) What is histochemistry? Explain the principle and histochemical method of detection of lipids.

Q8) a) Explain the precautions to be taken during histochemical detection of Enzymes.

b) Write a note on Schiff's reagent and its histochemical applications.

SECTION - III

Zy - 433 : Biodiversity Assessment

Q9) Enlist all the invertebrate phyla. Explain in detail the classification of phylum mollusca.

Q10) Describe the necessity and importance of wildlife conservation.

Q11) Explain the effect of man made alteration of environment on biosphere.

Q12) Write short notes on (any four) :

a) Symbiosis.

b) Endangered species.

c) Characters of Annelida.

d) Modern techniques of biodiversity assessment.

e) Aquatic adaptations.

SECTION - IV

Zy - 435 : Apiculture

Q13) Describe the distinguishing morphological features of the three casts of bees and give the role played by each caste.

Q14) Describe the digestive system of honey bee and add a note on foraging behaviour.

Q15) Explain the role of bees in pollination. Describe how bees are structurally and behaviourally efficient pollinators.

Q16) Write notes on :

a) Langstroth hive.

b) Predators of bees.

c) Royal Jelly.

d) Need and importance of bee keeping.

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