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

P376

[3624] - 201
M.Sc. (Sem. - II)
ZOOLOGY

ZY - 201 : A) Developmental Biology
B) Comparative Animal Physiology

(Old & New)

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 mechanisms of regulation of sperm motility.

Q2) Describe the various events involved in the activation of egg metabolism.

Q3) What is neural competence? Describe the molecular signalling during neural induction.

Q4) Write notes on any two of the following :

a) Fate maps in chick embryo.

b) Bicoid and Nanos morphogen gradients.

c) Mesoderm induction in Xenopus.

d) Role of Spemann's organizer in frog.

P.T.O.

SECTION - II

B) Comparative Animal Physiology

Q5) What are blood pigments? Explain the role of haemoglobin in oxygen transport.

Q6) Explain the role of various proteins and their interaction in myofilament.

Q7) What is thermoregulation? Explain how poikilotherms compensate their body temperature during cold and hot.

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

a) Neurohaemal organs.

b) Types of reflexes.

c) ECG.

d) Modes of excretion.

e) Ascorbic acid synthesis in animals.

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

P377

[3624] - 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) ***Draw neat labelled diagrams wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I
(A) Molecular Biology

Q1) a) Describe the process of initiation of transcription by RNA polymerase II. **[10]**

b) How RNA genomes are propagates? Comment on positive and negative strand genomes. **[10]**

Q2) a) Explain in details the organisation of globin gene. **[10]**

b) Describe the two strategies used for studying human genome. **[10]**

Q3) a) Explain in details the changes undergone by precursor transcript to become mature mRNA. **[10]**

b) Describe the mitochondrial genome and its use in phylogenetic analysis. **[10]**

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

a) Transposable element.
b) Post translational modifications.
c) DNA polymerases α & δ.
d) Rolling circle model of replication
e) Repetative DNA.
f) Okazaki pragments.

P.T.O.

SECTION - II

(B) Cell Biology

Q5) What is cell cycle? Give the methods of analysis of various phases of cell cycle. **[20]**

Q6) Explain the chemistry and molecular structure of plasma membrane. Add a note on passive and active transport. **[20]**

Q7) Describe the genetic system and mechanism of protein import in mitochondria. **[20]**

Q8) Write short notes on : **[20]**

a) Intermediate filament.
b) Glyoxysomes.
c) Nuclear pore complex.
d) Cell fusion and electroportion.

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

P378

[3624] - 203
M.Sc. ZOOLOGY
ZY - 203 : A) Biochemical Techniques
OR
A) Ichthyology
B) Endocrinology
(Old & New)

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

Instructions to the candidates:-

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

SECTION - I
A) Biochemical Techniques

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

a) What is radio isotope? Give its properties and importance.
b) Define RQ. Describe the Warburg's apparatus.
c) Give the properties of ion exchanger.
d) Explain the principle and importance of isoelectro focusing.

Q2) Give the principle, functioning and application of following : **[20]**

a) HPLC.
b) SDS-Polyacrylamide gel electrophoresis.
c) Ultracentrifuge.
d) G.M. Counter.

Q3) What is sequencing? Give its importance and explain in detail the methods used for protein sequencing. **[20]**

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

a) Use of matrix.
b) Gel chromatography.
c) Paper chromatography.
d) Electro magnetic spectrum.

P.T.O.

OR

A) Ichthyology

Q5) What do you understand by fish migration? Describe the catadromous and Anadromous migration in fishes. **[20]**

Q6) Give a detail account of sense organs in fishes with appropriate diagrams. **[20]**

Q7) Describe the digestive system of a fish. Add a note on its anatomical modifications. **[20]**

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

a) Pigmentation.
b) Swim bladder.
c) Parental care in fishes.
d) Structure of a gonad.

SECTION - II

B) Endocrinology

Q9) Describe the hormonal regulation of protein metabolism. **[20]**

Q10) a) Describe the role of gastrointestinal hormones in digestion.
b) Explain the mechanism of hormones with reference to transduction cascade. **[20]**

Q11) Describe various hypothalamic hypophysotropins. **[20]**

Q12) Write notes on : **[20]**

a) Hormonal control of calcium metabolism.
b) Role of hormones in colour change in crustaceans.
c) Role of Renin & Angiotensin.
d) Role of X & Y organs on salt and water balance.

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

P379

[3624] - 401
M.Sc. - II
ZOOLOGY
ZY - 411 : Entomology - II

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) What is vitellogenesis? Write an account of vitello-genesis in insects.

Q2) What do you mean by blastokinesis? Describe the process of blastokinesis in insects with suitable examples.

Q3) Describe the histology of sperm tube and comment on spermatogenesis.

Q4) Write notes on (any two) :
a) Gastrulation in insects.
b) Hadorn experiments.
c) Regeneration in insects.
d) Types of metamorphosis in insects.

Q5) Write an essay on pheromonal control in insects.

Q6) Give an account of biological control.

Q7) Write notes on (any two) :
a) 3rd generation insecticides.
b) Use of hormones in pest control.
c) Sterile male technique.
d) Systemic poisons.

Q8) What do you mean by insecticide? Classify the insecticides on the basis of mode of action.

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

P379

[3624] - 401
M.Sc.
ZOOLOGY
ZY - 412 : Genetics - II
(Sem. - IV)

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

Instructions to the candidates:-

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

Q1) Describe the somatic-cell gene therapy treatment of human diseases.

Q2) What is pedigree analysis? How are pedigree charts used in human genetics? Explain.

Q3) Explain how P^{53} protein can influence multiple pathways involved in tumor formation.

Q4) Explain the genetic basis of 'Antibody diversity'.

Q5) Explain the genetic regulation of Hox gene expression in Drosophila with respect to 'Fab' and 'iab' regulating 'Abd-B' expression.

Q6) Explain in brief

a) Mechanism of x-inactivation
b) Mitochondrial DNA-disorders.

Q7) Explain the use of various genetic markers in gene localization.

Q8) In general, how is animal behaviour related to genetics and environment. Explain the experiments carried out to study 'Learning' and 'Memory' in flies.

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

P379

[3624] - 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) Describe the role of central and peripheral receptors during respiration. Add a note on abnormalities in blood gas content.

Q2) Describe various events of cardiac cycle. Add a note on heart sounds.

Q3) What is resting membrane potential? Explain the factors affecting on it. Add a note on all or none law.

Q4) Describe the structure of gustatory and olfactory receptors. Explain their mechanism of stimulation and adaptation.

Q5) What is digestion? Explain the physiology of digestion in intestine. Add a note on gastrointestinal hormones.

Q6) a) What is blood clotting? Explain the role of extrinsic & intrinsic factors on it.
b) What is pulmonary respiration? Explain the mechanism of breathing.

Q7) Describe the contractile machinery of smooth muscles. Explain how it differs from skeletal muscles.

Q8) Write notes on :
a) Cardiovascular response to exercise.
b) Saltatory conduction.
c) Functions of smooth muscles in digestive system.
d) Venous return.

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

P380

[3624] - 402
M.Sc.
ZOOLOGY

ZY - 421 : Animal Tissue Culture

ZY - 422 : Pollution 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 the principle and importance of animal tissue culture.

b) Discuss the various methods of sterilization.

c) Give physicochemical properties of media.

Q2) a) What is BSS? Give its components & their importance.

b) What is organ culture? Describe the various scaffoid's used in organ culture.

Q3) Define cell line. Describe the biochemical and genetic methods for characterization of cell lines.

Q4) Write short notes :

a) Cell bank.

b) Serum Free media.

c) CO_2 incubator.

d) Primary culture.

P.T.O.

SECTION - II

ZY - 422 : Pollution Biology

Q5) Define water pollution. Give an account of water pollutants and their sources. Add a note on eutrophication.

Q6) What do you understand by Pesticide pollution? Give an account of different pesticides and their impact on living organisms.

Q7) Give an account of physiological methods to study the impact of pollutants on animal systems.

Q8) Write notes on :

a) Lithosphere.

b) Bioindicators.

c) Characteristics of sound.

d) Temperature inversion.

SECTION - III

ZY - 424 : Bacterial and Phage Genetics

Q9) What is meant by gene transfer? Give its types and importance in bacterial gene mapping.

Q10)a) What is transposable elements? Discuss its significance with suitable example.

b) Write a note on chromosomal mapping.

Q11)a) Explain the genetic regulation of life cycle in lambda bacteriophage.

b) What is RNA phage? Explain its replication with suitable example.

Q12)Write short notes :

a) Complementation analysis & its significance.

b) Conditional mutant.

c) Use of HFr strain.

d) Retrovirus and reverse transcriptase.

SECTION - IV

ZY - 425 : Medical Entomology

Q13) What are vectors? Explain the role of vectors in the transmission of diseases from the following orders:
Anoplura, Siphonoptera and Hemiptera.

Q14) Define house hold insects. Describe their importance in relation to human health.

Q15) Describe the causative agent, Pathogenecity and control measures of the following diseases : Epidemic & Endemic typhus, Trypanosomiasis and yaws.

Q16) Write notes on :

a) Sand flies.

b) Rat flea.

c) Malaria.

d) Furniture beetle.

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

P381

[3624] - 403

M.Sc. - II

ZOOLOGY

ZY - 431 : Physiology of Mammalian Reproduction

ZY - 432 : Comparative Invertebrate Histology & Histochemistry

ZY - 433 : Biodiversity Assessment

ZY - 435 : Apiculture

(Old & New)

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

Instructions to the candidates:-

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

SECTION - I

ZY - 431 : Physiology of Mammalian Reproduction

Q1) Describe the various ovarian events involved into menstrual cycle.

Q2) a) Explain types and functions of placenta in mammals.
b) Write an account on gonadotropins.

Q3) a) Write the various hormones involved into pregnancy.
b) What is infertility. Explain the various causes of infertility.

Q4) Write notes on (any four) :
a) In Vitrofertilization.
b) Testosterone.
c) Puerperium.
d) Suckling reflex.
e) Anatomical disorders in reproduction.

P.T.O.

SECTION - II

ZY - 432 : Comparative Invertebrate Histology & Histochemistry

Q5) Describe in detail the method of preparation of permanent histological slides.

Q6) Describe the Gomori procedure for localizing phosphatase activity.

Q7) a) Explain the fixatives useful in histochemistry.
b) Describe the types of epithelial tissues with reference to structure, function, location and special features.

Q8) Describe the histochemical methods for the detection of alkaline phosphatase.

SECTION - III

ZY - 433 : Biodiversity Assessment

Q9) Give a detail account of endangered flora and fauna of India. Add a note on its management stratigies.

Q10) Describe the modern tools and techniques of biodiversity assessment with appropriate examples.

Q11) Write an essay on anthropogenic alterations of environment on biosphere.

Q12) Write notes on :

a) Parasitism.
b) Zoogeographical realms.
c) Biosphere.
d) Major phyla with their characteristics.

SECTION - IV

ZY - 435 : Apiculture

Q13) Describe in detail the external morphology of worker bee which enable them in perform colony functions.

Q14) Describe colony organization in honey bees and add a note on division of labour.

Q15) Describe life cycle of honey bees. Add a note on importance of royal jelly.

Q16) Write short notes on :

a) Smoker and honey extractor.

b) Enemies of bees.

c) Bees wax.

d) Viral diseases of honey bees.

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

P689

[3624]-101
M.Sc. I
ZOOLOGY
ZY - 101 : Biochemistry
(Semester - 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) Answer the following : **[20]**

a) Discuss various structural polysaccharides and give their role.

b) Define the term co-factor. Give its significance with suitable examples.

c) Explain the importance of enzyme kinetic studies.

d) Give the importance of lipids in terms of structure and role.

Q2) a) Explain in detail the process of glycolysis. **[10]**

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

Q3) Give the following reaction : **[20]**

a) FDNB

b) Dansyl chloride

c) Ninhydrin

d) CnBr.

Q4) a) Describe the classification of amino acids on the basis of side chains. **[10]**

b) Explain the pentose phosphate pathway. **[10]**

Q5) a) What is km, V_{max}? Explain the effect of substrate concentration on enzyme activity. **[10]**

b) Describe the structure, significance and role of isoenzymes with suitable example. **[10]**

P.T.O.

Q6) Explain in detail the process of oxidation of saturated fatty acid. **[20]**

Q7) a) Discuss the mechanism of enzyme catalysis with suitable example. **[10]**

b) Explain the structure and importance of pyruvate dehydrogenase complex. **[10]**

Q8) Write short notes on : **[20]**

a) Co-operative behavior.

b) Deamination of serine.

c) Glyoxalate cycle.

d) ETC.

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

P690

[3624]-102
M.Sc. (Semester - I)
ZOOLOGY
ZY - 102 (a + b) : 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) ***Draw neat labelled diagrams wherever necessary.***

SECTION - I

A) Genetics

Q1) a) Explain the differences in the mode of inheritance pattern exhibited by an autosomal gene with that of sex-linked gene. Give examples.

b) Give two examples of epistatic interactions of two non-allelic genes leading to deviation from Mendelian dihybrid ratios.

Q2) a) What is 'arabinose' operon? How do negative and positive control work on 'arabinose' operon?

b) Give major contrasting features of quantitative and qualitative traits alongwith suitable examples.

Q3) Enlist various applications of the following :

a) Somatic cell genetics.

b) Microarray analysis.

Q4) a) In Drosophila following genes occur on chromosome III.

h (hairy)

fz (frizzles)

eg (eagle)

The cross +++/*h fz eg* and *h fz eg*/*h fz eg* yielded following F_1 progeny results.

P.T.O.

+	+	+	= 393	+	+	*eg*	= 28
h	*fz*	*eg*	= 409	*h*	*fz*	+	= 30
+	*fz*	*eg*	= 58	+	*fz*	+	= 1
h	+	+	= 80	*h*	+	*eg*	= 1

Give the sequence of genes on chromosomes and the distance between them.

b) A sample of 1000 hypothetical persons had their blood groups :

A-320; B-150; AB-40; O-490

What is the frequency in this sample of each of the following genotypes.

I^AI^A, I^AI^O, I^BI^B, I^BI^O, I^AI^B and I^OI^O?

SECTION - II

B) English for Scientists

Q5) a) Explain the different styles of citation used in a research paper, with suitable examples.

b) Explain how to write the 'Introduction' for a scientific paper.

Q6) a) Give the significance of using graphs and histograms in the text of a scientific paper.

b) 'Materials and Methods should be reliable and reproducible'. Explain this statement.

Q7) a) 'Genetic code is a simple language'. Explain.

b) What are galley-proofs? Explain the method of proof correction using appropriate symbols. Make use of your own sentences.

Q8) Attempt any four of the following :

a) Mention the common errors in written communication.

b) How to write legends for illustrations?

c) What are key words? Mention their purpose.

d) What is the importance of 'Discussion' in a research paper?

e) Write a letter to the Editor of a Scientific journal for publishing your research paper.

f) Give any five jargons with preferred usage.

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Total No. of Questions : 8] **[Total No. of Pages : 3**

P691

[3624]-103
M.Sc.
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 diagram wherever necessary.***

SECTION - I

A) Freshwater Zoology

Q1) Explain the protective adaptations and feeding habits of crustaceans. **[20]**

Q2) Describe the role played by light & temperature in freshwater. **[20]**

Q3) Give an account of freshwater rotifers. **[20]**

Q4) Write short notes on any four. **[20]**

a) Fairy shrimps & Tadpole shrimps.

b) Biological changes in freshwater due to sewage pollution.

c) Adaptations in freshwater reptiles.

d) Respiratory adaptations in freshwater insects.

e) Classification of lakes.

SECTION - II

B) Statistical Methods

Q5) a) Define the following terms :

i) Sample space.

ii) Intersection of two events.

iii) Union of two events. **[6]**

P.T.O.

b) A scientist reported that a sample of 10 male albino rats had iron concentrate (mg. per kg.) under 10 different diets as given below.

29; 23; 19; 84; 88; 91; 33; 36; 26; 31.

Find the mean and standard deviation of above data. **[8]**

c) Explain a large sample test for testing the equality of two population proportions. **[6]**

Q6) a) Explain the term correlation between two variables. Define Karl Pearson's coefficient of correlation and state its any two properties **[6]**

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

Population Density X :	300	450	250	500	650	750
Binary Division Rate Y :	13	16	12	18	20	21

Fit a regression equation of Y on X and estimate binary division rate when population density rate is 800. **[10]**

c) What is the role of randomisation and replication in design of experiment? **[4]**

Q7) a) Explain Chi-square test of goodness of fit. **[6]**

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 therapy	12.2	11.3	14.7	11.4	11.5	12.7
After 3 months therapy	13.0	13.4	16.0	13.6	14.0	13.8

Do the data indicate real improvements in haemoglobin level at 5% level of significance? **[8]**

c) Explain a large sample test for testing the population mean. **[6]**

Q8) a) Define probability mass function of Binomial and Poisson distributions and state under what conditions binomial distribution tends to Poisson distribution. **[6]**

b) A Besal Metabolic Rates (BMR, calories per minute after fasting) follows normal distribution with mean 1.6 and variance unity. **[8]**

Find

i) Probability that BMR will lie between 1.3 and 1.9.

ii) Probability that BMR will be less than 1.2.

c) Explain in brief type I and type II errors. **[6]**

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

P692

[3624]-301
M.Sc.
ZOOLOGY
ZY - 311 : Entomology - I
(Semester - III)

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 morphology of insect thorax. Add a note on leg modifications.

Q3) Describe morphology of head capsule of insect. Add a note on various types of insect antennae.

Q4) Write the taxonomical characters of insect orders with atleast two examples from two families (any four).

a) Hymenoptera

b) Hemiptera

c) Thysanura

d) Diptera

e) Neuroptera

Q5) Describe the morphology of male reproductive system of a generalised insect. Make a comparison of egg tube with sperm tube.

Q6) Describe the structure and function of excretory organs in insects.

Q7) Give an account of respiratory system in insects.

P.T.O.

Q8) Write short notes on <u>any four</u> :

a) Exocrine glands.

b) Types of haemocytes.

c) Modification of insect wings.

d) Filter chamber.

e) Histology of mesenteron.

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

P692

[3624]-301
M.Sc.
ZOOLOGY
ZY - 312 : Genetics - I
(Semester - III)

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 neat labelled diagram wherever necessary.***

Q1) a) Define 'genetic drift'. Explain why small populations are more susceptible to drift than large populations.

b) Explain how inbreeding increases the frequency of homozygotes and decreases the frequency of heterozygotes.

Q2) a) How does metric traits differ from non-metric traits. Give examples.

b) Distinguish between broad and narrow-sense heritabilities. Explain with suitable examples.

Q3) Discuss the principles and applications of following techniques in molecular genetic and clinical diagnostics.

a) Chromosome painting.

b) PCR.

Q4) Write notes on :

a) Mutation-selection balance.

b) Neutral mutation.

Q5) Define genetic polymorphism. Enlist different mechanisms through which stabilizing or balancing selection can be operative. Give examples.

P.T.O.

Q6) Justify the statement "selection is disruptive if different phenotypes are favoured in different environmental circumstances". Discuss its evolutionary implications.

Q7) Distinguish between : genetic map, cytogenetic map and physical map. How can each of these maps be used to identify a gene by cloning?

Q8) How do the reverse genetic approaches differ from classical genetic approaches? Discuss with examples.

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

P692

[3624]-301
M.Sc.
ZOOLOGY
ZY - 313 : Physiology - I
(Semester - III)

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

Instructions to the candidates:

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

Q1) Explain the respiratory and cardiovascular responses of animals at high altitude. Add a note on adaptations in high altitude dwellers.

Q2) Explain the mechanism of temperature compensation in homeotherms in extreme high and low environment.

Q3) What is biological rhythm? Explain circannual and lunar rhythms with suitable examples.

Q4) Describe the structure and functions of electroreceptors and electroorgans. Add a note on physiology of animal electricity.

Q5) What is action potential? Explain the various phases and properties of action potential. Add a note on voltage gated Na-K pumps.

Q6) What is osmoregulation? Explain the mechanism of osmoregulation in aquatic invertebrates and vertebrates.

Q7) a) Describe the structure and functions of gas floats and swim bladder with suitable examples.
b) Give the significance of fat and glycogen as energy storage in animals.

Q8) Write notes on :

a) Urea-ornithine cycle.
b) Counter current heat.
c) Goldman-Hodkin-Katz Potential.
d) Molecular Mechanism of bioluminiscence.

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

P693

[3624] - 302
M.Sc.
ZOOLOGY
(Sem. - III)

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) ***Neat diagrams must be drawn wherever necessary.***
5) ***All questions carry equal marks.***

ZY - 321 : Immunology

Q1) What is major histocompatibility complex? Explain the structure and functions of its classes.

Q2) Explain the Antibody-mediated response to deal with pathogens.

Q3) What is Immunological memory? Explain the concept of vaccination and add a note on types of vaccines.

Q4) Write notes on (any two) :
a) Principle and applications of Immunoelectrophoresis.
b) Autoimmune diseases.
c) Structure and function of Lymph node.

ZY - 322 : Environmental Biology

Q5) What is environmental degradation? Explain its nature and the types.

Q6) Write an essay on conservation of natural resources.

Q7) a) Explain the role of environment in human health.
b) Explain the biochemical cycles in the ecosystem.

P.T.O.

Q8) Write short notes on :

a) Impact of human beings on animals.
b) Sewage disposal.
c) Energy crisis.
d) Marine ecosystem.

ZY - 323 : Fundamentals of Systematics

Q9) Give an account of the system of classification suggested by Carolous Linnaeus.

Q10) What are the current approaches in taxonomy? Describe in brief.

Q11) a) What are the characteristics of a good key? Explain different kinds of keys.
b) What is species? Explain the concept of species.

Q12) Write short notes on (any four) :

a) ICZN.
b) Phylogeography.
c) Taxonomic collection.
d) Kinds of classification.
e) Origin and development of systematics.

ZY - 324 : Aquaculture

Q13) Give the concept of aquaculture and explain how aquaculture is an applied science.

Q14) Explain the types, habit and habitat of prawns. Add a note on freshwater prawn culture.

Q15) a) Explain the natural and induced breeding in fish farming.
b) Describe the harvesting, composition and quality of pearls.

Q16) Write short notes on :

a) Fish pathology.
b) Pearl formation.
c) Marine fisheries.
d) Edible freshwater fishes.

ZY - 325 : Insect Ecology

Q17) Explain the mode of feeding and host specificity in phytophagous insects.

Q18) Discuss the relationship between insects and vertebrates.

Q19) Write a note on the evolution of insects in soil and water.

Q20) Write short notes on :

a) Parasitoid insects.
b) Evolution of insect parasite.
c) Insect scavengers.
d) Physical environment.

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

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[3624] - 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 wherver necessary.***
5) ***Answers to the two sections should be written in separate answer books.***

SECTION - I

ZY - 331 : Parasitology

Q1) Describe the morphology, lifecycle, pathogenicity, prophylaxis and treatment of any two parasite.

a) Leishmania.

b) Ancyclostoma.

c) Dracunculus.

Q2) What is host parasitic system. Describe preadaptation to infectiousness and transmission in details.

Q3) Describe the method of serology and antibody synthesis in plasmodium and trypanosoma.

Q4) Write short notes on any two :

a) Myiasis.

b) Resistance of malaria to drug.

c) Mani pulation of host behavior.

d) Parasitism.

P.T.O.

SECTION - II
ZY - 332 : Insect Physiology & Biochemistry

Q5) Describe the digestion and absorption of carbohydrates, proteins and lipids in insects.

Q6) Describe the structure and function of malpighian tubules with respect to excretion in insects.

Q7) Write short notes on any two
a) Moulting & juvenile harmones.
b) Structure and function of haemocytes.
c) Structure of insect integument.

Q8) Describe the role of microsomal enzymes in insecticide degradation.

SECTION - III
ZY - 334 : Genetic Toxicology

Q9) Explain the various molecular methods for the detection of mutations.

Q10) What is toxicology? Explain the various branches of toxicology and comment upon the scope and importance of genetic toxicology.

Q11) What is Ame's test? Describe its principle and applications.

Q12) a) What are mutagenic agents? Explain the action of any four mutagens.
b) Explain Drosophila test system to assess the genotoxic potential of a test compound.

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