Total No. of Questions : 6]

SEAT No. :

P2898

[Total No. of Pages : 1

[5533]-101
M.Sc.
ZOOLOGY
ZY-101 - T : Biochemistry - I
(2013 Pattern) (Semester - I) (3 Credits)

Time : 2½ Hours] *[Max. Marks : 38*

Instructions to the candidates:

1) ***Attempt any three question from Q.No. 1 to Q.No. 5.***
2) ***Q.No. 6 is compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***

Q1) a) What are polysaccharides? Classify them with suitable examples. **[4]**
b) Explain Allosteric enzymes with suitable example. **[4]**
c) What are the sources of Vitamin B12? **[2]**

Q2) a) What are steroids? Explain their biological significance. **[3]**
b) Water is universal solvent, Explain. **[3]**
c) Explain the PITC reaction and give its importance. **[4]**

Q3) a) How does substrate concentration affect enzyme activity? **[4]**
b) Explain enzyme specificity with suitable examples. **[4]**
c) What is buffer? Name two biological buffers. **[2]**

Q4) a) Explain the non-covalent bonds responsible for maintaining the protein structure. **[5]**
b) Explain sources and functions of Vitamin K. **[3]**
c) What is active site of an enzyme? **[2]**

Q5) a) What are Isozymes? Explain with suitable example. **[5]**
b) Explain the source and functions of Vitamin - E. **[5]**

Q6) Attempt any two of the following **[8]**
a) Explain the structure of haemoglobin.
b) Proteins are most important biomolecules, Explain.
c) What are triglycerols? Explain the saponification reaction and give its significance?
d) Describe the factors affecting enzyme activity.

Total No. of Questions :6]

SEAT No. :

P2899

[Total No. of Pages :2

[5533]-102
M.Sc. - I
ZOOLOGY
ZY-102 (T) : CELL BIOLOGY
(2013 Pattern) (Semester - I) (3 - Credits)

Time : 2½ Hours] *[Max. Marks : 38*

Instructions to the candidates:

1) ***Attempt any three questions from Q.No.1 to Q. No. 5.***
2) ***Q. No. 6 is compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***

Q1) a) Explain the structure and function of microtubule motor proteins. **[4]**

b) Explain various phases of cell cycle. **[4]**

c) What is glycocalyx? **[2]**

Q2) a) "Carbon as backbone of biologically important molecules". Explain. **[4]**

b) Give the structure of adherens junction in plasma membrane. **[4]**

c) Explain Go-phase of cell cycle. **[2]**

Q3) a) Explain nucleo-cytoplasmic interactions with example. **[4]**

b) Give the structure and function of nuclear pore complex. **[4]**

c) What is protein trafficking? **[2]**

Q4) a) Explain polymorphism in Lysosomes. **[5]**

b) Describe fluid mosaic model of plasma membrane. **[5]**

P.T.O.

Q5) a) Differentiate between mitosis and meiosis. **[5]**

b) Explain role of G-protein in signal transduction. **[5]**

Q6) Write short notes on (any two) : **[8]**

a) Protein import in mitochondria

b) Glyoxysomes

c) Nucleolus

d) Prokaryotic cell

Total No. of Questions :4]

SEAT No. :

P2900

[Total No. of Pages :2

[5533]-103
M.Sc.
ZOOLOGY
ZY-103(T) Genetics
(2013 Pattern) (Semester - I)

Time : 2 Hours] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q.1, 2 and 3.***
2) ***Question No.4 is compulsory.***
3) ***Figures to the right indicates full marks.***
4) ***Draw neat labelled diagrams wherever necessary.***

Q1) a) Explain the concept of epistasis? Add a note on dominant epistasis. **[4]**

b) Discuss the Hybridoma technique and its applications. **[4]**

c) Define **[2]**

i) Monocistronic gene

ii) Multiple alleles.

Q2) a) Explain the law of dominant and law of segregation with suitable examples. **[4]**

b) Explain the structure and regulation of Arabinose operon. **[4]**

c) Define **[2]**

i) Linkage map

ii) HAT medium

Q3) a) Explain quantitative traits? Add a note on effect of environment on it. **[4]**

b) Explain the concept of crossing over? Add a note on types of crossing over. **[4]**

c) Define: **[2]**

i) Exon

ii) Gene frequency

P.T.O.

Q4) The following progenies were obtained from the three point test cross in Drosophila. **[5]**

+++	-	29
abc	-	31
++c	-	75
ab+	-	68
+bc	-	560
a++	-	574
a+c	-	08
+b+	-	04

Determine the sequence of genes on chromosome and distance between them. Construct a map for the three loci,

OR

In a population of town, the frequencies of alleles of ABO blood group were- I°=0.74, I^{A}=0.16 and I^{B}=0.10. Assuming random mating, what are expected frequencies of ABO genotypes and phenotypes in the population.

Total No. of Questions :4]

SEAT No. :

P2901

[Total No. of Pages :2

[5533]-104
M.Sc.
ZOOLOGY
ZY-104 (T) : Biostatistics
(2013 Pattern) (Semester - I) (Credit System)

Time : 1½ Hour] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q.No.1,2 and 3.***
2) ***Question No.4 is compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Use of calculator and statistical table is allowed.***

Q1) a) Define the following terms: **[3]**

i) Percentiles ii) Event iii) Range

b) For the following data compute mean, median and mode. **[4]**

18.7, 16.8, 17.7, 14.10, 13.11, 18.12, 18.8, 12.9, 18.10, 14.10, 14.10 19.9.

c) The height of CRPF follows normal distribution with mean 175cms and standard deviation 3.5cms. Compute the probability that heights of randomly selected CRPF is i) less than 160 cms ii) between 160 cms to 180 cs. **[3]**

Q2) a) Define the following terms. **[3]**

i) Intersection of two events ii) CV iii) Classical probability

b) The following data is the length of fishes (cms) captured in a day. **[4]**

Number fishes captured	30-35	35-40	40-45	45-50	50-55	55-60	60-65
Number of days	11	42	63	44	21	18	07

Draw less than and more then ogive curve

c) For the following bivariate data draw scatter diagram and comment on the correlation between X and Y. **[3]**

X	105	130	140	150	160	170	180
Y	80	82	63	84	65	86	97

P.T.O.

Q3) a) Define the concept of correlation. State its properties. **[3]**

b) State probability mass function of Poisson distribution also state its properties. **[4]**

c) Define type I and type II errors. **[3]**

Q4) Attempt and one of the following. **[5]**

a) Explain the paired t-test.

b) Among 200 off springs of a certain cross between guinea pigs, 120 were red, 30 were black and 50 white. According to the generic model the ratio should be 9:3:4. Are these data consistent with the model, test at 5% level of significance.

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Total No. of Questions :4]

SEAT No. :

P2902

[Total No. of Pages : 1

[5533]-105
M.Sc.
ZOOLOGY
ZY - 105 (T) Skills in Scientific communication & Writig
(Credit System) (2013 Pattern) (Semester -I) (2 Credits)

Time : 1½ Hours] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q.No 1, 2 & 3.***
2) ***Question No.4 is compulsory.***

Q1) a) Describe various styles of citations. **[4]**

b) Describe the outline of scientific paper. **[4]**

c) What are legends? **[2]**

Q2) a) Describe the use of communication and IT in oral presentation. **[4]**

b) Explain the role of introduction in defining the problem. **[4]**

c) What is concept? **[2]**

Q3) a) Explain 'contents' in materials and methods section. **[4]**

b) Explain the importance of precis writing in organization of english language. **[4]**

c) Write the names of any two synonyms and two antonyms. **[2]**

Q4) Describe common errors in written and spoken presentation. **[5]**

OR

Discuss the importance of summary and acknowledgement in scientific paper. **[5]**

Total No. of Questions : 4]

SEAT No. :

P2903

[Total No. of Pages : 1

[5533]-106
M.Sc. - I
ZOOLOGY
ZY - 106T : Freshwater Zoology
(2013 Pattern) (Semester - I)

Time : 1½ Hours] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q. NO. 1 to Q. No. 3.***
2) ***Question no. 4 is compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Describe protective adaptations in freshwater fishes. **[4]**

b) Give importance of dissolved oxygen in aquatic life. **[2]**

c) Discuss role of transparency & turbidity in fresh water. **[4]**

Q2) a) Give an economic importance of molluscs as food & as vectors of diseases. **[4]**

b) Write an account on lotic habitat. **[4]**

c) Describe succession of lakes. **[2]**

Q3) a) Give diagnostic features of Tadpole shrimps. **[4]**

b) Describe respiratory adaptations in freshwater insects. **[3]**

c) Give economic importance of reptiles. **[3]**

Q4) Attempt the following:

a) Explain Life Cycle of frog & give importance of tadpole. **[5]**

OR

b) Describe Biological changes in rivers due to sewage pollution.

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Total No. of Questions : 6]

SEAT No. :

P2904

[Total No. of Pages : 2

[5533] - 201

M. Sc. - I

ZOOLOGY

ZY-201- T : Biochemistry - II

(2013 Pattern) (Semester - II)

Time : 2½ Hours] *[Max. Marks :38*

Instructions to the candidates:

1) ***Attempt any three questions from Q.No.1 to Q.No.5.***
2) ***Question no.6 is compulsory.***
3) ***Figures to right indicates full marks.***
4) ***Draw neat labelled diagram wherever necessary.***

Q1) a) Explain in brief electron transport chain. **[5]**

b) Write note on entropy. **[3]**

c) Give the significance of glycolysis. **[2]**

Q2) a) Give the conversion of pyruvate to citrate during TCA cycle. **[4]**

b) Describe the role of ATP as high energy molecule. **[3]**

c) What is ketogenesis? Draw the structure of three ketone bodies. **[3]**

Q3) a) Explain De *novo* synthesis of purines. **[5]**

b) Explain the carnitine shuttle. **[3]**

c) State first law of thermodynamics. **[2]**

P.T.O.

Q4) a) Explain three bypass reaction of gluconeogenesis. **[4]**

b) Describe the breakdown of glycogen. Add note on debranching enzymes. **[4]**

c) Define catabolism and anabolism. **[2]**

Q5) a) Explain in brief urea cycle. **[5]**

b) Describe the process of β oxidation of saturated fatty acids. **[5]**

Q6) Attempt any two. **[8]**

a) Explain the pyrimidine degradation.

b) Explain transamination.

c) Role of Acetyl-CoA in metabolism

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Total No. of Questions : 6]

SEAT No. :

P2905

[Total No. of Pages : 1

[5533]-202
M.Sc. - I
ZOOLOGY
ZY : 202 T : Molecular Biology
(2013 Pattern) (Semester - II)

Time : 2½ Hours] *[Max. Marks : 38*

Instructions to the candidates:

1) ***Attempt any three questions from Q. No. 1 to Q. No. 5.***
2) ***Question No. 6 is compulsory.***
3) ***Figures to right indicate full marks.***
4) ***Draw neat labelled diagram wherever necessary.***

Q1) a) Describe the initiation complex during translation. **[5]**

b) What is Z form of DNA? **[3]**

c) What is transposable element? **[2]**

Q2) a) Explain charging of tRNA. **[4]**

b) Describe in brief mRNA structure. **[3]**

c) Explain the structure and function of DNA pol. III. **[3]**

Q3) a) Explain post transcriptional modification of mRNA. **[5]**

b) What is Hyperchromicity in context to DNA. **[3]**

c) Define phosphodiester linkage. **[2]**

Q4) a) Explain SOS repair mechanism of DNA. **[4]**

b) Describe the significance of promoter during transcription in bacteria. **[4]**

c) Define Cot value. **[2]**

Q5) a) Explain the salient features of DNA structure. **[5]**

b) Explain the ultrastructure of nucleosome and mention its significance. **[5]**

Q6) Write a note on. (Any Two): **[8]**

a) Hershey and Chase experiment.

b) LINES and SINES.

c) Genetic code.

d) Inhibitors of protein synthesis.

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Total No. of Questions : 4]

SEAT No. :

P2906

[Total No. of Pages : 1

[5533]-203
M.Sc. - I
ZOOLOGY
ZY - 203 (T) : Developmental Biology (2C)
(2013 Pattern) (Semester - II) (Credit System)

Time : 1½ Hour] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q. No.1 to Q. No. 3.***
2) ***Question No. 4 is compulsory.***
3) ***Neat labelled diagram must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***

Q1) a) Explain the role of Nanos and Bicoid in pattern formation of Drosophila. **[4]**

b) Describe significance of fertilization. **[3]**

c) Explain Apoptosis with example. **[3]**

Q2) a) Explain the properties of organizer and write in detail its role in neural induction. **[5]**

b) Explain radial cleavage. **[3]**

c) Define neural competence. **[2]**

Q3) a) Describe importance *Xenopus laevis* as model organism. **[4]**

b) Explain vitellogenesis. **[3]**

c) Explain concept of growth. **[3]**

Q4) Attempt any one of the following. **[5]**

a) Explain cortical granule reaction to avoid polyspermy.

b) Describe molecular signalling during neural induction.

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Total No. of Questions :4]

SEAT No. :

P2907

[Total No. of Pages : 1

[5533]-204
M.Sc. - I
ZOOLOGY
ZY - 204 - T : ENDOCRINOLOGY (2C)
(2013 Pattern) (Semester - II) (Credit System)

Time : 1 ½ Hour] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from question no.1,2 & 3.***
2) ***Question No. 4 is compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat labelled diagrams wherever necessary.***

Q1) a) What are hormone receptors? Explain plasma membrane receptors? **[4]**

b) Explain role of pituitary in regulating control of chromatophores. **[4]**

c) Enlist hormones of calcium and phosphate metabolism. **[2]**

Q2) a) Write a note on role of PRL & STH. **[4]**

b) Explain hormonal regulation in insect metamorphosis. **[4]**

c) What are chemical messengers. **[2]**

Q3) a) Write a note on gastro-intestinal hormones. **[4]**

b) Explain hormonal regulation of carbohydrate metabolism. **[4]**

c) Explain vitellogenesis in amphibians. **[2]**

Q4) Write short note on any one of the following : **[5]**

a) Role of X & Y organs in moulting and colour change of Crustaceans.

b) Osmoregulatory hormones.

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Total No. of Questions : 4]

SEAT No. :

P2908

[Total No. of Pages : 1

[5533]-205
M.Sc.
ZOOLOGY
ZY - 205 (T) : Comparative Animal Physiology
(2013 Pattern) (Semester - II)

Time : 1½ Hours] *[Max. Marks : 25*

1) *Attempt any two questions from Q.No. 1, 2, 3.*
2) *Question No. 4 is compulsory.*
3) *Figures to the right indicates full marks.*
4) *Draw neat labelled diagram wherever necessary.*

Q1) a) Describe the structure of skeletal muscle. **[4]**

b) Explain the process of digestion in intestine. **[4]**

c) Define osmosis. **[2]**

Q2) a) What is thermoregulation? Explain thermoregulation in Homeotherm. **[5]**

b) Explain excretion with respect to mammalian kidney. **[3]**

c) Define reflex action. **[2]**

Q3) a) Explain the mechanism of hormone action. **[4]**

b) Explain the mechanism of oxygen transport. **[4]**

c) Define tolerance. **[2]**

Q4) Explain photoreception in detail. **[5]**

OR

What is ventilation? Explain the role of gills in ventilation. **[5]**

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Total No. of Questions : 4]

SEAT No. :

P2909

[Total No. of Pages : 2

[5533]-206
M.Sc. - I
ZOOLOGY
ZY : 206 - T : Biochemical Techniques
(2013 Pattern) (Semester -II)

Time : 1½ Hour] *[Max. Marks :25*

Instructions to the candidates:

1) ***Attempt any two questions from Question No. 1, 2, 3.***
2) ***Question No. 4 is compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat labelled diagram wherever necessary.***

Q1) a) What is SDS - PAGE? Give its applications. **[4]**

b) Describe Ion exchange chromatography for separation of molecules. **[4]**

c) Define respiratory quotient. **[2]**

Q2) a) Explain agarose gel electrophoresis to resolve DNA. **[5]**

b) Explain the principle of Manometry. **[3]**

c) What is Becquerel? **[2]**

Q3) a) Explain principle and application of visible spectrophotometer. **[4]**

b) What is isotope? Give its application with respect to biology. **[3]**

c) Describe in brief RPLC. **[3]**

Q4) Explain principle, instrumentation and working of thin layer chromatography. **[5]**

OR

Explain the Sangers reactions for DNA sequencing.

■ ■ ■

P.T.O.

Total No. of Questions : 4]

[5533]-206
M.Sc. - I
ZOOLOGY
ZY : 206 Ichthyology
(2013 Pattern) (Semester -II) (Credit System)

Time : 1½ Hour] ***[Max. Marks :25***

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1 to Q. No. 3***
2) ***Question No.4 is compulsory.***
3) ***Neat labelled diagram must be drawn wherever necessary.***
4) ***Figures to the right side indicate the full marks.***

Q1) a) Explain water and salt balance in Euryhayline fishes. **[4]**

b) Describe anadromous and catadromous fishes. **[3]**

c) Describe lateral line organ in fishes. **[3]**

Q2) a) Describe various anatomical modifications in digestive system of fishes. **[5]**

b) Describe the different body forms found in fishes. **[3]**

c) Enlist types of scales. **[2]**

Q3) a) Describe parental care in fishes. **[4]**

b) What is significance of color change? **[3]**

c) Explain morphometric measurement in fishes. **[3]**

Q4) Explain the role of fat and swim bladder in fishes. **[5]**

OR

Describe corpuscles of stannius.

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Total No. of Questions : 8]

SEAT No :

P2910

[Total No. of Pages : 6

[5533]-301
M.Sc. - II
ZOOLOGY
ZY - 301 - T : Animal Physiology - I
(2013 Pattern) (Semester - III) (Special Paper - 4 Credits)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempts any five questions.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams wherever necessary.***

Q1) a) What is biological rhythm? Explain circaannual rhythm with suitable example. **[4]**

b) Explain the biochemical and molecular events during bioluminescence. **[4]**

c) Define capacitance. **[2]**

Q2) a) Explain metabolic rate in relation to body size in birds. **[4]**

b) What is animal electricity? Give it significance. **[4]**

c) Define osmoregulation. **[2]**

Q3) a) Explain how crustaceans adapt to hypo and hyper osmatic environment. **[4]**

b) Describe the structure and functions of swim bladders with suitable example. **[4]**

c) Define resistance. **[2]**

Q4) a) Describe the role of kidney in acid-base balance. **[5]**

b) Write a note on dynamics of semipermeable membrane. **[3]**

c) Define aerobic metabolism. **[2]**

P.T.O.

Q5) a) Describe resting membrane potential. Add a note on Goldman-Hodkin Katz equation. **[5]**

b) Write a note on energy cost of running and swimming. **[5]**

Q6) a) Explain the concept of deep sea hydrothermal went with suitable example. **[5]**

b) Explain osmoregulation in terrestrial vertebrates. **[5]**

Q7) a) What is biological clock? Explain exogenous clock hypothesis. **[5]**

b) Describe the structure of electroreceptors and electro-organ. **[5]**

Q8) a) Explain the respiratory and cardio-vascular responses of animals at high altitude. **[5]**

b) Explain the structure and function of voltage gated Na^+ and K^+ channels. **[5]**

P2910

[5533]-301
M.Sc. - II
ZOOLOGY
ZY - 301 - T : Entomology - I
(2013 Pattern) (Semester - III) (Special) (4 Credits)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempts any five questions.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) a) Discuss interrelationship of insects with other arthropods. **[5]**

b) Explain endocrine functions of corpora allata. **[3]**

c) Write the functions of antennae. **[2]**

Q2) a) Explain the characters of Dermaptera with two examples. **[4]**

b) Explain structure and function of thoracic spiracles of grasshopper. **[4]**

c) Explain hamuli. **[2]**

Q3) a) Explain circulatory system in insects. **[5]**

b) Sketch & label raptorial leg. **[3]**

c) Give the functions of Maxilla in biting & chewing insects. **[2]**

Q4) a) Give the distinguishing characters of order Collembola with two examples. **[5]**

b) Explain the characters of Phasmida with two examples. **[3]**

c) Explain opisthognathous type of head with suitable example. **[2]**

Q5) a) Mention the distinguishing characters of Coleoptera with two examples. **[4]**

b) Give an account of the alimentary canal of any orthopteroid insect. **[4]**

c) Define endopterygota. **[2]**

Q6) a) Explain polytrophic ovariole. **[4]**

b) Explain siphoning type of mouthparts. **[4]**

c) Explain photocytes. **[2]**

Q7) a) Explain important cuticular derivatives in insects. **[5]**

b) What is excretion? Explain nephrocytes & labial glands. **[5]**

Q8) a) Explain male reproductive system in insects. **[5]**

b) Describe exocrine glands in insects. **[5]**

P2910

[5533]-301
M.Sc. - II
ZOOLOGY
ZY - 301 - T : Genetics - I
(2013 Pattern) (Semester - III) (Special Paper) (4 Credits)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) ***Attempts any five questions.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat diagrams wherever necessary.***

Q1) a) "Evolutionary forces operating on population change the allelic frequency" Justify. **[4]**

b) What is Narrow and Broad sense heritability? **[3]**

c) What is Molecular phylogeny? **[3]**

Q2) a) Explain the partitioning of Environmental Variance (VE). **[4]**

b) A completely recessive allele 'g' is lethal in homozygous condition. If 'G' mutates to 'g' at rate of 10^{-6} per generation, what is the expected frequency of the lethal homozygous, when the population reaches mutation selection equilibrium. **[4]**

c) What are paralogous and orthologous genes. **[2]**

Q3) a) Explain phylogeny based on DNA - DNA hybridization. **[4]**

b) Write the characteristics of 'r' strategists. How do they differ from 'K' strategists? **[3]**

c) State the applications of reverse genetics. **[3]**

Q4) a) What are chromosomal probes? Explain the types of probes. **[5]**

b) Explain 'heterozygote superiority'. **[3]**

c) What is 'effective population size'? Calculate effective population size of a population with 76 females and 4 males. **[2]**

Q5) a) Explain the role of gene duplication in evolution. **[4]**

b) Define allopatric & sympatric speciation. **[4]**

c) A study of quantitative variation for abdominal bristle number in female Drosophila gave - Vg = 3.17; Vp = 6.08, Ve = 2.91. What is the broad sense heritability for this trait. **[2]**

Q6) a) Explain molecular phylogeny using amino acid sequencing. **[5]**

b) Distinguish between ' Ex-Vivo & In-Vivo methods' of gene therapy. **[5]**

Q7) a) Explain the life cycle of Neurospora. How is it useful in genetic studies. **[5]**

b) A, B, C are inbred strains of mice assumed to be completely homozygous. A is mated to B. B mated to C then A × B hybrids are mated to 'C', and their off springs to B × C. What is the inbreeding co-efficient of the off spring of this last mating? **[5]**

Total No. of Questions : 4]

SEAT No :

P2911

[Total No. of Pages : 2

[5533]-302
M.Sc. - II
ZOOLOGY
ZY - 302 - T : Immunology
(2013 Pattern) (Semester - III)

Time : 1½ Hours] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q.No. 1, 2, 3.***
2) ***Q.No. 4 is compulsory.***
3) ***Figures to the right indicates full marks.***
4) ***Draw neat labelled diagrams wherever necessary.***

Q1) a) What is antibody? Explain theories of antibody synthesis. **[4]**

b) Discuss autoimmune disease with suitable example. **[4]**

c) What Allergy? **[2]**

Q2) a) Explain various primary lymphoid organs. **[5]**

b) Describe the immunoelecrophoresis. **[3]**

c) What is Vaccine? **[2]**

Q3) a) Explain the structure and function of immunoglobulins. **[5]**

b) Draw a neat labelled diagram of lymph node. **[3]**

c) Define Epitope. **[2]**

Q4) Explain humoral immunity in detail. **[5]**

OR

What is complement fixation? Discuss the classical pathway of complement fixation. **[5]**

P.T.O.

Total No. of Questions : 4]

SEAT No :

P2911

[5533]-302
M.Sc. - II
ZOOLOGY
ZY - 302 - T : Environmental Biology
(2013 Pattern) (2 Credits) (Semester - III)

Time : 1½ Hours] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q.No. 1 to Q.No. 3.***
2) ***Q.No. 4 is compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) What is Ecology? Describe evolution of ecosystem. **[5]**

b) Write a note on population ecology. **[3]**

c) What is nutritional flux? **[2]**

Q2) a) Describe semiarid habitats of India. **[5]**

b) Describe different types of biomes. **[3]**

c) Give the example of endemic species? **[2]**

Q3) a) Describe various factors influencing wild life management. **[4]**

b) Describe energy flow in ecosystem. **[3]**

c) Write a note on Red data book. **[3]**

Q4) a) Describe the various IUCN Categories with suitable example. **[5]**

OR

b) Describe the role of local communities in wild life management. **[5]**

Total No. of Questions : 4]

SEAT No. :

P2912

[Total No. of Pages : 2

[5533]- 303
M.Sc.
ZOOLOGY
ZY - 303T : Genetic Toxicology
(2013 Pattern) (Semester-III) (Credit System)

Time : 1½ Hours] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from question No. 1, 2 & 3.***
2) ***Question No. 4 is compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat and labeled diagrams wherever necessary.***

Q1) a) What is mutation? Explain the mechanism by which 5-bromouracil causes mutation. **[5]**

b) Explain the mechanism of deletion. **[3]**

c) What is point mutation? **[2]**

Q2) a) How will you test the genotoxic potential of compound in bacteria. **[4]**

b) Explain trisomy & give its significance. **[4]**

c) What is reverse mutation? **[2]**

Q3) a) Explain any two molecular methods to detect mutation. **[4]**

b) What are alkylating agents? How do they cause mutation. **[4]**

c) Write a note on hazard assessment. **[2]**

Q4) Attempt any one of the following:

a) Ame's test and give its significance. **[5]**

b) Application of genetic toxicology in environmental monitoring. **[5]**

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P.T.O.

Total No. of Questions : 4]

P2912

[5533]- 303
M.Sc. - II
ZOOLOGY
ZY - 303T : Aquaculture
(2013 Pattern) (Semester-III) (2-Credits)

Time : 1½ Hours] ***[Max. Marks : 25***

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1, 2 and 3.***
2) ***Question No. 4 is compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat labeled diagrams wherever necessary.***

Q1) a) Describe in brief fish harvesting technique. **[4]**

b) Explain mixed fish farming. **[4]**

c) Explain stocking pond. **[2]**

Q2) a) Describe fresh water prawn culture in brief. **[5]**

b) Describe aquatic insects and their control measures. **[3]**

c) Explain Mariculture. **[2]**

Q3) a) Explain the causes of mortality in fish seed transport. **[4]**

b) Write a note on fish food organisms and their production. **[4]**

c) Describe worm diseases of fish. **[2]**

Q4) Write short notes on any one of the following: **[5]**

a) Fish processing and preservation.

b) Transport of fish seed.

Total No. of Questions :4]

SEAT No. :

P2913

[Total No. of Pages :1

[5533]-304
M.Sc.
ZOOLOGY
ZY-304 : Insect Physiology and Biochemistry
(2013 Pattern) (2 Credits)

Time : 1½ Hours] *[Max. Marks : 25*

Instruction to the candidates:

1) ***Attempt any 2 question from Q.1 To Q.3.***
2) ***Question No.4 is compulsory.***
3) ***Neat and labeled diagram must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Describe mechanism of water balance and nitrogen excretion in insects. **[5]**

b) Describe physico-chemical characteristics of haemolymph. **[3]**

c) How proteins are digested by insects. **[2]**

Q2) a) Describe structure and functions of insect haemocytes. **[5]**

b) Explain how ventilation controlled in insects. **[3]**

c) Enlist functions of insect integument. **[2]**

Q3) a) Describe structure of fat body. Comment on its role in integration of carbohydrates, fats and acids. **[4]**

b) Describe the types of insect Endocrinegland. **[3]**

c) Explain moulting hormone. **[3]**

Q4) Describe the structure and function of malpighian tubules in insects. **[5]**

OR

What is digestion? Describe physiology of digestion and absorption of carbohydrates.

Total No. of Questions :4]

SEAT No. :

P2914

[Total No. of Pages : 2

[5533]-305
M.Sc. - II
ZOOLOGY
ZY - 305 (T) Research Methodology
(2013 Pattern) (Semester -III) (2 Credits)

Time : 1½ Hour] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q.No 1 to Q.No.3.***
2) ***Question No.4 is compulsory.***
3) ***Neat diagram must be drawn wherever necesarry***
4) ***Figures to the right indicate full marks.***

Q1) a) Explain in detail about the Real time polymerase chain reaction. **[4]**

b) Write about the biostatistical quantitative methods used to analyse the biological data. **[3]**

c) Define immuno flourescence. Give its applications. **[3]**

Q2) a) Explain the process of ultrafilteration in purification on Biomolecules. **[5]**

b) Explain the procedure followed for preparation of manuscript. **[3]**

c) Explain the significance of flourescence microscopy. **[2]**

Q3) a) Write importance of literature review white preparing a research paper. **[4]**

b) Explain the histochemical staining technique used for characterization of cell type. **[4]**

c) Define Bioinformatics **[2]**

P.T.O.

Q4) a) What is Data? Discuss in detail the primary and secondary data. **[5]**

OR

b) Explain the principle, working and applications of chromatography. **[5]**

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Total No. of Questions : 4]

SEAT No. :

P2915

[Total No. of Pages : 1

[5533]-306
M.Sc. - II
ZOOLOGY
ZY - 306T : Parasitology
(2013 Pattern) (Semester - III) (2 Credit

Time : 1½ Hours] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q. NO. 1 to Q. No. 3.***
2) ***Question no. 4 is compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Describe life cycle and mode of transmission of *Leishmania sps.* **[5]**

b) Describe the mode of transmission of *Schistosoma sps.* **[3]**

c) Describe the vector specificity of *Myasis.* **[2]**

Q2) a) Describe the diploid and sexual stages of *Trypanosoma.* **[4]**

b) Explain the chromosomal polymorphism in *Plasmodium*. **[3]**

c) Explain the mechanism of resistance to malarial drug. **[3]**

Q3) a) Describe radio immuno assay. **[4]**

b) Explain the transovarian transmission of parasites. **[3]**

c) What is biological Prophylaxis? **[3]**

Q4) a) Give an account of physiological preadaptations of parasites to infect host. **[5]**

OR

b) Explain ELISA test in detail.

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Total No. of Questions : 4]

SEAT No. :

P2917

[Total No. of Pages : 1

[5533]-308
M.Sc. (Part-II)
ZOOLOGY
ZY-308 T : Insects Ecology
(2013 Pattern) (Semester - III) (2 Credits)

Time : 1½ Hour] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1 to Q. No. 3.***
2) ***Question No. 4 is compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Describe the interspecific relationship in insects. **[5]**

b) Relation of insects with vascular plants. **[3]**

c) Insect parasitoids. **[2]**

Q2) a) Discuss the cycling of nutrients in insects. **[4]**

b) Describe aquatic and soil insects. **[3]**

c) Effect of humidity on insects. **[3]**

Q3) a) State giving one example the effect of climate change on insect. **[4]**

b) History of insect ecology. **[3]**

c) Describe Parental care in insects. **[3]**

Q4) Write short notes on any one of the following: **[5]**

a) Threats to insects and conservation measures.

b) Leaf shredding in insects.

Total No. of Questions : 4]

SEAT No. :

P2918

[Total No. of Pages : 1

[5533]-309
M.Sc. - II
ZOOLOGY
ZY-309T : Toxicology - I
(2013 Pattern) (Semester-III) (2 - Credits)

Time : 1½ Hour] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1, 2 and 3.***
2) ***Question No. 4 is compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat labeled diagrams wherever necessary.***

Q1) a) What are toxic agents? Explain their mode of action. **[5]**

b) Explain mechanism of xenobiotic translocation. **[3]**

c) What is LD50? **[2]**

Q2) a) What are pesticides? Write its classification. **[4]**

b) Explain the source, toxicity and mode of action of chromium. **[4]**

c) What is chronic toxicity? **[2]**

Q3) a) What is bioaccumulation? Explain it with suitable example. **[4]**

b) Write a note on clinical toxicology. **[3]**

c) Explain the itai-itai disease. **[3]**

Q4) Write short notes on any one of the following: **[5]**

a) Membrane permeability and mechanism of chemical transfer.

b) Maintenance and general handling of animals for toxicological laboratory.

Total No. of Questions : 8]

SEAT No. :

P2919

[Total No. of Pages : 6

[5533]-401
M.Sc.
ZOOLOGY
ZY- 401 T : Animal Physiology-II
(2013 Pattern) (Semester - IV) (Special Paper-IV Credits)

Time : 3 Hours] *[Max. Marks : 50*

Instructions to the candidates:

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

Q1) a) Explain Nernst potential. Add a note on Goldman-Hodkin Katz potential. **[5]**

b) What is Nutrition? Explain nutritive types. **[3]**

c) Define: Partial pressure. **[2]**

Q2) a) Explain the role of central and peripheral receptors in process of respiration. **[5]**

b) Explain the electrical activity of heart pace makers. **[3]**

c) Define: Neuropeptides. **[2]**

Q3) a) Explain the hypertension and hypotension in maintenance of blood pressure. **[5]**

b) Explain the mechanism of twitch, summation and tetanus in muscles. **[3]**

c) Define: Cardiac Output. **[2]**

Q4) a) Explain the role of extrinsic nerve flexus and intrinsic never flexus in process of digestion. **[5]**

b) Explain the role of rhodopsin in sense of vision. **[5]**

Q5) a) Explain the structure of skeletal muscle. **[5]**

b) What are blood components **[3]**

c) Define: Saltatory conduction **[2]**

P.T.O.

Q6) a) Explain the process of metabolism of neurotransmitters. **[4]**

b) Explain the process of gas exchange across pulmonary and systemic capillaries. **[4]**

c) Resting membrane potential. **[2]**

Q7) a) Explain the types of receptors. Add a note on potential of receptor. **[4]**

b) Explain the relation in between the muscle length and tension. **[4]**

c) Define: Blood pressure **[2]**

Q8) a) Role of arteries as pressure reservoir and arterial pressure. **[5]**

b) Explain the mechanism of excitation and conduction of signal through nerve fiber. **[5]**

Total No. of Questions : 8]

P2919

[5533]-401
M.Sc.II
ZOOLOGY
ZY- 401 T :Entomology-II (Special)
(2013 Pattern) (Semester - IV) (4 Credits)

Time : 3 Hours] ***[Max. Marks : 50***

Instructions to the candidates:

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

Q1) a) Explain spermiogenesis in insects. **[5]**

b) Explain oviposition habits in phytophagous insects. **[3]**

c) Define vitellogenesis. **[2]**

Q2) a) Describe the blastokinesis in insects. **[4]**

b) Sketch & label telotrophic ovariole. **[4]**

c) Define gastrulation. **[2]**

Q3) a) Describe cleavage and blastoderm formation in insects. **[5]**

b) Describe oligopod larva with suitable examples. **[3]**

c) Explain dorsal organ in insects. **[2]**

Q4) a) Describe formation of embryonic membrane in insects. **[5]**

b) Explain holometabolous development. **[3]**

c) Explain naid. **[2]**

Q5) a) Describe obtect pupa with suitable examples. **[4]**

b) What is metamorphosis? Explain its control by the hormones. **[4]**

c) Explain scarabaei form larve with suitable example. **[2]**

P.T.O.

Q6) a) Explain emergence form the pupa and cocoon. **[4]**

b) Explain in brief regeneration in insects. **[4]**

c) Define aging. **[2]**

Q7) a) Explain embryonic development of reproductive system in insects. **[5]**

b) What is diapause? Describe its occurrence and initiation. **[5]**

Q8) a) Explain Hadorn's experiments with imaginal discs. **[5]**

b) Describe embryonic development of tracheal system in insects. **[5]**

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Total No. of Questions : 8]

P2919

[5533]-401
M.Sc.
ZOOLOGY
ZY- 401 (T) :Genetics-II (Special)
(2013 Pattern) (Semester - IV) (4 Credits)

Time : 3 Hours] ***[Max. Marks : 50***

Instructions to the candidates:

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

Q1) a) Explain molecular basis of hemophilia **[5]**

b) Discuss psychopathology of Alzheimer's disease? **[5]**

Q2) a) Explain the genetic defects Huntington syndrome. **[4]**

b) What is positional cloning? Explain positional cloning using structural abnormalities. **[3]**

c) Describe role of RAG1& RAG 2. **[3]**

Q3) a) Explain the principal indication for prenatal diagnosis. **[4]**

b) Write a note on the very first physical map. **[3]**

c) Explain shared and non-shared environment influence on behavioral traits. **[3]**

Q4)a) Explain the role of genetic counselors. **[4]**

b) Write a note on heraditic cancers. **[4]**

c) Define: MIM number. **[2]**

Q5)a) What is inborn errors of metabolism? Discuss any two Carbohydrate metabolism disorders. **[5]**

b) What are Fab and iab regions in *Drosophilla* homiotic genes? How these are involved in expression of genes? **[5]**

P.T.O.

Q6) a) Write a note on parametric and non parametric analysis. **[5]**

b) Explain HLA and disease association. **[5]**

Q7) a) Explain molecular basis of Tay-Sachs disease. **[4]**

b) 'LOD Score analysis is one of the statistical tools to study gene linkages' -Explain. **[3]**

c) Explain twinning methods. **[3]**

Q8) a) What are autosomal recessive disorders? Explain how pedigree analysis is imp while diagnosingtheses disorders. **[4]**

b) Explain banding tech. **[4]**

c) Define: Sex influenced genes and sex limited genes. **[2]**

Total No. of Questions : 4]

SEAT No. :

P2920

[Total No. of Pages : 2

[5533]-402
M.Sc. (Part - II)
ZOOLOGY
ZY - 402 (T) : Economic Zoology
(2013 Pattern) (Semester -IV) (Credit System) (2 Credits)

Time : 1½ Hour] *[Max. Marks :25*

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1 to Q. No. 3.***
2) ***Question No. 4 is compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***

Q1) a) What are nematodes? Explain role of any two parasitic animal nematodes. **[5]**

b) Economic importance of Amphibian. **[3]**

c) Name the species used in Prawn culture. **[2]**

Q2) a) Comment on Dairy industry. Give examples. **[4]**

b) Give brief account of wool industry. **[3]**

c) Explain significance of coral reef. **[3]**

Q3) a) Enlist earthworm species used in vermiculture and explain briefly the vermiculture operation. **[4]**

b) Explain economic importance of sponges. **[3]**

c) Name any four animals used in Pharmaceutical company. **[3]**

Q4) Explain **[5]**

a) Piggery

b) Brief account of wool industry.

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P.T.O.

Total No. of Questions : 4]

P2920

[5533]-402
M.Sc. - II
ZOOLOGY
ZY - 402 (T) : Bacterial and Phage Genetics
(2013 Pattern) (Semester -IV) (2 Credits)

Time : 1½ Hour] ***[Max. Marks :25***

Instructions to the candidates:

1) ***Attempt any two questions from Question No. 1 to Question No. 3.***
2) ***Question No. 4 is compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Discuss fine structure of gene. **[5]**

b) Explain complementation groups. **[3]**

c) Define : Plasmids **[2]**

Q2) a) Discuss salient features of T7 phage. **[4]**

b) Explain the concept of overlapping genes. **[3]**

c) Explain : terminally redundant circularly permuted DNA. **[3]**

Q3) a) Discuss in detail : Transformation **[5]**

b) Justify the following statement with suitable examples:

"Mutations are extremely valuable for understanding molecular biology, physiology and genetic regulation" **[5]**

Q4) Describe in detail the molecular switch between lytic and lysogenic cycle of Bacteriophage lambda. **[5]**

OR

Write a note on "Use of Three-point crosses in chromosomal mapping". **[5]**

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Total No. of Questions : 4]

SEAT No. :

P2921

[Total No. of Pages : 2

[5533]-403
M.Sc.-II
ZOOLOGY
ZY - 403 (T) : Mammalian Reproductive Physiology
(2013 Pattern) (Semester - IV) (2 - Credits)

Time : 1½ Hour] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Que. No.1 to Que. No. 3.***
2) ***Question No. 4 is compulsory.***
3) ***Draw neat & labelled diagrams wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Explain sexual diamorphism & factors responsible for it. **[4]**

b) Describe the concept of delayed implantation with suitable example. **[3]**

c) What is parturition? Explain it's control mechanism. **[3]**

Q2) a) Explain environmental factors affecting breeding. Give suitable examples. **[4]**

b) Explain hypothalamo-hypophyseal-gonadal axis. **[3]**

c) Explain pubertal changes in human females. **[3]**

Q3) a) Explain advantages & disadvantages of barrier methods of contraception. **[4]**

b) Write a note on suckling reflex. **[3]**

c) Explain the concept of amenorrhea. **[3]**

Q4) Describe estrus cycle in detail. **[5]**

OR

Explain functions of gonadal hormones.

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P.T.O.

Total No. of Questions : 4]

P2921

[5533]-403
M.Sc. - II
ZOOLOGY
ZY - 403 (T) : Biodiversity Assessment
(2013 Pattern) (Semester - IV) (2 - Credits)

Time : 1½ Hour] ***[Max. Marks : 25***

Instructions to the candidates:

1) ***Attempt any two questions from Q. No.1 to Q. No. 3.***
2) ***Question No. 4 is compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Describe the productive value of Biodiversity. **[4]**

b) Write a note on Red Data Book. **[3]**

c) Write a note on Vulture Culture project. **[3]**

Q2) a) Describe Endangered and vulnerable species with suitable examples. **[4]**

b) Describe the Characteristics of Phylum Mollusca with suitable examples. **[3]**

c) Write about the action plans of Biodiversity conservation. **[3]**

Q3) a) Write about the hotspots of a biodiversity distribution of the world. **[4]**

b) Describe the class Pisces with suitable examples. **[3]**

c) Discuss in detail the project Crocodile. **[3]**

Q4) What is forest conservation act? Write a role of NGO's in forest conservation. **[5]**

OR

Describe the characteristics features of Reptilia and Aves.

Total No. of Questions :4]

SEAT No. :

P2922

[Total No. of Pages : 1

[5533]-404
M. Sc. - II
ZOOLOGY
ZY-404 (T) : HISTOLOGY AND HISTOCHEMISTRY
(2013 Pattern) (Semester - IV) (2 Credits)

Time : 1 ½ Hours] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q.No.1 to Q.No.3.***
2) ***Question No.4. is compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Draw neat labeled diagrams wherever necessary.***

Q1) a) Write a note on immunohistochemistry. **[5]**

b) Explain the use of microtome in histology. **[3]**

c) Define nuclear stain. **[2]**

Q2) a) What is a muscle tissue? Write a note on skeletal muscle. **[5]**

b) Mention the significance of cold impregnation in block preparation. **[3]**

c) Mention any two differences between simple and differential staining techniques. **[2]**

Q3) a) Describe the procedure for PAS staining method and give its applications. **[5]**

b) Mention the difference between histochemistry and immunohistochemistry. **[3]**

c) Define bipolar neuron. **[2]**

Q4) Explain the procedural differences between temporary and permanant whole mount preparations. **[5]**

OR

Elaborate on the histochemical method for detection of nonspecific esterases.

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Total No. of Questions : 4]

SEAT No. :

P2923

[Total No. of Pages : 1

[5533]-405
M.Sc. - II
ZOOLOGY
ZY - 405 (T) : Pollution Biology
(2013 Pattern) (Semester - IV) (2 Credits)

Time : 1½ Hour] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Que. No.1 to Que. No. 3.***
2) ***Question No. 4 is compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right side indicate full marks.***

Q1) a) Define pollution. Describe sources of air pollution. **[4]**

b) Write a note on the management of Biomedical waste. **[4]**

c) Describe lithosphere. **[2]**

Q2) a) Describe strategies for monitoring of soil pollution. **[4]**

b) What is Biomagnification? State with the help of one example. **[3]**

c) What are the characteristics of sound? **[3]**

Q3) a) What are the pathways of pesticide pollution? **[4]**

b) What is bioassay? Explain pollutant bioassay using fish. **[3]**

c) Describe the atmosphere in detail. **[3]**

Q4) Describe biochemical methods to study impact of pollutants on animals. **[5]**

OR

Describe the effects and control of noise pollution.

Total No. of Questions : 4]

SEAT No. :

P2924

[Total No. of Pages : 1

[5533]-406
M. Sc.
ZY - 406T : ZOOLOGY Apiculture
(2013 Pattern) (Semester-IV) (2 Credits)

Time : 1½ Hour] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q.1 to Q. 3.***
2) ***Question No. 4 is compulsory.***
3) ***Draw neat labelled diagrams wherever necessary.***

Q1) a) Describe the limitations of development in beekeeping. **[5]**

b) Mention in brief the history of beekeeping. **[3]**

c) Write the chemical composition of Honey. **[2]**

Q2) a) Discuss any two bee research institutes and training centres in India. **[4]**

b) Explain Queen rearing techniques. **[4]**

c) Explain division of labour in honey bee colony. **[2]**

Q3) a) Explain the advantages of beekeeping. **[4]**

b) Explain honey flow period. **[4]**

c) Explain any two insect pests of bee colony. **[2]**

Q4) Write short notes on any one of the following: **[5]**

a) Management of bee colony in summer season.

b) Routine inspection of a bee colony.

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Total No. of Questions : 4]

SEAT No. :

P2925

[Total No. of Pages : 1

[5533]-407
M.Sc. -II
ZOOLOGY
ZY-407(T): Pest control
(2013 Pattern) (2 Credits) (Semester-IV) (Credit System)

Time : 1½ Hour] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from question No.1 to 3.***
2) ***Q.No. 4 is compulsory.***
3) ***Draw neat, labelled diagrams wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Explain role of biological agents in agricultural pest control. **[5]**

b) Write control measures of crabs & snail. **[3]**

c) Describe aerosols. **[2]**

Q2) a) Describe drawbacks of chemical control. **[4]**

b) Explain dry insecticide formulations. **[3]**

c) What are the damages caused by various pests. **[3]**

Q3) a) Describe hazards of pesticides. **[4]**

b) Describe integrated pest management. **[4]**

c) What are non-insect pests? **[2]**

Q4) Write short notes (any two) **[5]**

a) Types of pests & their importance

b) Physical control measures.

Total No. of Questions : 4]

SEAT No. :

P2926

[Total No. of Pages : 1

[5533]-408
M.Sc. - II
ZOOLOGY
ZY-408T : Toxicology - II
(2013 Pattern) (Semester-IV) (2 Credits)

Time : 1½ Hour] *[Max. Marks : 25*

Instructions to the candidates:

1) ***Attempt any two questions from Q. No. 1 to Q. No. 3.***
2) ***Questions no. 4 is compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

Q1) a) Give the advantages and limitations of toxicogenomics. **[4]**

b) Mention the role of regulatory agencies in toxicity testing. **[3]**

c) Explain the bioassay for fish testing. **[3]**

Q2) a) Describe the detoxification of any one OP compound. **[4]**

b) What is IAEC? Give its role in animal research. **[3]**

c) What is metabolomics? **[3]**

Q3) a) Explain the transfer of toxic agents across the membranes. **[4]**

b) Write a note on rational use of animals for toxicological testing. **[4]**

c) Define bioactivation. **[2]**

Q4) Attempt the following: **[5]**

a) Explain the mechanism of absorption of xenobiotics from GI tract & lungs.

OR

b) What is biomedical waste? Add a note on disposal of biomedical waste.