

Msc Zoology  
April 2015

खेळ - 001

Seat Number

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ZOO-401 : SPECIAL PAPER (ANY ONE OF THE FOLLOWING)

- I) Entomology-II (411) II) Animal Physiology-II (412)  
III) Reproductive Physiology-II (413)

P. Pages : 7

Time : Three Hours

Max. Marks : 80

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicate full marks.
6. Attempt two sections in two separate answer books.
7. Draw neat labelled diagrams wherever necessary.

I) Entomology – II  
Section – I

A) Applied Entomology

1. a) Select and write the most appropriate answer from the given 4 options:
- i) Chilo Partellus is the pest of .....  
a) Jute    b) ber  
c) maize                                         d) brinjal
- ii) ..... also acts as a vector of pea viruses.  
a) Dysdercus cingulatus                  b) Acyrtosiphon pisum  
c) Agratis ipsillon                         d) Odontotermes obesus
- iii) Seasamum gall fly maggots feed on .....  
a) leaves                                         b) external floral organs  
c) shoots                                         d) internal floral organs
- iv) Ideocercus atkinsoni is commonly called .....  
a) mango leaf hopper                        b) mango fruit fly  
c) mango stem borer                         d) barkeating caterpillar

b) Define / Explain the following. 4

i) Rice weevil

ii) Termites

2. Describe the general biology of brinjal and cabbage pests. 8

3. Give an account of any two household pests and their control measures. 8

OR

Describe the role of insects in forensic science.

4. How the pests are managed by the integration of many control measures ? 8

OR

Describe any two pests of medical importance and their control measures.

5. Write notes on any two. 8

i) Forest sap suckers.

ii) Pests of Paddy.

iii) Pests of sesamum

**SECTION - II**  
**B) Insect Physiology**

6. a) Select and write the most appropriate answer from the given options. 4
- i) In homoptera ..... supply B-vitamins and sterols.
- |             |                |
|-------------|----------------|
| a) bacteria | b) mycocyies   |
| c) yeasts   | d) flagellates |
- ii) ..... occur in wood-eating cockroaches and termites and help in digestion of cellulose.
- |                |             |
|----------------|-------------|
| a) flagellates | b) bacteria |
| c) fungi       | d) amoebae  |
- iii) Locusts have ..... as the static organs.
- |                  |                |
|------------------|----------------|
| a) tactile hairs | b) hair plates |
| c) halteres      | d) cristae     |
- iv) The brain hormone stimulates the corpora allata to secrete .....
- |             |        |
|-------------|--------|
| a) ecdysone | b) TTH |
| c) ATH      | d) JH  |

b) Define / Explain : 4

- |                |                |
|----------------|----------------|
| i) Pace-maker. | ii) Uric acid. |
|----------------|----------------|

Explain the mechanism of digestion in insects. 8

8. Write an account on penetration of substances through insect cuticle. 8

OR

Give an account of locomotion in terrestrial insects.

9. Explain the respiration in aquatic insects. 8

OR

Describe the physiological properties of insect muscle.

10. Write notes on any two. 8

- i) Static organs.
- ii) Mechanism of image formation.
- iii) Cardiac cycle.

## II) Animal Physiology – II

1. a) Select and write the most appropriate answer from given options. **8**

- i) The risk factor for liver disease includes.....
  - a) consumption of alcohol
  - b) viral infection
  - c) Anabolic steroids
  - d) All of above
- ii) Acid dyspepsia is the common disorder related to .....
  - a) Brain
  - b) Liver
  - c) Stomach
  - d) Kidney
- iii) Resting potential across cell membrane is about .....
  - a) -100 mv
  - b) -70 mv
  - c) +70 mv
  - d) +100 mv
- iv) Deficiency of hormones secreted by adrenal cortex leads to ....
  - a) Gaucher's disease
  - b) Tay-Sach's disease
  - c) Turner's syndrome
  - d) Addison's disease
- v) Umbilical cord blood is good source of .....
  - a) Oxytocin
  - b) Stem cells
  - c) hepatocytes
  - d) Androgens.
- vi) Bioluminescence in firefly is due to oxidation of .....
  - a) Glucose
  - b) Casein
  - c) Luciferin
  - d) Lactose
- vii) Myocardial infarction is medical term used for .....
  - a) Dementia
  - b) Heart beat
  - c) ECG
  - d) Heart attack
- viii) Acetylcholine is a type of .....
  - a) Neurotransmitter
  - b) Promotor
  - c)  $\beta$ -blocker
  - d) Inhibitor

b) Define and explain.

**8**

- i) Action potential.
- ii) Bronchitis.
- iii) Glomerulus Filtration rate.
- iv) Infertility.

2. Describe blood coagulation pathway using intrinsic and extrinsic factors. Add a note on significance of blood clotting. 16

OR

Explain role of kidney in maintenance of acid-base homeostasis. Add a note on clinical abnormalities due to acid-base imbalance.

3. Attempt any two. 16
- Diabetes.
  - Congenital heart failure.
  - Cholinergic receptors.
4. Attempt any two. 16
- Emphysema.
  - Nephrotoxicity.
  - In vitro fertilization (IVF)
5. Write short notes on any four. 16
- Totipotency and Pluripotency.
  - Gout.
  - Phenyl Ketonuria.
  - Biochemistry of cancer cells.
  - Functional approach to bioluminescence.
  - Asthma.

III) Reproductive Physiology - II

1. a) Select and write the most appropriate answer from the given options. **8**

- i) The fertilised egg is called .....
  - a) diploid cell
  - b) ovum
  - c) Zygote
  - d) blastocyst
- ii) Implantation of blastocyst occurs on .....
  - a) 4<sup>th</sup> day
  - b) 5<sup>th</sup> day
  - c) 6<sup>th</sup> day
  - d) 7<sup>th</sup> day
- iii) The placenta in humans is .....
  - a) endothelial
  - b) hemochorial
  - c) epitheliochorial
  - d) syndesmochorial
- iv) Condom's diaphragms and cervical caps, sponge and spermicides are .....
  - a) oral contraceptives
  - b) barrier contraceptives
  - c) injected contraceptives
  - d) implant contraceptives
- v) A network of blood vessel that carry nutrients and oxygen to the foetus and fetal waste products to the mother is called .....
  - a) fetal blood stream
  - b) amniotic fluid
  - c) placenta
  - d) chorionic villi
- vi) Fertilization of ova in human takes place in .....
  - a) vagina
  - b) ovary
  - c) Uterus
  - d) Fallopian tube
- vii) Sterilization surgery in males is called as .....
  - a) IVF
  - b) Vasectomy
  - c) tubectomy
  - d) GIFT
- viii) The eggs in human beings are .....
  - a) alecithal
  - b) microlecithal
  - c) macrolecithal
  - d) mesolecithal

b) Define / Explain.

- i) Chemotaxis
- ii) Morulla
- iii) Umblical cord

**8**

iv) Syndesmochorial placenta.

2. a) Describe pseudopregnancy. 8  
 b) Describe the artificial insemination process. 8

OR

- a) Describe the abnormal conditions of female sterility.  
 b) Describe the remedies of population control.
3. a) Describe the histological structure of human placenta. 8  
 b) Sketch and label the diagrammatic representation of Uteroplacental circulation. 8

OR

- a) Describe the Morphological and physiological relationship between blastocyst and uterus during implantation.  
 b) Describe the hormones secreted by placenta.
4. a) Write an account on extra embryonic membrane of amnion. Add a note on its functions. 8  
 b) Describe the advantages and disadvantages of male condoms. 8
5. Write short notes on any two. 16  
 a) Fertilization of ovum.  
 b) Fetal membranes.  
 c) Enlist Equipments used in artificial insemination.

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Seat Number

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ZOO-101

**a) Structural & Functional Anatomy of Invertebrates,  
b) Biostatistics (New)  
(151101)**

P. Pages : 4

Time : Three Hours

Max. Marks : 80

## Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicate full marks.
6. Answer the two sections in two separate answerbooks.
7. Draw neat labelled diagrams wherever necessary.

## SECTION - I

## a) Structural &amp; Functional Anatomy of Invertebrates

1. a) Select and write the most appropriate answer from given options : 4
- i) The coelom which arises from larval enteron is called -----
    - a) Schizocoel
    - b) enterocoel
    - c) aberrant schizocoel
    - d) pseudocoel.
  - ii) Onychophora are the connecting links between -----
    - a) Nematoda & Annelida
    - b) Arthropoda & Mollusca
    - c) Annelida & Arthropoda
    - d) Mollusca & Echinodermata.
  - iii) Porpita is the colonial -----
    - a) Protozoan
    - b) insect
    - c) Sponge
    - d) coelenterate
  - iv) Which one of the following is the larva of true crab?
    - a) Zoea
    - b) Nauplius
    - c) Mysis
    - d) Alima.



- b) Explain the following : 4
- a) Bipinnaria
- b) Haemocyanin.
2. Describe the Phylogeny of Invertebrates. 8
3. Describe the Molluscan Larvae. 8

OR

Describe the tracheae in Arthropoda and add a note on gaseous exchange by tracheal system.

4. Write an account on Primitive Nervous System. 8

OR

Write an account on Nephridia.

5. Write notes on any two. 8
- a) Cercaria
- b) Amoeboid movement in Protozoa.
- c) Social behaviour in Insects.

**SECTION - II**  
**b) Biostatistics**

6. a) Choose the correct alternative. 4
- i) If the lower and upper limit of a class are 10 and 40 respectively, the midpoint of the class is
- |       |         |
|-------|---------|
| a) 25 | b) 12.5 |
| c) 15 | d) 30   |
- ii) If  $b_{yx}$  and  $b_{xy}$  are two regression coefficients, they have
- a) same sign
- b) opposite sign
- c) either same or opposite sign
- d) nothing can be said.

iii) If a constant 5 is added to each observation of a set, the mean is :

- a) increased by 5
- b) decreased by 5
- c) 5 times the original mean
- d) not affected.

iv) Rejecting  $H_0$  when it is true, leads to

- a) type I error
- b) type II error
- c) both type I and type II errors.
- d) None of the type of error.

b) Draw the ogive curves for the following frequency distribution : 4

Class :	150 - 155	155 - 160	160 - 165	165 - 170	170 - 175
Frequency :	2	17	29	21	1

7. A scientist reported that a sample of 10 male albino rats had iron content (ms/kg) under 10 different diets as given below : 8

18, 22, 28, 32, 90, 87, 83, 35, 25, 30

Find mean, median and standard deviation.

8. Explain the following terms : 8

- i) Null hypothesis
- ii) Critical region
- iii) Type II error
- iv) level & significance

OR

Explain t-test for testing a population mean.

9. Draw a scatter diagram for the following data and interpret it. 8

X :	1	3	5	8	10	12	15
Y :	2	6	10	16	20	24	30

OR

Students were given different drug treatments before revising for their examinations. Some were given a memory drug, some a placebo drug and some no treatment. The examination scores shown below for the three different groups.

Memory drug	Placebo	No treat
2	7	3
7	3	0
3	0	7
6	7	3
7	3	2

Carry out a analysis of variance to test the hypothesis that the treatments will have no different effects.

10. Write notes on **any two** of the following :

8

- Chi - square test for independence of attributes.
- Importance and uses of statistics.
- Analysis of Variance.

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Seat Number

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ZOO-101

**a) Structure & Function Invertebrates,  
b) Biochemistry (Old)  
(101)**

P. Pages : 3

Time : Three Hours

Max. Marks : 80

## Instructions to Candidates :

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4. All questions are compulsory.
5. Figure to the right indicate full marks.
6. Draw neat labelled diagram whenever necessary.
7. Answer the two sections in two separate answer books.

**SECTION - I****a) Structure and Functions in Invertebrates**

1. a) Select and write appropriate answer from the given options : 4
- i) Which is common between Earthworm, Leech and Centipede?
    - a) Presence of Malpighian tubules
    - b) Presence of ventral nerve cord
    - c) Absence of legs
    - d) They are hermaphrodite.
  - ii) ----- is pseudocoelomate animal.
 

a) Ascaris	b) Tape worm
c) Hydra	d) Pila
  - iii) Redia larva is one of the larval form of -----
 

a) Crustacea	b) Platyhelminthes
c) Insecta	d) Echinodermata.
  - iv) Locomotion in Euglena is performed by ----
 

a) Flagellum	b) Cilium
c) Pseudopodium	d) Podium.

b) Define / Explain :

4

i) Haemocyanin.

ii) Protostomia.

2. Describe the Nervous system in Annelida.

8

3. Give an account on the Larval forms of Mollusca.

8

OR

Comment on Ciliary and amoeboid movements in Protozoa.

4. Describe the phylogeny of Invertebrates.

8

OR

What is Coelom? How different types of Coelom formed in Metazoa?

5. Write short notes on any two :

8

a) Colonial life in sponge.

b) Diversity of Invertebrates.

c) Respiratory pigments.

**SECTION - II**  
**Biochemistry (old)**

6. a) Select most appropriate option of the following :

4

i) ----- serves as the cellular energy currency that links energy yielding reactions.

a) GTP

b) ATP

c) CTP

d) UTP

ii) pKa value(s) at 25°C are ----- for aspartic acid -----

a) 2

b) 3

c) 4

d) 5

iii) Riboflavin is a constituent of coenzyme -----

a) FAD

b) NAD

c) ATP

d) NADH

- iv) Select odd man out with respect to presence of OH group.  
 a) Serine, ethanolamine, choline  
 b) Ethanolamine, choline, glycerol  
 c) Choline, glycerol, inositol.  
 d) Choline, glycerol, glycine.

- b) Define / Explain : 4  
 i) Active site of enzyme.  
 ii) Phospho protein.  
 iii) Disulphide bond / bridge  
 iv) Homopolysaccharide

7. What is pH? state Henderson Hasselbalch equation. Give importance of it. 8

OR

Explain various buffer systems exist in human body. Give their roles in Homeostasis.

8. What is enzyme? Classify them with suitable example. Give biological role of hydrolases in digestion. 8

OR

What are proteins? Give I & II structure of protein.

9. What is glycolysis? Describe various steps of glycolysis. Give importance of it with respect to energy production. 8

OR

What are phospholipids? How are they involved in membrane integrity / stability.

10. Write note on any two. 8

- a) Tertiary structure of RNA.  
 b) Watson Crick DNA model.  
 c) Vitamin C.  
 d) Law of thermodynamics.

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Seat Number

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ZOO-201

**A) Structural and Functional Anatomy of Vertebrates****B) Immunology****(New)**

P. Pages : 3

Time : Three Hours

Max. Marks : 80

**Instructions to Candidates :**

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3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicate full marks.
6. Answer the two sections in two separate answers book.
7. Draw neat labelled diagrams wherever necessary.

**SECTION - I****A) Structural and Functional Anatomy of Vertebrates**

1. a) Select and write the most appropriate answer. 4

- i) Sexual phase of Salpa is called.....
  - a) Oozoid
  - b) Blastozoid
  - c) Gastrozoid
  - d) Trophozoid
- ii) Which one of the following is Lung fish?
  - a) Salmon
  - b) Remora
  - c) Exocoetus
  - d) Protopterus
- iii) Atlas is the.....vertebra.
  - a) lumber
  - b) sacral
  - c) cervical
  - d) thoracic
- iv) Superclass Tetrapoda includes.....
  - a) Amphibia, Reptilia, Aves & Mammalia
  - b) Bony fishes, Amphibia, Aves & Reptiles.
  - c) Fishes, Amphibia, Reptilia & Mammalia
  - d) None of these.

- b) v) Define / Explain 4
- i) Endolymph
- ii) Protostomia
2. Describe the morphology of Cephalochordate with respect to Amphioxus. 8
3. Describe the Girdles in Rabbit. 8

OR

- Describe the Joint in Rabbit.
4. Explain the adaptive radiations in Mammalia. 8

OR

- Give the comparative account of ANS in Amphibia and Mammalia.
5. Write notes on any two: 8
- i) Flight - less birds.
- ii) Eye in Reptilia.
- iii) Olfactory organs in Chondrichthyes.

**SECTION - II**  
**B) Immunology**

6. a) Select and write the most appropriate answer from the given options. 4
- i) The antigen binding site on a antibody is called.
- a) antitope b) epitope
- c) paratope d) endotope
- ii) .....is the first immunoglobulin class produced in a primary response of an antigen.
- a) IgA b) IgD
- c) IgG d) IgM





Seat Number

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ZOO-102

**a) Structure & Function Vertebrates b) Biostatistics  
(Old) (102)**

P. Pages : 3

Time : Three Hours

Max. Marks : 80

**Instructions to Candidates :**

1. Do not write anything on question paper except Seat No.
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3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicate full marks.
6. Answer the two sections in two separate answer books.
7. Draw neat labelled diagrams wherever necessary.
8. Use of statistical tables and calculator is allowed.

**SECTION - I**

**a) Structure & Function Vertebrates**

1. a) Select and write the most appropriate answer from the given options. 4
- i) In Eultheria which of the following mammals is include.
 

a) Man	b) Kangaroo
c) Platypus	d) Ant eater
  - ii) In which type of animal have long small intestine.
 

a) Herbevores	b) Cornivores
c) Omnivores	d) None of above
  - iii) One of the Major Characteristic of bony fish is.....
 

a) Air sac	b) Air bladder
c) Gall bladder	d) Spongy lung
  - iv) R.B.C. of frog is.....
 

a) Multinuçleated	b) Enuçleated
c) Nuçleated	d) None of these
- b) Define / Explain/ Sketch any two. 4
- i) Deuterostomes.
  - ii) Adaptive radiations.
  - iii) Photoreceptors.
  - iv) Sketch and label ear of mammals.

2. Describe Autonomous nerves system of mammals. 8
3. Write comparative account of eye of bird and mammals. 8

OR

Describe joints in Rabbit.

4. Define adaptive radiation? Describe comparative account of adaptive radiation of Amphibian and Reptiles. 8

OR

What is organisation of protochordates? Describe cephalochordata and Urochordata with examples.

5. Write short notes on any two. 8
- a) Ear of Reptile.
- b) Phylogeny of chordates.
- c) Sympathetic nervous system of Amphibian.

**SECTION - II**  
**b) Biostatistics**

6. Choose the correct alternative. 4
- i) The mid-point of the class intervals 34.5 - 44.5 is
- |         |         |
|---------|---------|
| a) 41.5 | b) 39   |
| c) 39.5 | d) 40.5 |
- ii) Median for arranged data is
- |                                 |
|---------------------------------|
| a) mean of first and last value |
| b) most frequent value          |
| c) least frequent value         |
| d) middle most value            |
- iii) Rejecting  $H_0$  when it is true leads to.
- |                                   |
|-----------------------------------|
| a) type I error                   |
| b) type II error                  |
| c) both type I and type II errors |
| d) none of the type of error      |

- iv) The Karl - Pearson's coefficient of correlation between X and Y is.
- independent of change of origin
  - independent of change of scale
  - independent of change of origin and scale
  - none of the above

b) State the properties of normal distribution. 4

7. If  $n = 10$ ,  $\Sigma X = 120$ ,  $\Sigma X^2 = 1530$ , find 8

- mean,
- Standard deviation and
- Coefficient of variation.

8. Let  $X \sim N(\mu = 40, \sigma^2 = 100)$ . Find from the normal table, the following probabilities. 8

- $P(X \leq 40)$
- $P(30 \leq X \leq 50)$
- $P(X \geq 60)$

OR

A certain brand of tyre has the following frequency distribution for its life ( in thousand kms). 8

Life :	15-20	20-25	25-30	30-35	35-40	40-45
No of tyres	5	8	13	20	14	10

Draw less than and more than ogive curve.

9. Find correlation coefficient between X and Y, given that 8  
 $n = 25$ ,  $\Sigma X = 75$ ,  $\Sigma Y = 100$ ,  $\Sigma X^2 = 250$ ,  $\Sigma Y^2 = 500$ ,  $\Sigma XY = 325$

OR

A random sample of 100 flower stems has an average length of 10cm. Can this be regarded as a sample from a large population with mean 10.2 cm and S. D. of 2 cm? Use 5% l.o.s. 8

10. Write notes on any two. 8

- ANOVA
- F - test
- Type I and type II errors.

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Seat Number

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ZOO-402

**a) Systematic and Evolutionary Biology,  
b) Animal Biotechnology (402)**

P. Pages :3

Time : Three Hours

Max. Marks : 80

## Instructions to Candidates :

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2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicate full marks.
6. Attempt two sections in two separate answer book.
7. Draw neat labelled diagrams wherever necessary.

## SECTION - I

## a) Systematic and Evolutionary Biology

1. a) Select and write most appropriate answer from the given option. 4

- i) The science of naming and classifying organism is.
 

a) Binomial nomenclature	b) Taxonomy
c) Class	d) Order
- ii) The basic biological unit in the Linnaean system of classification is the.
 

a) Kingdom	b) Genus
c) Family	d) Species
- iii) Human being belongs to the species of.....
 

a) Homo erectus	b) Homo habilis
c) Homo sapiens	d) Hominidae
- iv) Binomial nomenclature contains which taxonomic group?
 

a) Domain and kingdom	b) Phylum and family
c) Class and order	d) Genus and species

b) Define / Explain

- |                           |                       |
|---------------------------|-----------------------|
| a) Hierarchical taxonomy. | b) Arthropod parasite |
|---------------------------|-----------------------|

4

2. Describe the biological nomenclature. 8

OR

Describe the colonial and multicellular forms level of structural organisation.

3. Describe the geographic origin and migration of species of Indian subcontinent. 8

OR

Describe the common parasite and pathogens of domestic animals.

4. Comment on common Indian mammals. 8

5. Write note on **any two** of the following. 8

- a) Common Indian birds.
- b) Concept of species.
- c) Unicellular level of structural organisation.

**SECTION - II**

**b) Animal Biotechnology**

6. a) i) Hela cell is a type of..... 4
- a) Human cell line
  - b) Animal cell
  - c) Plant cell line
  - d) None of these
- ii) Genetic engineering involves.....
- a) Recombinant DNA
  - b) Recombinant Proteins
  - c) E - Coli
  - d) All of these
- iii) Polio vaccines contains.....
- a) Live bacteria
  - b) Party killed viruses
  - c) Both a & b
  - d) Proteins
- iv) Apoptosis is related to.....
- a) Cell regeneration
  - b) Cell death
  - c) Cell organization
  - d) None of these

- b) Define / Explain 4
- a) Media for culture of cells.
  - b) Measurement as cell death.

2. Describe conventional methods of animal improvement. Add a note on in vitro fertilization. 8

3. Explain primary and established cell line culture. 8

OR

Describe role of recombinant DNA technique in production of plasma, red cells and platelets.

4. Give an account of somatic cell cloning and embryo sexing. 8

OR

Define animal cell/tissue culture. Enlist merits and demerits of animal cell culture.

5. Write short notes on any two. 8

a) Media sterilization equipment's

b) interferons and interleukins.

c) Cryopreservation

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Seat Number

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ZOO-302

**a) Enzymology,  
b) System Physiology-Animal  
(302)**

P. Pages : 3

Time : Three Hours

Max. Marks : 80

## Instructions to Candidates :

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7. Draw neat labelled diagrams wherever necessary.

## SECTION – I

## a) Enzymology

1. a) Select and write the most appropriate answer from given options : 4
  - i) In ..... the total LDH levels may rise 5-10 times the normal.
 

a) obstructive jaundice	b) cirrhosis
c) pulmonary embolism	d) myocardial infarction
  - ii) Quaternary structure of proteins is not stabilized by ..... bonds.
 

a) hydrogen	b) covalent
c) hydrophobic	d) electrostatic
  - iii) The adhesion of a protein to the surface of a carrier is known as.....
 

a) absorption	b) diffusion
c) adsorption	d) active transport
  - iv) ..... do not cause any elevation of the serum acid phosphatase level.
 

a) Benign prostatic hyperplasia
b) Sarcoma
c) Prostatic carcinoma
d) Metastasis



- b) Define / Explain. 4
- i) Chymotrypsin.
- ii) Uncompetitive inhibition.
2. Describe the primary and secondary structures of proteins. 8
3. How the study of glucose-6-phosphate-de-hydrogenase is useful in medical diagnosis ? 8

OR

Give the determination of  $K_m$  and  $V_{max}$ .

4. What is allosterism ? Describe the concerted symmetry model. 8

OR

Describe the covalent attachment techniques for enzyme immobilization.

5. Write notes on any two. 8
- a) Radioassays.
- b) Enzyme therapy for Jaundice.
- c) Isotope labelling.

## SECTION - II

## b) System Physiology Animal

6. a) Select appropriate answer from given options : 4
- i) A healthy adult male individual contains about ..... liters of blood.
- |        |        |
|--------|--------|
| a) 3-4 | b) 5-6 |
| c) 2-3 | d) 1-2 |
- ii) The tidal volume in a normal man at rest is about.
- |          |          |
|----------|----------|
| a) 0.5 L | b) 1.2 L |
| c) 2.5 L | d) 4.9 L |

- iii) Which of the following is not a function of the liver ?  
 a) Production of bile                      b) detoxification of drugs  
 c) Storage of glucose                      d) Storage of Vitamin C

- iv) During systemic circulation, blood leaves the  
 a) right ventricle and moves to the lungs  
 b) left ventricle and goes directly to the aorta  
 c) right atrium and goes directly to the lungs  
 d) lungs and moves to the left atrium

b) Define / Explain. 4

i) ECG.

ii) Action potential.

7. Describe the mechanism of transport of gases (O<sub>2</sub> and CO<sub>2</sub>) in mammals. 8

OR

Explain the process of urine formation in vertebrates.

8. Describe the comparative anatomy of vertebrates heart. 8

OR

Explain the mechanism of digestion and absorption of food material.

9. Describe the details of haemopoiesis. 8

OR

Explain the neuroendocrine regulation in vertebrates.

10. Write notes on any two. 8

i) Cardiac cycle.

ii) Regulation of water balance.

iii) Types of blood capscles.

iv) Role of hormone in reproduction.

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Seat Number

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ZOO-202

**A) Biochemistry, B) Enzymology**  
**(New) (151202)**

P. Pages : 3

Time : Three Hours

Max. Marks : 80

## Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Answer the two sections in two separate answer books.
5. Draw neat labelled diagram wherever necessary.
6. Figures to the right indicate full marks.

**a) Biochemistry**

1. a) Select most appropriate answer of the following. 4
  - i) Some enzymes are named by their function.
 

a) Pepsin	b) ptylin
c) reductase	d) trypsin
  - ii) Haemoglobin take up the number of molecules of oxygen.
 

a) 1	b) 2
c) 4	d) 6
  - iii) Glucogenolysis takes place in
 

a) Kidneys	b) Muscles
c) Liver	d) Brain
  - iv) Vitamin D2 is also said to be.
 

a) Activated ergosterol	b) Ergocalciferol
c) Viosterol	d) All the above
- b) Explain / define. 4
  - i) Oxidative phosphorylation.
  - ii) Enzyme inhibitor.

2. What are buffers ? How do you derive Handerson-Hasselblach equation ? 8

OR

Define pH. Name the important buffer systems of the body. Explain how they work?

3. Define carbohydrate. Classify them. Describe biological importance of hetero polysaccharides. 8

OR

What are enzymes ? Classify them. Give suitable example of each. Describe any four properties of enzyme.

4. Describe biological function of lipid. 8

OR

Describe tertiary and quaternary structure of protein.

5. Write notes on any two. 8

- a) Z-DNA.
- b) t-RNA.
- c) Ramchandran Plot.
- d) Basic amino acids.

### b) Enzymology

6. a) Select appropriate option from the given option : 4
- i) The degree of inhibition for non-competitive inhibition of an enzyme catalysed reaction ?
    - a) increase with increase substrate concentration
    - b) reaches with increase in substrate concentration
    - c) reaches a maxima with increase in substrate concentration and the decrease
    - d) decreases with increase in substrate concentration.

- ii) Which one of the following techniques is not ideal for immobilised cell free enzymes ?  
 a) physical entrapment by encapsulation  
 b) physical bonding by flocculation  
 c) covalent chemical bonding by cross linking the precipitate  
 d) covalent surface bonding to surface carriers
- iii) Most industrial enzymes are obtained from –  
 a) plants  
 b) microbes  
 c) insects  
 d) animal tissues
- iv) Enzymes having slightly different molecular structures but performing identical activity are –  
 a) holoenzymes  
 b) apoenzymes  
 c) isoenzymes  
 d) coenzymes

b) Define / Explain : 4

i) Immobilised enzyme.

ii) Enzyme purification.

7. Explain Briggs-Haldane hypothesis. 8

8. What is enzyme therapy ? Add a note on neonatal jaundice. 8

OR

Describe uncompetitive inhibition.

9. Describe effects of substrate concentration on initial velocity. 8

OR

Write an account on deviations from hyperbolic Michaelis-Menten behaviour.

10 Write short notes on any two. 8

i) Diagnostic significance of Alkaline phosphatase.

ii) Secondary structure of Enzyme.

iii) Allosteric activation.

iv) Cancer.

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Seat Number

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ZOO - 202

**a) Advances in Molecular Biology, b) Genetics  
(Old) (202)**

P. Pages : 3

Time : Three Hours

Max. Marks : 80

## Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicate full marks.
6. Attempt two sections in two separate answer books.
7. Draw neat labelled diagrams wherever necessary.

## SECTION - I

## a) Advances in Molecular biology

1. a) Select and write the most appropriate answer from the given options: 4
  - i) Eukaryotic promoters consist of sites located 100 to 200 base pairs upstream called .....
 

a) Enhancers	b) Silencers
c) Transcription factors	d) Promoter-proximal elements
  - ii) Okazaki fragment also called .....
 

a) leading strand	b) lagging strand
c) helical strand	d) replication fork
  - iii) Binding of RNA polymerase to .....
 

a) Initiation, Elongation, Termination and Promotor
b) Elongation, Promotor, Initiation and Termination
c) Promotor, Initiation, Elongation and Termination
d) Initiation, Promotor, Elongation and Termination.
  - iv) The process of using information in RNA to make protein is called -
 

a) Transcription	b) Reverse transcription
c) Translotion	d) Inverse transcription

- b) Define / Explain the following. 4
- i) Central dogma.
- ii) Capping.
2. Describe the two classical experiments which demonstrated the semiconservative mode of DNA replication. 8
3. Describe the structure and functions of RNA polymerases II known in eukaryotes and describe the differences between DNA polymerase and RNA polymerase. 8

OR

Give short account of the mechanism of protein synthesis : Compare it with prokaryotes and Eukaryotes.

4. Describe control of gene expression at transcription in prokaryotes. 8

OR

Explain the various steps of involved in the RNA synthesis in eukaryotes. Elaborate the specific role of two different enzymes in this process.

5. Write notes on any two. 8
- a) mRNA splicing.
- b) Ribozymes.
- c) Peptidyl transferase.

**SECTION – II**  
**b) Genetics**

6. a) Select and write the most appropriate answer from given options : 4
- i) In a cross between two heterozygotes (Aq), the F<sub>2</sub> generation will be.....
- a) in the ratio 1:1 homozygous to heterozygous
- b) In the ratio 1:3 heterozygous to homozygous
- c) All heterozygous
- d) In the ratio 1:3 homozygous to heterozygous





Seat Number

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ZOO-103

**a) Ecology b) Animal Behaviour**  
**(New) (151103)**

P. Pages : 4

Time : Three Hours

Max. Marks : 80

## Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicate full marks.
6. Answer two sections in two separate answer books.
7. Draw neat labelled diagrams wherever necessary.

**SECTION – I****a) Ecology**

1. a) Select and write the most appropriate answer from the given options **4**
- i) Rate of energy storage at consumer level is known as.....
    - a) net community productivity
    - b) net primary productivity
    - c) secondary productivity
    - d) gross primary productivity
  - ii) Which of the following is not recycled in an ecosystem ?
 

a) water	b) carbon
c) energy	d) nitrogen
  - iii) Population of individuals of a species having genetically fixed variations but are interfertile and placed under same taxonomic species is known as .....
 

a) ecads	b) ecotype
c) endemic species	d) key store species

- iv) What is the defining feature of exponential growth ?  
 a) it lasts indefinitely  
 b) the growth rate is constant  
 c) the growth rate increase rapidly overtime  
 d) the growth rate is very high
- b) Define / Explain / Sketch. 4
- i) Niche overlap.  
 ii) Food web.
2. What is metapopulation ? Explain population growth curves. 8
3. What is symbiosis ? Give a broad outline of various types of positive interactions among organisms. 8

OR

Define ecosystem. Give an account of the structure and function of an ecosystem.

4. Describe the nitrogen cycle with suitable example. 8

OR

Write the difference between :

- a) Primary and Secondary succession. and  
 b) Autogenic and allogenic succession.
5. Write short notes on **any two** of the following. 8
- i) Age structured population.  
 ii) Changes involved in succession.  
 iii) Primary production.

**SECTION – II**  
**b) Animal Behaviour**

6. a) Select and write appropriate answer from the given options : 4
- i) Learning is related to .....
- a) Cerebrum b) Medulla  
c) Cerebellum d) Hypothalamus
- ii) The biologist who discovered the meaning of the dances performed by honey bee forager was .....
- a) Karl Von Frisch b) Niko Tinbergen  
c) Konard Lorenz d) Ion Pavlov
- iii) The term aggression is used for .....
- a) Thinking b) Attacking  
c) Drinking d) Grouping
- iv) Amplexus in frogs and toads is an example of .....
- a) vision b) learning  
c) communication d) none of above
- b) Define / Explain : 4
- i) Freezing.
- ii) Camouflage.
7. a) What is Orientation ? Explain meteorological cues. 6
- b) Define – Social carnivore. 2
8. Give an account of forms of learning. 8

OR

What is Dominance ? Explain Dominance Hierarchies.

9. Define communication ? Explain channels of communication. 8

OR

What is Territoriality ? Describe territorial behaviour.

10. Write short notes on any two.

8

- a) Concealment.
- b) Anti predator behaviour.
- c) Factors affecting aggression.

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Seat Number

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ZOO-303

**a) Applied Biology**  
**b) Skill in Scientific Communication and Writing**  
**a Research Report**  
**(303)**

P. Pages : 4

Time : Three Hours

Max. Marks : 80

## Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Answer the two section in two separate answer books.
6. Figure to the right indicate full marks.
7. Draw neat labelled diagrams wherever necessary.

## SECTION - I

## a) Applied Biology

1. a) Select and write appropriate from the given options : 4
- i) Which of the following organelles is related with genetic engineering?
- |                 |              |
|-----------------|--------------|
| a) Mitochondria | b) Plasmids  |
| c) Golgi bodies | d) Lysosomes |
- ii) First cloned animal.
- |                |                |
|----------------|----------------|
| a) Dolly sheep | b) Polly Sheep |
| c) Molly sheep | d) Dog         |

- iii) Which one of the following is the most suitable medium for culture of Drosophila Melanogaster.
- a) Low dung                      b) Ripe banana  
c) Agar                              d) Moist bread
- iv) Use of insect to detect crime is called as.....
- a) Forensic entomology      b) Forensic pathology  
c) Forensic insectology      d) Forensic herpetology
- b) Define / Explain : 4
- i) Genomics  
ii) Biodiversity
2. What is culture ? Describe the tissue and cell culture methods for animals. 8
3. Give the list of laboratory facilities for tissue culture in animals including the facilities of space and equipment's. 8
- OR**
- How can transgenic plants produced and used for phytoremediation?
4. Write short notes on **any two**. 8
- a) Citric acid fermentation.  
b) Biosensors.  
c) Bioremediation.
5. a) Genetic methods of diagnostic procedure for VDRL and WIDAL. 6  
b) Define - Gene therapy. 2

## SECTION - II

b) Skill in Scientific Communication and Writing  
a Research Report

6. a) Select appropriate answer of following options. 4
- a) Thinking of feet skill in handing questions and answers means.
- i) Standing on feet
  - ii) Standing & thinking simultaneously
  - iii) Answering the questions camly and confidently
  - iv) Standing and seeking help of others
- b) The presentation style that applies to corporate executives is the.
- i) Cool zone
  - ii) Hot zone
  - iii) Drill zone
  - iv) ii + iii
- c) A monosyllabic word with one vowel letter does not end in -c but requires -ck. Choose and write appropriate word.
- i) Pick
  - ii) Back
  - iii) ----
  - iv) Luck
- d) Clarify in written communication is achieved by using.....
- i) Exact words
  - ii) Editing and correction
  - iii) Meaning full words
  - iv) Complicated words
- b) Explain / Define. 4
- i) Nature and scope of communication
  - ii) Phonetics.

7. a) Summarise use of visual aids in effective communication. 8  
b) Main body of the scientific report.

OR

What is communication ? Comment on objectives and effective communication.

8. Answer any two. 8  
a) Global communication.  
b) Final evaluation of research report.  
c) Importance of writing review of literature in thesis or dissertation.

9. Give an account on techniques to improve communication in brief. 8

OR

What is listening ? Comment on characteristic and effective listening.

10. Write short notes on any two. 8  
a) Vocabulary.  
b) Analysis of data.  
c) Abstract.  
d) Group discussion.

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Seat Number

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ZOO-203

**A) Developmental Biology, B) Genetics  
(New) (151203)**

P. Pages : 3

Time : Three Hours

Max. Marks : 80

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicate full marks.
6. Attempt the **two** sections in two separate answer books.
7. Draw neat labelled diagrams wherever necessary.

**SECTION - I****A) Developmental Biology**

1. a) Select and write the most appropriate answer from the given options : 4
- i) The concept of competence was first introduced in the embryological literature by.
- a) Lort rup, 1974                      b) Need ham, 1942
- c) Berril, 1971                        d) Waddington, 1932
- ii) According to Balinsky, 1970, the..... is the production of unique protein patterns.
- a) Specification                      b) Cell growth
- c) Cell aggregation                  d) Differentiation
- iii) The Oxford English Dictionary defines ..... as an engagement or involvement that restricts freedom of action.
- a) Morphogenesis                      b) Organogenesis
- c) Development                        d) Commitment





Seat Number

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ZOO-403

**a) Methods in Biology,  
b) Fundamental Processes and tools in Biology  
(403)**

P. Pages : 3

Time : Three Hours

Max. Marks : 80

## Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicate full marks.
6. Attempt two sections in two separate answer books.
7. Draw neat labelled diagrams wherever necessary.

## SECTION – I

## a) Methods in Biology

1. a) Select and write appropriate answer :

4

- i) ..... is a novel DNA finger printing technique.
 

a) RAPD	b) RFLP
c) AFLP	d) IEF
- ii) Western blot is used for transfer of .....
 

a) Proteins	b) DNA
c) RNA	d) Carbohydrates
- iii) ..... is used to separate out cell sub populations from a mixed population.
 

a) RIA	b) Flow cytoflurimetry
c) PCR	d) RAPD
- iv) ..... enzyme survives prolonged exposure to temperature above 95°C.
 

a) urease	b) DNA ligase
c) Tag DNA polymerase	d) RNA polymerase

- b) Define / Explain : 4
- i) Remote sensing.
- ii) Plasmid.
2. Describe the methods for analysis of DNA. 8
3. Describe FISH technique. 8

OR

Describe the methods of DNA sequencing.

4. Describe the methods of estimating population density of organisms. 8

OR

What is genomic library ? How is it constructed.

5. Write notes on any two. 8
- a) Immune fluorescence microscopy.
- b) Cosmids.
- c) IEF.

### SECTION - II

#### b) Fundamental Processes and Tools in Biology

6. a) Select most appropriate option of the following. 4
- i) Light microscopes have resolution limit of about ..... micrometers ( $\mu\text{M}$ )
- |                      |                       |
|----------------------|-----------------------|
| a) 0.2 $\mu\text{m}$ | b) 1.0 $\mu\text{m}$  |
| c) 0.8 $\mu\text{m}$ | d) 10.0 $\mu\text{m}$ |
- ii) Full sequence / reference data of enzyme is given by .....
- |           |          |
|-----------|----------|
| a) FRENDA | b) RENDA |
| c) AMEND  | d) KENDA |
- iii) EEG is related to .....
- |                   |                      |
|-------------------|----------------------|
| a) Heart function | b) Muscle function   |
| c) Brain activity | d) Visceral function |

- iv) Breast cancer has marker .....
- |            |         |
|------------|---------|
| a) BCR-ABL | b) CEA  |
| c) PSA     | d) EGFR |

b) Define / Explain any two. 4

- |        |         |
|--------|---------|
| a) MRI | b) fMRI |
| c) PET | d) CT   |

7. Describe various biomarkers used to detect cancer. 8

OR

How do you determine molecular weight of protein / enzyme. Explain any one method.

8. Enlist various methods of imaging ? Explain detection of antigen antibody reaction. 8

OR

Discuss the different fixation and staining techniques for electron microscopy.

9. Web application in proteomics and Genomics. 8

OR

- a) Write various isotopes used in biological research.
- b) Principle of UV-VIS spectrophotometer.

10. Write notes on any two. 8

- a) Visualization of cells by light microscopy.
- b) Freeze etch and freeze fracture method.
- c) Metastasis.

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Seat Number

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ZOO-103

**a) Ecology b) Animal Behaviour**  
**(New) (151103)**

P. Pages : 4

Time : Three Hours

Max. Marks : 80

## Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicate full marks.
6. Answer two sections in two separate answer books.
7. Draw neat labelled diagrams wherever necessary.

**SECTION - I****a) Ecology**

1. a) Select and write the most appropriate answer from the given options **4**
- i) Rate of energy storage at consumer level is known as.....
    - a) net community productivity
    - b) net primary productivity
    - c) secondary productivity
    - d) gross primary productivity
  - ii) Which of the following is not recycled in an ecosystem ?
 

a) water	b) carbon
c) energy	d) nitrogen
  - iii) Population of individuals of a species having genetically fixed variations but are interfertile and placed under same taxonomic species is known as .....
 

a) ecads	b) ecotype
c) endemic species	d) key store species

- iv) What is the defining feature of exponential growth ?  
 a) it lasts indefinitely  
 b) the growth rate is constant  
 c) the growth rate increase rapidly overtime  
 d) the growth rate is very high
- b) Define / Explain / Sketch. 4
- i) Niche overlap.
- ii) Food web.
2. What is metapopulation ? Explain population growth curves. 8
3. What is symbiosis ? Give a broad outline of various types of positive interactions among organisms. 8

OR

Define ecosystem. Give an account of the structure and function of an ecosystem.

4. Describe the nitrogen cycle with suitable example. 8

OR

Write the difference between :

- a) Primary and Secondary succession. and
- b) Autogenic and allogenic succession.
5. Write short notes on any two of the following. 8
- i) Age structured population.
- ii) Changes involved in succession.
- iii) Primary production.



**SECTION – II**  
**b) Animal Behaviour**

6. a) Select and write appropriate answer from the given options : 4
- i) Learning is related to .....
- |               |                 |
|---------------|-----------------|
| a) Cerebrum   | b) Medulla      |
| c) Cerebellum | d) Hypothalamus |
- ii) The biologist who discovered the meaning of the dances performed by honey bee forager was .....
- |                    |                   |
|--------------------|-------------------|
| a) Karl Von Frisch | b) Niko Tinbergen |
| c) Konard Lorenz   | d) Ion Pavlov     |
- iii) The term aggression is used for .....
- |             |              |
|-------------|--------------|
| a) Thinking | b) Attacking |
| c) Drinking | d) Grouping  |
- iv) Amplexus in frogs and toads is an example of .....
- |                  |                  |
|------------------|------------------|
| a) vision        | b) learning      |
| c) communication | d) none of above |

- b) Define / Explain : 4
- i) Freezing.
- ii) Camouflage.

7. a) What is Orientation ? Explain meteorological cues. 6
- b) Define – Social carnivore. 2
8. Give an account of forms of learning. 8

OR

What is Dominance ? Explain Dominance Hierarchies.

9. Define communication ? Explain channels of communication. 8

OR

What is Territoriality ? Describe territorial behaviour.

10. Write short notes on any two.

8

- a) Concealment.
- b) Anti predator behaviour.
- c) Factors affecting aggression.

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