

P - (1+1+1)H/10

2010

## ZOOLOGY (Honours)

FIRST PAPER

Total Marks : 90

Time : Four Hours

*The figures in the margin indicate full marks.*

### Group - A

1. Answer any *four* of the following : 2×4=8
  - (a) What is amphimixis ?
  - (b) How a gastrozoid differs from a genozoid ?
  - (c) Why is the living *Ascaris* not digested in the human intestine ?
  - (d) What is coelomoduct ?
  - (e) What is coxal gland ?
  - (f) Define torsion.
2. Answer any *four* of the following : 4×4=16
  - (a) Write about the significance of conjugation.
  - (b) Write a note on significance of metamerism.
  - (c) Write a note on cell types in Porifera.
  - (d) Write in brief about the locomotion in *Hydra*.

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2. (e) Why are echinoderms considered more closely related to chordates.
- (f) State the parasitic adaptations of *Fasciola* sp.
3. Answer any two of the following :  $10 \frac{1}{2} \times 2 = 21$
- (a) Classify phylum mollusca upto sub class with suitable reasons and examples.
- (b) Give a brief account of canal system of *Scaph*. Write on its significance.
- (c) Discuss in detail the structure of an insect eye emphasizing on the mechanism of image formation.
- (d) Describe the life history of *Fasciola hepatica*. Discuss briefly on its control measures.

**Group - B**

4. Answer any four of the following :  $2 \times 4 = 8$
- (a) What is filter feeding ? Cite example.
- (b) What is scroll valve ?
- (c) Mention two effects of neurotoxic venom.
- (d) What is pecten ? State its function.
- (e) What is blubber ?
- (f) What is ductus caroticus ?
5. Answer any four of the following :  $4 \times 4 = 16$
- (a) Explain neoteny and paedogenesis.

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- (b) Write a short note on endostyle.
- (c) Describe the structure of accessory respiratory organ of *clarius* sp.
- (d) Give a comparative account between horn and antler.
- (e) Write a note on echolocation in bat.
- (f) Write a short note on ammocoete larva.
6. Answer any two of the following :  $10 \frac{1}{2} \times 2 = 21$
- (a) Classify living reptiles upto sub-order level with suitable reasons and examples.
- (b) Compare briefly the structure of aortic arches in vertebrates.
- (c) Describe about the aerodynamics in the flight mechanism of birds.
- (d) Give an account of parental care in amphibia.

P - II (1+1+1)H/10

2010

**ZOOLOGY (Honours)**

THIRD PAPER

Full Marks : 90

Time : Four Hours

*The figures in the margin indicate full marks.*

**Group - A**

**(Cell Biology and Histology)**

1. Answer any *four* questions : 2×4=8
  - (a) What is tubulin ?
  - (b) Give the sources of Haematoxylin and Carmine.
  - (c) Define fixative.
  - (d) What is proto-oncogene ?
  - (e) What is Philadelphia chromosome ?
  - (f) Define mordant.
  
2. Answer any *four* questions : 4×4=16
  - (a) Write a note on primary cell culture.
  - (b) Explain the purpose of metal shadowing in relation to microscopy.
  - (c) Define continuous and discontinuous cellular secretion.

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- (d) Why cytoskeleton is stated to be dynamic ?
  - (e) What is microtomy ?
  - (f) Differentiate dye and stain.

3. Answer any *two* questions :  $10\frac{1}{2} \times 2 = 21$

(a) Describe the structural details of an electron microscope. Discuss its working principles.

$8 + 2\frac{1}{2}$

(b) What do you understand by cancer ? Discuss the properties and behaviour of a cancer cell.

$2\frac{1}{2} + 8$

(c) Write the mechanism of ATP synthesis by ATP synthase in the mitochondrial inner membrane.

$10\frac{1}{2}$

(d) Outline the process of  $Ca^{2+}$  signaling pathway that involves calmodulin.

$10\frac{1}{2}$

**Group - B**

**(Genetics and Immunology)**

4. Answer any *four* questions :  $2 \times 4 = 8$

- (a) What is hemizygosity ?
- (b) What is non-sense mutation ?
- (c) What is holandric trait ?
- (d) Differentiate between triploidy and trisomy ?

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(e) Write full forms of DTP and BCG.

(f) What is  $F_c$  region ?

5. Answer any *four* questions :  $4 \times 4 = 16$

(a) Prove that crossing over occurs at four stranded stage.

(b) What are the characteristics of X-linked recessive inheritance ?

(c) What is a gynandromorph? Add a note on mosaicism.

(d) What is a macrophage? State its role in immune system.

(e) Explain Clonal selection hypothesis of immune response.

(f) Write a note on functional cytokines.

6. Answer any *two* questions :  $10\frac{1}{2} \times 2 = 21$

(a) Discuss the cytological basis of crossing over. Give one experimental evidence to show that crossing over occur due to breakage and reunion.

$10\frac{1}{2}$

(b) Singed bristles (Sn), Cross veinless wings (cv) and vermilion eye (v) colour are due to recessive mutant alleles of three sex-linked genes in *Drosophila*. When a female heterozygous for

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each of the three genes was test crossed with a singed, cross veinless, vermilion male. The following progeny were obtained :

Singed, Cross veinless, Vermilion—

Crossveinless, Vermilion— 39

Vermilion— 24

Crossveinless— 61

Singed, Cross veinless— 33

Singed, Vermilion— 6

Singed— 410

Wild type— 3

What is the correct order of the three genes on the chromosome ? What are the genetic map distances between these genes ? What is the coefficient of coincidence ?  $3\frac{1}{2}+4+3$

(c) What do you mean by B-cell activation ? Prove that both T-cell and B-cell are responsible for immune response. Describe the role of  $T_H$  cell in the activation of B cell.  $2+3+5\frac{1}{2}$

(d) Explain the principle of vaccination. Explain active and passive immunization with example.  $3+7\frac{1}{2}$

P-II (1+1+1)H/10

2010

### ZOOLOGY (Honours)

FOURTH PAPER

Total Marks : 90

Time : Four Hours

*The figures in the margin indicate full marks.*

#### Group - A

#### (Ecology)

1. Answer any four questions :  $2 \times 4 = 8$

- Define ecosystem.
- What is edge-effect ?
- What is Heliotherm ?
- What is lithosere ?
- Define commensalism.
- What is facultative parasite ?

2. Answer any four questions :  $4 \times 4 = 16$

- Distinguish between grazing and detritus food chain.
- Explain Bergman's principle with appropriate examples.
- State the characteristics of euphotic, aphotic and disphotic zone in relation to animal distribution.

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- (d) Explain Lindemann's ten percent rule regarding energy-flow in an ecosystem.
- (e) Describe the biological characters of Tundra biome.
- (f) Explain predation and forage ratio.
3. Answer any *two* questions :  $10\frac{1}{2} \times 2 = 21$
- (a) Explain prey-predator relationship with the help of Lotka-Volterra model.  $10\frac{1}{2}$
- (b) Explain habitat, trophic and hypervolume niche with suitable examples.  $10\frac{1}{2}$
- (c) Mention the components of ecosystem. Explain biological nitrogen fixation.  $4+6\frac{1}{2}$
- (d) Discuss phenotypic plasticity. Explain climax pattern theory.  $5+5\frac{1}{2}$

**Group - B**

**(Zoogeography, Wildlife and Biodiversity)**

4. Answer any *four* questions :  $2 \times 4 = 8$
- (a) Mention the parent and daughter atoms in case of radio-carbon dating of fossils.
- (b) Expand IARI and BNHS.
- (c) What is Wallace line ?
- (d) What is afforestation ?

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- (e) What is red data book ?
- (f) Define era.
5. Answer any *four* questions :  $4 \times 4 = 16$
- (a) How petrified fossils are formed ?
- (b) Name the zoogeographical realms proposed by Sclater (1858). To which realm does *Lepidosiren* exist ?
- (c) How continental drift influences the faunal distribution ?
- (d) Write a note on biosphere reserve.
- (e) Write a short note on bioindicator.
- (f) Define Endangered category of animal and distinguish it from a vulnerable category.
6. Answer any *two* questions :  $10\frac{1}{2} \times 2 = 21$
- (a) What is the significance of the study of Zoogeography? Mention the noteworthy evolutionary advancements of animal groups during Palaeozoic era.  $5+5\frac{1}{2}$
- (b) What is biodiversity hotspot? Mention the faunal characteristics of any one megadiverse zone of India.  $2+8\frac{1}{2}$

- (4-)
- (c) Enumerate the causes of wildlife depletion.  
Describe the strategies of wildlife conservation.

- (d) Describe the role of different barriers in limiting  
the dispersal of terrestrial animals.

B I (Three Year II)  
Under 1+1+1 System

2010

**ZOOLOGY (Honours)**

FIRST PAPER

( Revised New Syllabus )

Time : 4 hours

Full Marks : 90

*The figures in the margin indicate full marks.*

**( Animal Diversity—I )**

1. Answer any **four** questions : 2×4=8

- (a) Give an example of a protozoan with—  
(i) mixotrophic nutrition;  
(ii) coprozoic nutrition.
- (b) What are the advantages of multicellularity?
- (c) What are the features of a lagoon?
- (d) Name two ciliary bands of Trocophore larva.
- (e) "Pila is an amphibious animal." Justify.
- (f) Differentiate between nymph and maggot.

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*( Turn Over )*

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2. Answer any **four** questions : 4×4=16
- (a) State the importance of Poriferan spicules in classification.
  - (b) Write a short note on Bryozoa.
  - (c) Write on the structural features of hexacanth larva.
  - (d) "Limulus is a living fossil." Justify.
  - (e) Write a note on corpora allata.
  - (f) Why are echinoderms considered to be closely related to chordates than other invertebrates?
3. Answer any **two** questions : 10½×2=21
- (a) Write the general characters of Mollusca. What is the speciality of the shell of *Nautilus*? State the taxonomic position of any three of the following : 3+1½=4½  
*Neopalina, Chiton, Doris, Dentalium, Sepia*
  - (b) Describe the life history of *Ascaris*. Add a note on its parasitic adaptations. 6+4=10
  - (c) Discuss the affinities and systematic position of *Hormiphora*. 5+5=10
  - (d) What is metamorphosis? Describe the different types of metamorphosis in insects giving suitable examples in each case. Elucidate the role of different hormones in the process. 2+3½=5½

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( Animal Diversity—II )

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4. Answer any **four** questions : 2×4=8
- (a) What is a solenocyte? In which chordate is it present?
  - (b) What is spiral valve and where is it found?
  - (c) What do you mean by mouth brooders? Give an example.
  - (d) State four distinguishing characters of Gymnophiona.
  - (e) Define pterylosis.
  - (f) What is acrodont dentition?
5. Answer any **four** questions : 4×4=16
- (a) Mention the specialized and degenerated characters of Cyclostomes.
  - (b) Differentiate between Neoteny and Paedogenesis.
  - (c) Why do birds migrate?
  - (d) Write a short note on reptilian affinities of Monotremata.
  - (e) Write a short note on echolocation in bat.
  - (f) Draw and label (description not required) the schematic diagrams of aortic arches in an amphibian and a bird.

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( Turn Over )



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6. Answer any **two** questions :  $10\frac{1}{2} \times 2 = 21$

(a) What is meant by retrogressive metamorphosis? Describe the life cycle of *Ascidia*.  $1\frac{1}{2}$

(b) State the peculiar features of Dipnoi.  $10$

(c) Give a comparative account of the structure of heart of Teleost, Amphibia, Reptile and Mammal.  $10$

(d) What is exoskeleton? Write short notes on any **four** of the following :  $\frac{1}{2} + (2\frac{1}{2} \times 4) = 11$

(i) Placoid scale

(ii) Horn and antler

(iii) Double respiration in *Columba*

(iv) Venous heart

(v) Metanephric kidney

(vi) Rectrices and remiges

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B II (Three Year H)  
Under 1+1+1 System

2010

ZOOLOGY (Honours)

THIRD PAPER

( Revised New Syllabus )

Time : 4 hours

Full Marks : 90

*The figures in the margin indicate full marks.*

GROUP—A

( Cell Biology and Histology )

1. Answer any **four** questions :  $2 \times 4 = 8$

(a) What is minimal medium?

(b) Define plasmid.

(c) What do you mean by vital stain? Give one example.

(d) What is nucleoplasmic index?

(e) What do you understand by membrane fluidity?

(f) Why is haematoxyline a basic dye and eosin an acid dye?

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- Answer any **four** questions :  $4 \times 4 = 16$
- (a) "G<sub>1</sub> is the most variable period of the cell cycle." Elucidate the fact. 4
  - (b) Discuss that "Differentiation is an irreversible process". 4
  - (c) Write the differences between dye and stain. 4
  - (d) Write the working principle of fluorescent microscope. Why is mercury lamp used in it as a source of illumination?  $2+2$
  - (e) Write a note on totipotency. 4
  - (f) Briefly describe the structure of a nucleoid. 4
3. Answer any **two** questions :  $10\frac{1}{2} \times 2 = 21$
- (a) What is cell signalling? Describe G protein mediated cell signalling with the help of suitable diagrams.  $2\frac{1}{2}+8$
  - (b) What is fixative? Mention the different types of fixative used in histology. Discuss briefly the principles of fixation.  $2+6+2\frac{1}{2}$
  - (c) Describe different types of animal cell culture with examples for the study of living cells.  $10\frac{1}{2}$
  - (d) Describe the structural details of electron microscope. Discuss its working principle.  $7\frac{1}{2}+3$

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GROUP—B

( Genetics and Immunology )

4. Answer any **four** questions :  $2 \times 4 = 8$
- (a) What is position effect?
  - (b) What is Edwards' syndrome?
  - (c) What is the relation between linkage and crossing over?
  - (d) What is gynandromorphy?
  - (e) What is immunogen?
  - (f) Which interferon is secreted by NK cells?
5. Answer any **four** questions :  $4 \times 4 = 16$
- (a) Why is the term 'Radio' used in Radioimmunoassay (RIA)? What are the different classes of antigens used in this technique?
  - (b) "Bombay Phenotype is due to an epistatic effect." Discuss.
  - (c) How can you produce metafemal, metamale and intersex in *Drosophila*?
  - (d) Describe antibody dependant cellular cytotoxicity (ADCC).
  - (e) Distinguish between sex-linked, sex-influenced and sex-limited traits with suitable examples.
  - (f) Write a brief note on clonal selection theory.

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6. Answer any **two** questions :  $10\frac{1}{2} \times 2 = 21$
- (a) What is Vaccination? Briefly describe the principle of vaccination. Explain active and passive immunization.  $2+4+4 = 10$
- (b) Write the differences between cytoplasmic inheritance and nuclear gene inheritance. Explain cytoplasmic inheritance on the basis of mitochondrial genome.  $5+5 = 10$
- (c) What is Immunelectrophoresis? How does it differ from immunodiffusion? What are cytokines? Mention its function.  $2+3+2\frac{1}{2} = 7\frac{1}{2}$
- (d) What is Recombination? How does Holliday model explain the mechanism of recombination?  $2\frac{1}{2} \times 2 = 5$

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B II (Three Year H)  
Under 1+1+1 System

2010

**ZOOLOGY (Honours)**

FOURTH PAPER

( Revised New Syllabus )

Time : 4 hours

Full Marks : 90

*The figures in the margin indicate full marks.*

GROUP—A

( Ecology )

1. Define any **four** of the following :  $2 \times 4 = 8$
- (a) Commensalism  
(b) Xerosere  
(c) Photoperiodism  
(d) Protocooperation  
(e) Cline  
(f) Shelford's law of tolerance
2. Answer any **four** questions :  $4 \times 4 = 16$
- (a) Distinguish between :
- (i) Micro- and Macroparasite  
(ii) Grazing and Detritus food chain

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- (b) Explain J-shaped curve of population growth.
- (c) Distinguish between facultative and obligatory mutualism with suitable example.
- (d) Diagrammatically represent nitrogen cycle.
- (e) Distinguish between :  
(i) Natality and Mortality  
(ii) Fundamental and Realized Niche
- (f) What do you mean by Y-shaped model of energy flow in an ecosystem? Why is it more realistic than box-pipe model?

3. Answer any two questions :  $10\frac{1}{2} \times 2 = 21$

- (a) What do you mean by species richness? Explain Shannon index. Which of the following communities is more diverse and why?  $2+4+4\frac{1}{2}$

	No. of individuals of species 1	No. of individuals of species 2
Community A	99	1
Community B	50	50

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- (b) Where do you find inverted pyramids? What are the physical and biological features of desert? What do you know by Lindeman's 10% rule in an ecosystem? Distinguish between autotrophic and heterotrophic succession.  $2+4+2+2$
- (c) What do you mean by age-specific and time-specific life table? Mention different types of survivorship curves. What do you mean by emigration and immigration? What are *r*- and *k*-selected species?  $2+3+2+3$
- (d) Give an account of the adaptations found in animals with reference to light and temperature.  $5+5$

GROUP—B

( Zoogeography, Wildlife and Biodiversity )

4. Answer any four questions :  $2 \times 4 =$

- (a) What is cryopreservation?
- (b) Write the full name of TRAFFIC.
- (c) Name two mammalian species that are common to Nearctic and Neotropical realms.

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- (d) Define wildlife.  
(e) What do you mean by Biosphere Reserve?  
(f) Name two sanctuaries of West Bengal.

5. Answer any **four** questions :  $4 \times 4 = 16$

- (a) Write short note on biological magnification.  
(b) Comment on the faunal diversity of oriental and Ethiopian realms.  
(c) Discuss the effectiveness of barriers in speciation.  
(d) Give a note on land bridges as the means of animal dispersal and the consequent evolutionary impact.  
(e) What is Red Data Book? What do you understand by critically endangered species?  
(f) What do you understand by era, period and epoch? What is Holocene epoch?

Answer any **two** questions :  $10\frac{1}{2} \times 2 = 21$

- (a) Define fossil. Enumerate the conditions that favour fossilization. Give the evolutionary importance of fossils.

$2 + 4\frac{1}{2} + 4$

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- (b) Name two biodiversity hot spots of India. What do you understand by Endemism? Why biodiversity hot spots need to be conserved? Write a brief account of any one biodiversity hot spot of India.  $2+2+3+3\frac{1}{2}$   
(c) Discuss the faunal explosion during the Mesozoic era in the context of reptiles.  $10\frac{1}{2}$   
(d) Give an outline classification of different types of barriers to animal distribution. Discuss the impact of barriers on animal evolution.  $10\frac{1}{2}$

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