

**FIRST YEAR T. D.C.SCIENCE, 2010-11
ZOOLOGY**

The first year TDC examination shall consist of three theory papers, each of three hours duration and a practical examination of five hours duration.

	<u>Marks</u>
Paper-I: Life and Diversity Of Animals-I (Invertebrates)	50
Paper-II : Cell Biology	50
Paper-III : Developmental Biology	50
Practical :	75

Pattern of question paper in the annual examination and distribution of marks:

Each theory paper in the annual examination shall have three sections i.e. A, B, and C. In section A, total 10 questions will be set in the paper, selecting at least two from each unit. These questions to be answered in a word or so. All questions are compulsory. Each question carries 0.5 mark, total 05 marks.

In section B, there shall be total 10 questions, selecting two questions from each unit, five questions to be answered by the student selecting at least one from each unit. Answer should be given in approximately 250 words. Each question carries 05 marks, total 25 marks.

In section C, 04 descriptive type questions will be set in the examination paper from five units of the syllabus of the paper, selecting not more than one question from a unit. Each question may have two sub divisions. Students are required to answer any two questions approximately in 500 words. Each question is of 10 marks, total 20 marks.

FIRST YEAR T. D.C.SCIENCE, 2010-11

ZOOLOGY

PAPER-I

LIFE AND DIVERSITY OF ANIMALS-I (INVERTEBRATES)

Duration : 3 hours

M.M. 50

UNIT-I

- 1 General characters and classification of phylum Protozoa upto classes with examples and their economic importance.
- 2 Type study-*Paramecium*.
- 3 Parasitic protozoans: Pathogenesis and morphology of *Entamoeba histolytica*, *Trichomonas vaginalis*, *Leishmania tropica*, *Trypanosoma gambiense* *Plasmodium*.

UNIT-II

- 4 General characters and classification of phylum Porifera upto classes with examples and their economic importance.
- 5 Type study-*Sycon*
- 6 Canal system in sponges.
- 7 General characters and classification of phylum Coelenterata upto classes with examples.
- 8 Type study-*Obelia*
- 9 Corals and coral reefs - their formation, kinds and importance. Polymorphism in Coelenterates, Metagenesis.

UNIT-III

- 10 General characters and classification of phylum Platyhelminthes and Aschelminthes upto classes with examples.
- 11 Type study -*Fasciola hepatica*, *Wuchereria bancrofti*.
- 12 Helminths parasites in relation to human diseases, parasitic adaptations of trematodes, cestodes, and nematodes.

UNIT-IV

- 13 General characters and classification of phylum Annelida and Arthropoda upto classes with examples.
- 14 Type study-*Nereis*, *Palaemon*.
- 15 Mouth parts of insects.
- 16 Social organization in insects.

UNIT-V

- 17 General characters and classification of phylum-Mollusca, Echinodermata and Hemichordata upto classes with examples.
- 18 Type Study -*Pila*, *Asterias*, *Balanoglossus*
- 19 Echinoderm larvae.
- 20 Affinities of Hemichordata

FIRST YEAR T.D.C.SCIENCE, 2010-11

ZOOLOGY
PAPER II
CELL BIOLOGY

Duration : 3 hours

M.M. 50

UNIT -I

- 1 The Cell: Discovery of cell, basic properties of cells, diversity of cell size and shape, cell theory.
- 2 Prokaryotic cell: Characteristics and structure.
- 3 Cellular macromolecules: Proteins, carbohydrates, lipids.

UNIT -II

- 4 Centrioles and basal bodies.
- 5 Cilia and flagella.
- 6 Cytoplasmic skeleton : Microfilaments and microtubules.
- 7 Plasma membrane: Fluid mosaic model, functions of plasma membrane viz. Endo- and exocytosis, active and passive transport.

UNIT -III

- 8 Shape, size, distribution, chemical nature and functions of following:
 - (a) Endoplasmic reticulum.
 - (b) Golgi complex.
 - (c) Lysosomes.
 - (d) Mitochondria.
 - (e) Peroxisomes

UNIT -IV

- 9 Nucleus and nucleolus: Structure, chemical nature and functions.
- 10 Nucleic acids: Watson and Crick model of DNA, chemical nature of DNA, types of DNA, replication of DNA , different types and chemical nature of RNAs Ribosomes.
- 11 Elementary knowledge of protein synthesis.

UNIT -V

- 12 Brief idea of cell cycle. General description of mitosis and meiosis.
- 13 An elementary idea of cell transformation and cancer.
- 14 An elementary idea of cellular basis of immunity.
- 15 Methods in cell Biology.
 - (a) Elementary idea of techniques in cell biology: Light, electron and fluorescence microscopy.
 - (b) Elementary idea of cell culture.

FIRST YEAR T.D.C. SCIENCE, 2010-11
ZOOLOGY
PAPER- III
DEVELOPMENTAL BIOLOGY

Duration : 3 hours

M.M. 50

UNIT -I

- 1 Aims and scope of developmental biology. Historical review and concepts of Embryology.
- 2 Neuroendocrine regulation of reproductive organs (hypothalamo-hypophysial axis only).
- 3 Gametogenesis: Spermatogenesis and structure of sperm, oogenesis and structure of ovum, types of ova.

UNIT -II

- 4 Fertilization: Events of fertilization, mechanism of sperm transfer, polyspermy, preventing mechanisms.
- 5 Errors in fertilization and significance of fertilization.
- 6 *In vitro* fertilization and test tube baby
- 7 Parthenogenesis.
- 8 Embryo transplant

UNIT -III

- 9 Cleavage: Patterns and planes of cleavage.
- 10 Blastulation: Types of blastula.
- 11 Gastrulation: Types, mechanism, fate maps, morphogenetic cell movement and their significance in gastrulation.

UNIT -IV

- 12 Elementary knowledge of primary organizer.
- 13 Embryonic induction, concept of competence.
- 14 Determination, differentiation and growth.
- 15 Regeneration.

UNIT -V

- 16 Extra embryonic membranes: Development and functions.
- 17 Placentation: Definition, types, classification on the basis of morphology and histology. Functions of placenta.

FIRST YEAR T.D.C. SCIENCE – 2010-11
ZOOLOGY: PRACTICAL

Duration : 5 hours

M.M. 75

<u>S.No.</u>	<u>Exercise</u>	<u>Regular</u>	<u>Ex-Students</u>
1	Major dissection	18	25
2	Cell Biology/ Developmental Biology exercise	09	12
3	Mounting/ Slide preparation	08	08
4	Spots(10)	20	20
5	Viva-voce	10	10
6	Record	10	--
Total :-		75	75

1. General survey of invertebrates (museum specimens):

The student is required to know classification, habit and habitat, economic importance etc.

- A Protozoa : *Entamoeba, Polystomella, Monocystis, Euglena, Noctiluca, Trypanosoma, Nyctotherus, Paramecium, Vorticella,*
- B Porifera : *Scypha, Hyalonema, Euplectella, Spongilla, Euspongia.*
- C Coelenterata : *Physalia, Aurelia, Alcyonium, Corallium, Gorgonia, Pennatula, Madrepora, Metridium*
- D Platyhelminthes and Aschelminthes : *Dugesia, Fasciola, Taenia, Schistosoma, Dracunculus, Ascaris (male and female), Wucheraria, Enterobius*
- E Annelida and : *Nereis Heteronereis, Aphrodite, Arenicola, Chaetopterus Hirudinaria.*
- F Onychophora : *Peripatus.*
- G Arthropoda : *Limulus, Aranëa, Palamnaeus, Lepas, Balanus, Apus, Sacculina, Eupagurus, Carcinus, Lepisma, Pediculus, Bombyx, Apis, Cimex, Julus, Scolopendra, Ixodes.*
- H Mollusca : *Mytilus, Chiton, Teredo, Turbinella, Laviculus, Limax, Doris, Aplysia, Dentalium, Nautilus, Sepia, Octopus, Loligo, Pecten, Solen, Pinctada.*
- I Echinodermata : *Asterias, Pentaceros, Antedon, Ophiothrix, Holothuria.*
- J Hemichordata : *Balanoglossus, Saccoglossus.*

II. Study of the permanent slides, sections passing through different regions of animals and developmental stages.

- 1 Protozoa : Blood smears showing malarial parasite. *Paramecium*: Binary fission, conjugation.
- 2 Porifera : T.S. and L.S. of *Sycon*., spicules, spongin fibres and gemmules
- 3 Coelenterata : *Obelia* (colony and medusa), planula, scyphistoma and ephyra larvae of *Aurelia*, T.S. of mesentery of *Metridium*
- 4 Platyhelminthes : Miracidium, sporocyst, redia and cercaria larvae of *Fasciola*, scolex of *Taenia*, W.M. of mature and gravid proglottids of *Taenia*, hexacanth and cysticercus larvae of *Taenia*.
- 5 Aschelminthes : T.S. of *Ascaris* (male and female)
- 6 Annelida : T.S. of *Nereis* through different regions, parapodia of *Nereis* and *Heteronereis*. Trochophore larva.
- 7 Arthropoda : V.S. of compound eye, nauplius, zoea, megalopa larvae and *Mysis*
- 8 Mollusca : T.S. of gill lamella and T.S. of shell of *Lamellidens*, glochidium larva.
- 9 Echinodermata : T.S. of arm, tube feet and pedicellaria, bipinnaria larva of starfish, echinopluteus larva.
- 10 Hemichordata : *Torneria* larva.

III Dissections:

1. *Pheretima* : General anatomy, digestive, nervous, excretory and reproductive systems.
2. *Palaemon* : Appendages, general anatomy, digestive system and nervous system.
3. *Pila* : Organs of pallial complex, nervous system.

IV Mountings: Permanent preparation of the following:

- 1 Protozoa : *Euglena*, *Paramecium*, rectal ciliates, *Polystomella*.
- 2 Porifera : Sponge spicules, spongin fibres and gemmules.
- 3 Coelenterata : *Obelia* (colony and medusa)
- 4 Platyhelminthes : Proglottid of *Taenia*.
- 5 Annelida : Parapodia of *Nereis* and *Heteronereis*, ovary, septal nephridia and setae (*in situ*) of earthworm.
- 6 Arthropoda : Statocyst and hastate plate of prawn, salivary glands and tracheae of cockroach, W.M. of *Cyclops*, *Daphnia*, mouth parts of any 4 insects *Culex*, *Anopheles* male and female, housefly, cockroach and honey bee.
- 7 Mollusca : Gill lamella, glochidium larva, osphradium and radula of *Pila*.

Cell Biology

1. Prepared slides of mitochondria, Golgi bodies, centrosome, different stages of mitosis.
2. Buccal smear preparation for localization of mitochondria and Golgi complex using vital stains.
3. Preparation of Mitosis.
4. Squash preparation of polytene chromosomes.

Developmental Biology: Slides and specimen

- 1 W.M of eggs, early cleavage stage, T.S. of blastula and gastrula of frog.
- 2 Study of chick embryo: 18 hours, 24 hours, 36 hours, 48 hours and 72 hours.
- 3 T.S. of ovary and testis.
- 4 Sperm smear to study the structure of sperm.
- 5 Foetus with placenta.

REFERENCE BOOKS (LATEST EDITIONS):

LIFE AND DIVERSITY OF ANIMALS (INVERTEBRATES)

- 1 Hickman C.P.Jr., F.M. Hickman and L.S. Roberts, Integrated Principles of Zoology, Mosby College Publication. St. Louis.
- 2 Ayyar, E.K. and T.N. Ananthakrishnan, Manual of Zoology, Vol.1 (Invertebrata), Parts I and II. S. Viswanathan (Printers and Publishers) Pct. Ltd., Madras.
- 3 Jordan, E.L. and P.S. Verma, Invertebrate Zoology, S.Chand & Co. Ltd., Ram Nagar, New Delhi. (English and Hindi Editions).
- 4 Parker and Haswell, Text Book of Zoology, Vol.1, (Invertebrata), A.Z.T.B.S. Publishers and Distributors, New Delhi- 110051
- 5 Ismail, S.A., Vermicology: The Biology of Earthworms, Orient Longman, India.
- 6 Kotpal, R.L. Agarwal and Khetrapal: Modern Text Book of Zoology: Invertebrates, Rastogi Publications, Meerut. (English and Hindi Editions)
- 7 Storer, T.I. and Usinger, K.L.: General Zoology, Tata McGraw- Hill Publishing Co., New Delhi.
- 8 Simpson, G.G: Principles of Taxonomy, Oxford and IBH Publisher Co. New Delhi.

CELL AND DEVELOPMENTAL BIOLOGY:

- 9 Alberts, Bray, Lewis, Raff, Roberts and Watson, Molecular Biology of the Cell (Garland).
- 10 Balinsky, An Introduction to Embryology (CBS College Publishers)
- 11 Grant: Biology of Developing systems (Holt, Reinhart and Winston).
- 12 Gilbert: Developmental Biology (Sinauer)
- 13 Alberts, B., et al., Molecular Biology of the Cell (Garland)
- 14 Lodish, H., et al., Molecular Cell Biology (Freeman).

PRACTICAL :

- 15 Verma, P.S, A manual of practical Zoology S.Chand and Co. Ltd., Ram Nagar, New Delhi (English and Hindi Editions).
- 16 Lal, S.S: Practical Zoology, Invertebrates, Rastogi Publication, Meerut (English and Hindi Editions).