

**THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (REGULAR)
EXAMINATION, NOVEMBER 2020**

(CBCSS)

Zoology

ZOL 3E 09—HUMAN GENETICS—I : CLINICAL GENETICS

(2019 Admissions)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend all questions in each Section/Part.*
2. *The minimum number of questions to be attended from the Section/Part shall remain same.*
3. *There will be an overall ceiling for each Section/Part that is equivalent to maximum weightage of the Section/Part.*

Part A

I. Answer any *four* of the following. Each question carries 2 weightage :

- 1 Karyotyping.
- 2 Klinefelter syndrome.
- 3 Isochromosome.
- 4 Achondroplasia.
- 5 Primer designing.
- 6 SCID.
- 7 Proteomics.

(4 × 2 = 8 weightage)

Part B

II. Answer any *four* of the following. Each question carries 3 weightage :

- 8 Write note on endocrine disorders.
- 9 Comment on different types of PCR.
- 10 Write note on methods used in gene therapy.
- 11 Comment on the genetic basis of neuromuscular disorders.

Turn over

- 12 Write on Mendelian inheritance in human.
- 13 Give an account on metabolic engineering.
- 14 Explain the steps involved in the production of monoclonal antibodies.

(4 × 3 = 12 weightage)

Part C

III. Answer any *two* of the following. Each question carries 5 weightage :

- 15 Write an account on cytogenetic techniques.
- 16 Explain recombinant DNA technology.
- 17 Write an essay on biological databases.
- 18 Give an account on signal transduction pathway. Add note on dysregulations of signal transduction pathway.

(2 × 5 = 10 weightage)

**THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (REGULAR) EXAMINATION
NOVEMBER 2020**

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Zoology

ZOL 3E 09—FISHERY SCIENCE—I : TAXONOMY, BIOLOGY, PHYSIOLOGY AND
ECOLOGY

(2019 Admissions)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend **all** questions in each Section / Part.*
2. *The minimum number of questions to be attended from the Section / Part shall remain same.*
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Part A

I. Answer any *four* of the following. Each question carries 2 weightage :

- 1 What are absolute growth and relative growth ?
- 2 Briefly explain neurohypophysial hormones.
- 3 Give the adaptations of the family Ariidae.
- 4 Enlist the functions of blood in fishes.
- 5 Briefly explain the role of corpuscles of Stannius in fish.
- 6 What are the different types of reservoirs ?
- 7 Differentiate upwelling and outwelling.

(4 × 2 = 8 weightage)

Part B

II. Answer any *four* of the following. Each question carries 3 weightage :

- 8 Explain different types of chromatophores in fishes.
- 9 Discuss the commercial importance of elasmobranchs.

Turn over

- 10 Briefly explain the physico-chemical properties of pond water.
- 11 Discuss the role of hormonal stimulation in fish reproduction.
- 12 Comment on different kinds of ocean currents.
- 13 Explain the structure and working mechanism of heart in a teleost fish.
- 14 Describe the adaptations of deep sea fishes.

(4 × 3 = 12 weightage)

Part C

III. Answer any *two* of the following. Each question carries 5 weightage :

- 15 Explain the methods for determination of age and growth among fishes.
- 16 Discuss the factors which influence the productivity of an estuarine ecosystem.
- 17 Write an essay on the structure, functions and modifications of fins among fishes.
- 18 Explain the process of digestion and absorption in a teleost fish.

(2 × 5 = 10 weightage)

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Zoology

ZOL 3E 09—ENTOMOLOGY I—MORPHOLOGY AND TAXONOMY

(2019 Admissions)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend all questions in each Section / Part.*
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Part A

I. Answer any *four* of the following. Each question carries 2 weightage :

- 1 Distinguish between apterygotes and pterygotes.
- 2 Write the medical importance of Reduviidae.
- 3 Give an account of butterfly farming.
- 4 What are the salient features of the order Embioptera ?
- 5 Comment on tentorium.
- 6 Distinguish between open and closed galls.
- 7 Write the major characters of the order Neuroptera.

(4 × 2 = 8 weightage)

Part B

II. Answer any *four* of the following. Each question carries 3 weightage :

- 8 Briefly describe the origin and evolution of insect wings.
- 9 Explain the various modifications of thoracic leg of insects.
- 10 Give an account of the mating behaviour in odonates.
- 11 Explain the role of parasitic hymenoptera in biological control.

Turn over

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

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**THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (REGULAR) EXAMINATION
NOVEMBER 2020**

(CBCSS)

Zoology

ZOL 3C 08—DEVELOPMENTAL BIOLOGY AND ENDOCRINOLOGY

(2019 Admissions)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend all questions in each Section / Part.*
2. *The minimum number of questions to be attended from the Section / Part shall remain same.*
3. *There will be an overall ceiling for each Section / Part that is equivalent to maximum weightage of the Section / Part.*

Part AI. Answer any *four* of the following. Each question carries 2 weightage :

- 1 What is Nieuwkoop center ?
- 2 What is meant by trans differentiation ?
- 3 Write on the role of PAX-6 expression in eye development.
- 4 Explain the impact of alcohol in fetal development.
- 5 Give a brief account on the structure and hormones of pituitary gland.
- 6 What are second messengers of hormone action ?
- 7 Write on eicosanoids and hormone action.

(4 × 2 = 8 weightage)

Part BII. Answer any *four* of the following. Each question carries 3 weightage :

- 8 Explain genomic imprinting.
- 9 Describe the process of vulval induction in *Caenorhabditis elegans*.
- 10 Explain metamorphosis and its hormonal control in amphibians.

Turn over

- 11 What are Hedgehog proteins ?
- 12 Write a brief account on storage, secretion and transportation of peptide hormones.
- 13 Give an account on hormonal control of menstrual cycle.
- 14 Describe the gaseous neural hormones and their mode of action.

(4 × 3 = 12 weightage)

Part C

III. Answer any *two* of the following. Each question carries 5 weightage :

- 15 Write on the different types of hormone receptors and their regulation.
- 16 Briefly describe the major processes involved in differential gene transcription.
- 17 Write an essay on axes and pattern formation in *Drosophila*.
- 18 Explain the process of gastrulation in amphibians.

(2 × 5 = 10 weightage)

**THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (REGULAR) EXAMINATION
NOVEMBER 2020**

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Zoology

ZOL 3C 07—IMMUNOLOGY

(2019 Admissions)

Time : Three Hours

Maximum : 30 Weightage

General Instructions

1. *In cases where choices are provided, students can attend all questions in each Section / Part.*
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Part AI. Answer any *four* of the following. Each question carries 2 weightage :

- 1 Myeloid lineage in hematopoiesis.
- 2 Distinguish between autografts and xenografts.
- 3 T-cell receptors.
- 4 Major factors that influence immunogenicity.
- 5 Burton's disease.
- 6 Complement deficiencies.
- 7 What is RSS in VDJ recombination ?

(4 × 2 = 8 weightage)

Part BII. Answer any *four* of the following. Each question carries 3 weightage :

- 8 Compare Classical complement pathway with Lectin pathway.
- 9 Compare the structure of IgG and IgM.
- 10 Write a short essay on systemic and organ specific autoimmune diseases.

Turn over

- 11 Briefly describe the mechanisms involved in the formation of antibody diversity.
- 12 Explain the advantages of DNA vaccines over other types of vaccines.
- 13 Compare ELISA with Western Blot technique.
- 14 Briefly describe the procedure involved in Hybridoma technology and mention the applications of monoclonal antibodies.

(4 × 3 = 12 weightage)

Part C

III. Answer any *two* of the following. Each question carries 5 weightage :

- 15 Write an essay on the structure of MHC-I and MHC-II molecules. What are their functions ?
- 16 Write an essay on Type-I and Type-II hypersensitivity reactions.
- 17 Describe the immunological basis of graft rejection. What is general immunosuppressive therapy ?
- 18 Write an elaborate account on cytokines and their role in immune mechanism.

(2 × 5 = 10 weightage)

**THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (SUPPLEMENTARY)
EXAMINATION, NOVEMBER 2020**

(CUCSS)

Zoology

ZO 3E T09—FISHERY SCIENCE—I : TAXONOMY BIOLOGY, PHYSIOLOGY AND
ECOLOGY

(2016 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Part A

I. Answer *all* questions. Each question carries 1 weightage :

- 1 What is an iteroparous species ?
- 2 Give an example for pivot feeder.
- 3 What are chloride cells ?
- 4 What is meant by Trophic State Index ?
- 5 Which are the calcified structures analyzed in fish growth studies ?
- 6 What are the different types of camouflage among fishes ?
- 7 Write any four adaptations of live bearers.
- 8 Differentiate upwelling and downwelling.
- 9 Mention the significance of detritus on food chain.
- 10 What is potamodromous migration ?
- 11 Write on a discrete endocrine gland in fish.
- 12 Define ammonotelism.
- 13 What is a type specimen ?
- 14 Mention the systematic position of any two Requiem shark.

(14 × 1 = 14 weightage)

Part B

II. Answer any *seven* questions. Each question carries 2 weightage :

- 15 Explain different types of chromatophores in fishes. Add notes on its practical applications.
- 16 Write down the morphological features of Cichlidae with suitable examples.

Turn over

- 17 Explain the structure and working mechanism of a teleost heart.
- 18 Comment on different types of ocean currents.
- 19 Briefly explain the physico-chemical properties of pond water.
- 20 Give an account on accessory respiratory organs in fishes.
- 21 Explain the muscle activation patterns during swimming.
- 22 Describe the factors which influence the productivity of an estuarine ecosystem.
- 23 Comment on X-organ sinus gland complex.
- 24 Enlist the adaptations of hill stream fishes.

(7 × 2 = 14 weightage)

Part C

Answer any *two* questions. Each question carries 4 weightage :

- 25 Explain the process of digestion and absorption in a teleost fish.
- 26 Discuss the zonation and characteristics of marine habitat.
- 27 Explain the mechanisms of osmoregulation among marine and freshwater fishes.
- 28 Describe the structural modifications and functions of caudal fin.

(2 × 4 = 8 weightage)

**THIRD SEMESTER M.A./M.Sc./M.Com. DEGREE (SUPPLEMENTARY)
EXAMINATION, NOVEMBER 2020**

(CUCSS)

Zoology

ZO3ET09—ENTOMOLOGY—I MORPHOLOGY AND TAXONOMY

(2016 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Part A

I. Answer all *fourteen* questions. Each question carries 1 weightage :

- 1 What is metasternum ?
- 2 Citing an example each differentiate between exopterygote and endopterygote.
- 3 Mention four diagnostic characters of the family Nepidae.
- 4 Write on bioluminescence with reference to the family Lampyridae.
- 5 What do you know about locomotion in Collembola ?
- 6 What is cervix ?
- 7 Differentiate between the suborders Nematocera and Brachycera.
- 8 Comment on different types of galls.
- 9 What do you know about sound production in cicadas ?
- 10 Mention four adaptations in predatory insects.
- 11 Mentioning an example each differentiate between serrate antenna and pectinate antenna.
- 12 Write on ovipositor in female insect.
- 13 What is labium ?
- 14 What is stylopization ?

(14 × 1 = 14 weightage)

Part B

II. Answer any *seven* questions. Each question carries 2 weightage :

- 15 Explain different methods of respiration in aquatic insects.
- 16 Elaborate on insect-plant co-evolution.

Turn over

- 17 Explain caste-system in termites.
- 18 Elucidate the structure of mouthparts in house flies.
- 19 Explain sexual dimorphism and parental care in Dermaptera.
- 20 Enlist the diagnostic characters of the family Acrididae. Add a note on biology.
- 21 Present your knowledge on the family Papilionidae with respect to diagnostic characters and biology.
- 22 Enumerate the basic structure of insect wing.
- 23 Explain the generalized structure of male genitalia in insects.
- 24 Describe various modifications of legs in insects.

(7 × 2 = 14 weightage)

Part C

III. Answer any *two* questions. Each question carries 4 weightage :

- 25 Elucidate the origin and evolution of insects.
- 26 Enumerate the diagnostic characters and biology of any four families of the order Hymenoptera.
- 27 Explain the general morphology of insect head.
- 28 Elaborate on the different aspects of leaf mining in insects.

(2 × 4 = 8 weightage)

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(CUCSS)

Zoology

ZO 3CT 08—DEVELOPMENTAL BIOLOGY AND ENDOCRINOLOGY

(2016 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Part A

I. Answer all *fourteen* questions. Each question carries 1 weightage :

- 1 . What are cytoplasmic determinants ?
- 2 What is blastulation ?
- 3 Distinguish between epimorphic and morpholactac regeneration.
- 4 Write on Wnt family paracrine factors.
- 5 Briefly explain heterotopy, citing an example.
- 6 What is meant by autonomous specification ?
- 7 What are cadherins ?
- 8 Elucidate the role of apical ectodermal ridge in limb development of vertebrates.
- 9 What are second messengers ?
- 10 What are endorphins ?
- 11 What is diabetes mellitus ?
- 12 What are G-protein coupled receptors ?
- 13 Elucidate the role of heart as endocrine gland.
- 14 Discuss on Addison disease.

(14 × 1 = 14 weightage)

Turn over

Part B

II. Answer any *seven* of the following. Each question carries 2 weightage :

- 15 Give an account on eye lens induction.
- 16 Explain the development of imaginal disc into legs in insects.
- 17 What is induction ? Give a brief account on different types of inductive interaction.
- 18 Write on teratogenesis and environmental disruptions on animal development.
- 19 Give an account on the major changes occurring during amphibian metamorphosis.
- 20 Explain the process involved in neural crest cell differentiation.
- 21 Explain the process of vulval induction in *Caenorhabditis elegans*.
- 22 Write on synthesis and metabolism of androgens.
- 23 Explain the role and regulation of hormones in menstrual cycle.
- 24 Explain the mode of action of peptide and steroid hormones.

(7 × 2 = 14 weightage)

Part C

III. Answer any *two* of the following. Each question carries 4 weightage :

- 25 Explain the biochemistry and physiology of fertilization.
- 26 Discuss the role of genes in axes formation in *Drosophila* development.
- 27 Write on mechanisms involved in the control of gene expression at the level of translation.
- 28 Discuss hypothalamo-hypophyseal complex and regulation of their hormones.

(2 × 4 = 8 weightage)

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Zoology

ZO 3C T07—IMMUNOLOGY

(2016 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Part A

I. Answer all *fourteen* questions. Each question carries 1 weightage :

- 1 Antigen presenting cells.
- 2 Freund's adjuvant.
- 3 Haptens.
- 4 Central tolerance.
- 5 Hashimoto's thyroiditis.
- 6 Toll like receptors.
- 7 Xenograft.
- 8 Cross-reactivity.
- 9 Inflammation.
- 10 Organ specific immunity.
- 11 IgG.
- 12 C3 convertase.
- 13 Cytokine.
- 14 Flow cytometry.

(14 × 1 = 14 weightage)

Part B

II. Answer any *seven* question. Each question carries 2 weightage :

- 15 Structure and functions of T lymphocytes.
- 16 There are five major classes of antibody heavy chains. Explain.
- 17 Process of formation of membrane attack complex.

Turn over

- 18 Write down the role of T Cells in graft rejection.
- 19 Write a brief account on exogenous pathway of antigen processing and presentation.
- 20 General mechanism underlying an immediate type I hypersensitivity reaction.
- 21 Some autoimmune diseases are systemic. Explain.
- 22 What is primary immunodeficiency ?
- 23 Briefly describe humoral immunity.
- 24 Write a brief account on the generation of antibody diversity.

(7 × 2 = 14 weightage)

Part C

III. Answer any *two* questions. Each question carries 4 weightage :

- 25 Hematopoiesis is the process by which hematopoietic stem cells develop into mature blood cells. Describe in detail.
- 26 There are several vaccine strategies, each with unique advantages and challenges. Explain in detail.
- 27 Write an essay on the major pathways of complement activation.
- 28 Explain the major factors that influence immunogenicity.

(2 × 4 = 8 weightage)