Seat No. : _____

NH-150

November-2025

M.Sc., Sem.-III

503 : Zoology

(EA : Cell Biology, Cytogenetics and Molecular Biology-I)

Time : 2:30 Hours] **[Max. Marks : 70**

1. (1) Write a descriptive account of the FISH technique. **14**
   (2) Write a note on trisomy disorders observed in humans.

OR

1. (1) Explain the role of chromosomes in the evolution of primates. **14**
   (2) Give the application of ultrasound and maternal blood screening in prenatal diagnosis.

2. (1) Write a note on the SOS repair mechanism. **14**
   (2) Write a descriptive account of the Human Genome Project.

OR

2. (1) What is the role of DNA modification & restriction in prokaryotes ? Discuss. **14**
   (2) What is the technique of subtractive hybridization ? Discuss its use in gene isolation.

3. (1) Describe the steps involved in the execution of EMT. **14**
   (2) Write a note on Embryonic proteins as tumour markers.

OR

3. (1) Write a note on angiogenesis and cancer. **14**
   (2) Enlist the properties of tumour markers.

4. (1) Explain the principle of the Ames test used for detecting mutagenic chemicals and include its method (flow chart), applications, merits and demerits. **14**
   (2) Describe the various routes of administration of drugs, giving their advantages and disadvantages.

OR

4. (1) Explain how the dose-response relationship is evaluated and mention its significance. **14**
   (2) What are the major factors relating to the organisms that influence the toxic action of chemicals ? Explain with examples.

5. Answer any **SEVEN** out of **TWELVE** : **14**

(1) What is the application of cord blood sampling ?

(2) Give the karyotype of Turner syndrome.

(3) What is the advantage of G Banding ?

(4) Give examples of gene families.

(5) Give reasons why rRNA genes were the first to be isolated.

(6) What is the limitation of the recombination repair mechanism ?

(7) What are prognostic cancer markers ? Give two examples.

(8) Briefly explain the use of PET in the diagnosis of cancer.

(9) Briefly explain any one protein involved in the regulation of the cell cycle during the development of cancer.

(10) Write the names of environmental (surrounding medium) factors that influence toxicity.

(11) Give the names of four in vitro methods used for testing free radical scavenging activity.

(12) Explain the meaning of IC_{50} and EC_{50} in toxicological evaluations.

Seat No. : _____

NH-150

November-2025

M.Sc., Sem.-III

503 : Zoology

(EB : Endocrinology and Reproductive Technology-I)

Time : 2:30 Hours] **[Max. Marks : 70**

1. (1) Describe the major Endocrine glands in vertebrates with reference to their hormones and major functions. **14**

   (2) Explain in detail the Negative feedback mechanism with examples.

OR

1. (1) Describe the synthesis of amino acid-derived hormones. **14**

   (2) Describe Peptide & Protein hormone synthesis.

2. (1) Explain the regulation of Hormone release. **14**

   (2) Describe the mechanism of Neural Hormonal Control and give examples.

OR

2. (1) What is Acromegaly ? Describe in detail the causes, pathophysiology, anatomical changes and treatment. **14**

   (2) Describe Cushing's Syndrome.

3. (1) Describe Addison's Disease. **14**

   (2) Describe Type 1 Diabetes mellitus.

OR

3. (1) Explain in detail Hypothyroidism. **14**

   (2) Explain Myxedema in detail.

4. (1) What is Hyperinsulinism ? Explain types and causes. **14**

   (2) Describe LD_{50}, LC_{50}, IC_{50}, and EC_{50}.

OR

4. (1) What are the different types of toxicity ? Explain the criteria it depends upon. **14**

   (2) Explain the factors affecting toxicity.

5. Answer any **SEVEN** out of **TWELVE** : **14**

(1) Name three types of the Endocrine system based on morphology and location.

(2) Name the feedback mechanisms and write their purpose.

(3) What is the importance of the feedback mechanism in physiology ?

(4) How are thyroid hormones released ?

(5) What is Let Down Reflex ? Which hormone shows this reflex ? What is the result ?

(6) What are the types of Hypogonadism ? Write the causes.

(7) What are the symptoms of Menopause ?

(8) Name the hormones involved in Carbohydrate metabolism.

(9) Name the processes involved in Lipid Metabolism by Hormones.

(10) Name the key hormones involved in Protein metabolism.

(11) Name the four routes of administration of Toxicants.

(12) What is Genotoxicity ? Name different Genotoxicity testing methods.

Seat No. : _____

NH-150

November-2025

M.Sc., Sem.-III

503 : Zoology

(EC : Ecotoxicology and Wildlife Forensic-I)

Time : 2:30 Hours] **[Max. Marks : 70**

1. (1) Write a note on the implications of the Wildlife Protection Act 1972. **14**
   (2) Write a note on the "Buffer zone" around wildlife sanctuaries.

OR

1. (1) Write a note on "National Parks". **14**
   (2) Write a note on "Ghudkhar Sanctuary".

2. (1) Write a note on the wounds created by bullets on mammals. **14**
   (2) Write a note on insecticides and their effect on wildlife.

OR

2. (1) Explain Wildlife toxicology. **14**
   (2) Write a note on rodenticides and their effect on wildlife.

3. (1) Write in detail about the impact of anthropogenic pollution on the terrestrial system. **14**
   (2) Explain in detail about environmental toxicology.

OR

3. (1) Explain the steps involved in ERA. **14**
   (2) Write a detailed note on the Minamata disaster.

4. (1) Describe the principle, procedure (flow chart), applications, advantages, and disadvantages of the Ames Test. **14**
   (2) What are the different methods by which drugs can be administered to the body ? Give examples.

OR

4. (1) Describe the concept and types of dose-response relationships in toxicology. **14**
   (2) Write an account of the various factors pertaining to the organism that influence the toxicity of a substance.

5. Answer any **SEVEN** out of **TWELVE** : **14**

(1) Briefly explain the inclusion of Lesser Floricans in the Schedule 1 species index.

(2) In which schedule list are Saras cranes included ? Give reasons for its inclusion.

(3) What is the role of the state Wildlife Advisory Board ?

(4) Write about any two recent cases of the use of insecticides and their impact on wildlife.

(5) Explain the reason behind the disappearance of vultures.

(6) Explain bioaccumulation in wildlife toxicology.

(7) Who is the mother of environmental toxicology ? Which book did she write ?

(8) Who is the father of toxicology, and who is the father of modern toxicology ?

(9) Name the triggering factor of Minamata disease. Which organization was responsible for the spread of this disease ?

(10) List the factors of the surrounding medium that affect the toxicity of a substance.

(11) Write the names of four commonly used in vitro antioxidant evaluation tests.

(12) What do you mean by IC_{50} and EC_{50} ? Define both terms.

Seat No. : _____

NH-150

November-2025

M.Sc., Sem.-III

503 : Zoology

(EE : Genetic Counselling-I)

Time : 2:30 Hours] **[Max. Marks : 70**

1. (1) Explain the indications & purpose of genetic counselling. **14**
   (2) Discuss : the goals & components of genetic counselling.

OR

1. (1) Write a detailed note on the construction of a pedigree. **14**
   (2) Explain : the value of extended negative history & red flags in a family history suggestive of a genetic condition.

2. (1) Write a note on case preparation & management. **14**
   (2) What are the core qualities important in a genetic counselling session ? Explain.

OR

2. (1) Write a note on psychotherapeutic counselling. **14**
   (2) What are the different interviewing techniques ? Discuss.

3. (1) Illustrate the rules of addition and multiplication with relevant genetic examples. **14**
   (2) Explain the different components of probability with examples.

OR

3. (1) Explain pathway-based genetic counselling for multiple genetic changes. **14**
   (2) Write a short note on the genetic diagnosis of single-gene disorders with an example.

4. (1) Explain the principle of the Ames test used for detecting mutagenic chemicals and include its method (flow chart), applications, merits and demerits. **14**
   (2) Describe the various routes of administration of drugs, giving their advantages and disadvantages.

OR

4. (1) Explain how the dose-response relationship is evaluated and mention its significance. **14**
   (2) What are the major factors relating to the organisms that influence the toxic action of chemicals ? Explain with examples.

5. Answer any **SEVEN** out of **TWELVE** : **14**

(1) What is autonomy in a genetic counselling session ?

(2) Draw a pedigree which cannot be X-linked recessive.

(3) Differentiate between empathy & sympathy.

(4) What is the importance of silence ?

(5) Define counter transference.

(6) What is projective identification ?

(7) What is Bayes' Theorem and how is it useful in genetics ?

(8) Give the full form of "MLPA" and mention its role.

(9) Name two drugs used to treat cystic fibrosis.

(10) Write the names of environmental (surrounding medium) factors that influence toxicity.

(11) Give the names of four in vitro methods used for testing free radical scavenging activity.

(12) Explain the meaning of IC_{50} and EC_{50} in toxicological evaluations.

Seat No. : _____

NH-150

November-2025

M.Sc., Sem.-III

503 : Zoology

(EF : Toxicology-I)

Time : 2:30 Hours] **[Max. Marks : 70**

1. (1) Discuss the design and construction principles for the animal house in accordance with CPCSEA guidelines. **14**

   (2) Explain the composition and fundamental roles of the Institutional Animal Committee (IAC) as mandated by CPCSEA.

OR

1. (1) Explain the caging facility and physiological factors for different lab animals according to CPCSEA guidelines. **14**

   (2) Explain in detail: IACUC guideline, including scope and committee structure, key responsibilities, documentation, and animal care standards for animal housing facilities.

2. (1) Explain in detail: Toxic response to skin. **14**

   (2) Explain the core cellular and molecular mechanisms of hepatotoxicity. Describe the key events and how they lead to hepatocyte injury.

OR

2. (1) Describe the health consequences of long-term exposure to Endocrine-Disrupting Chemicals (EDCs) in humans. **14**

   (2) List the main routes by which hazardous agents enter the human respiratory system and identify the primary target organs or tissues affected by each route.

3. (1) Describe the major factors affecting radiotoxicity. **14**

   (2) List and describe the main classes of food additives used in the food industry.

OR

3. (1) Explain teratogens and their effects on embryonic development. **14**

   (2) How are toxicants classified ? Write briefly about each category with examples.

4. (1) Describe the principle, procedure (flow chart), applications, advantages, and disadvantages of the Ames Test. **14**

(2) What are the different methods by which drugs can be administered to the body ? Give examples.

OR

4. (1) Describe the concept and types of dose-response relationships in toxicology. **14**

(2) Write an account of the various factors pertaining to the organism that influence the toxicity of a substance.

5. Answer any **SEVEN** out of **TWELVE** : **14**

(1) Define photoperiod.

(2) What are the signs of heatstroke in Cats ?

(3) Compare the CPCSEA and IACUC guidelines. (any two)

(4) What is the meaning of genotoxic ?

(5) Define: Presumed Toxicity

(6) Give the full name of DLCO.

(7) Give the complete names of the abbreviations NOAEL and DNEL used in toxicology.

(8) Write the difference between food contamination and food adulteration.

(9) Give four examples of naturally occurring plant-based pesticides.

(10) List the factors of the surrounding medium that affect the toxicity of a substance.

(11) Write the names of four commonly used in vitro antioxidant evaluation tests.

(12) What do you mean by IC_{50} and EC_{50} ? Define both terms.