[This question paper contains 4 printed pages.]

(11) Your Roll No. 2022

Sr. No. of Question Paper : 1119 A

Unique Paper Code : 32231601

Name of the Paper : Developmental Biology

Name of the Course : **B.Sc. (H) Zoology Examination, LOCF**

Semester : VI

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **ANY FIVE** questions in all including Question No. **1** which is compulsory.
3. Illustrate your answers with diagrams, wherever necessary.

1. (a) Define the following : (6×1.5=9)

   (i) Morphogen

   (ii) Implantation

P.T.O.

(iii) Fertilization envelope

(iv) Delamination

(v) Stem cells

(vi) Spermiogenesis

(b) Differentiate between the following : (5×2=10)

(i) Telolecithal and centrolecithal eggs

(ii) Epiboly and emboly

(iii) Epigenesis and preformation

(iv) Epimorphosis and morphallaxis

(v) Juxtracrine and paracrine signaling

(c) Name the germ layer/s from which the each if the following is derived : (5)

(i) Dentine

(ii) Ovary

(iii) Tonsils

(iv) Glial cells

(v) Pharynx

(d) Give the contribution of the following scientists in the field of developmental biology **(any three)** (3)

(i) Ernst Haeckel

(ii) Hans Spemann

(iii) F.R. Lillie

(iv) H.C. Pander

2. (a) Describe the process of oogenesis and discuss the changes that occur in the egg post fertilization until the onset of cleavage divisions (9)

(b) Write in brief about the patterns of cleavage based on the amount of yolk. (3)

3. (a) Discuss the formation and regression of primitive streak in avian development. What is the significance of primitive streak? (7)

(b) Explain the functions of extra embryonic membranes in birds. (5)

4. (a) What are the different types of metamorphosis in insects? Discuss the hormonal control of insect metamorphosis. (9)

(b) State some of the distinctive metamorphic changes exhibited by anurans. (3)

5. Describe the different types of placenta on the basis of morphology and histology. Add a note on the physiological functions of placenta. (12)

6. (a) Explainthe mechanisms involved in preventing polyspermy. State the need for fast and slow block to polyspermy. (8)

(b) Discuss various theories of ageing. (5)

7. Write short notes on **any three** of the following : (3×4=12)

(a) In vitro fertilization

(b) Acrosomal reaction

(c) Impact of teratogens on human embryonic development

(d) Cytoplasmic determinants in development

(e) Egg membranes

(f) Primary Organizer

[This question paper contains 4 printed pages.]

(12) Your Roll No. 2022

Sr. No. of Question Paper : 1235 A

Unique Paper Code : 32237903

Name of the Paper : Animal Biotechnology

Name of the Course : **B.Sc. (H) Zoology Examination, 2022-LOCF**

Semester : VI – Theory Examination

Duration : 3 hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Write your Roll No., Name of the paper, Course, Semester, and Date of examination on the first page of answer sheet.
3. Attempt **five** questions in all.
4. Question No. **1** is compulsory.

1. (a) Define the following terms : (5×1=5)

(i) Transfection

P.T.O.

(ii) Transgene

(iii) Plasmid

(iv) Polylinker

(v) DNA microarray

(b) Expand the following terms : (5×1=5)

(i) TALEN

(ii) MAC

(iii) VNTR

(iv) RFLP

(v) ASO

(c) Differentiate between the following : (6×2=12)

(i) Real time PCR and Reverse transcription PCR

(ii) Cosmid and phagemid

(iii) Westem and Southern blotting

(iv) Agarose gel and polyacrylamide gel electrophoresis

(v) Isoschizomer and Isocaudomer

(vi) Insertion and Replacement lambda vector.

(d) Explain the contribution of following scientists in the field of Biotechnology : (5×1=5)

(i) Watson and Crick

(ii) Sanger

(iii) Sir Alec JefFerey

(iv) Fredrick Griffith

(v) Arber, Nathans and Smith

2. (a) Explain the Embryonic Stem Cell method of producing transgenic animals. (6)

(b) Discuss the use of Ti plasmid for introduction of genes into plants. (6)

3. (a) Explain the principle of Sanger's chain termination method. (6)

(b) Discuss the applications of PCR. (6)

4. (a) Describe the CRISPR-CAS system as a gene editing tool. (6)

(b) Explain the process of genetic recombination with Cre-lox P recombination system. (6)

5. Explain the process of molecular diagnosis of Cystic Fibrosis. (12)

6. Write short note on the following **(Any two)** : (6×2=12)

(i) Recombinant Growth Hormone

(ii) DNA Microarray

(iii) Insect Resistant Plants

(iv) Type II restriction endonucleases

[This question paper contains 4 printed pages.]

(13) Your Roll No. 2022

Sr. No. of Question Paper : 1328 A

Unique Paper Code : 32237910

Name of the Paper : Reproductive Biology (DSE)

Name of the Course : B.Sc. (Hons.) Zoology

Semester : VI (LOCF)

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **five** questions in all including Question No. **1** which is compulsory.

1. (a) Differentiate between the following **(any five)** : (2×5=10)

   (i) Theca externa and Theca interna

   (ii) Vasectomy and Tubectomy

   (iii) Luteotrophic factors and luteolytic factors

(iv) Gonadotropin receptors and steroid receptors

(v) ART and contraception

(vi) Caput and Cauda Epididymis

(b) Define the following **(any eight)** : (1.5×8=12)

(i) Second messenger

(ii) Ectopic pregnancy

(iii) Spermiation

(iv) Diapause

(v) Cortical reaction

(vi) Oligospermia

(vii) Superovulation

(viii) Puberty

(ix) Braxton-Hicks contractions

(x) Infertility

(c) Match the following : (1×5=5)

(i) hCG	(a) Aromatase activity
(ii) PRL	(b) Milk production
(iii) Oxytocin	(c) Pregnancy detection hormone
(iv) FSH	(d) Uterine contraction
(v) Progesterone	(e) Pregnancy maintenance

2. (a) Describe the various hormones secreted by the placenta and their role in maintaining gestation. (12)

3. (a) What is meant by 'gestational adaptations'? Discuss any four adaptations. (6)

(b) Describe the hormonal regulation of folliculogenesis in mammals. (6)

4. (a) What is contraception? Discuss any four types of contraceptive methods. (9)

(b) Discuss the role of decidua in implantation. (3)

(c) Match the following : (1×5=5)

(i) hCG	(a) Aromatase activity
(ii) PRL	(b) Milk production
(iii) Oxytocin	(c) Pregnancy detection hormone
(iv) FSH	(d) Uterine contraction
(v) Progesterone	(e) Pregnancy maintenance

2. (a) Describe the various hormones secreted by the placenta and their role in maintaining gestation. (12)

3. (a) What is meant by 'gestational adaptations'? Discuss any four adaptations. (6)

(b) Describe the hormonal regulation of folliculogenesis in mammals. (6)

4. (a) What is contraception? Discuss any four types of contraceptive methods. (9)

(b) Discuss the role of decidua in implantation. (3)

5. (a) With the help of well-labelled diagram describe the process of spermiogenesis. Compare the role of Leydig cells and Sertoli cells in spermatogenesis. (6+6=12)

6. (a) How does fetal endocrine system control parturition? (3)

(b) With the help of diagrams, explain the development of mammary glands. Give hormonal control of milk production (9)

7. Write short notes **(any three)** : (4×3=12)

(a) Mode of steroid action

(b) Foeto-placental unit

(c) Estrous cycle

(d) Types of implantation

(e) Sperm transport in male genital tract

[This question paper contains 4 printed pages.]

(14) Your Roll No 2022

Sr. No. of Question Paper : 1364 A

Unique Paper Code : 32231602

Name of the Paper : Evolutionary Biology

Name of the Course : **B.Sc. (H) Zoology (LOCF)**

Semester : VI

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **Five** Questions in all including Question No. **1** which is compulsory.

1. (a) Define the following :

(i) Stromatolites

(ii) Inbreeding coefficient

(iii) Sister taxon

(iv) Ring species

(v) Gene flow

(vi) Molecular clock (1×6=6)

P.T.O.

(b) Differentiate between the following :

(i) Parapatric and Peripatric modes of speciation

(ii) Rooted and Unrooted trees

(iii) Background and mass extinction

(iv) Stabilizing and disruptive selection

(2×4=8)

(c) Mention the contributions of following :

(i) Raymond Dart

(ii) Alaxander Oparin

(iii) Theodosius Grygorovych Dobzhansky

(iv) Barbara McClintock

(v) Henry Bernard Davis Kettlewell

(1×5=5)

(d) Justify the following statements :

(i) Horse evolution didn't proceed in a straight line.

(ii) Drift changes the gene frequency but inbreeding does not

(iii) Over-reproduction is the driving force of evolution.

(iv) Prokaryotic cells have given rise to aerobic eukaryotic cell

(2×4=8)

2. (a) What are the 'isolating barriers' for species? With suitable examples, elaborate the barriers that operate before the formation of zygote. (8)

(b) Outline the merits and demerits of RNA-world hypothesis. (4)

3. (a) Describe various sources of genetic variations at individual and population level? (8)

(b) Explain how migration causes changes in allele frequency among populations. (4)

4. (a) Discuss the paleontological evidences of evolution with suitable examples. Also, briefly comment upon different types of fossils. (8)

(b) Justify the statement, 'Incompleteness of fossil records does not disprove the theory of evolution.' (4)

5. (a) Discuss the different types of natural selection with suitable examples. (6)

(b) What do you understand by 'Hardy-Weinberg equilibrium'? Comment upon its assumptions and applications. (6)

6. What are the unique hominin characteristics in contrast to primates? Trace the primate phylogeny from *Dryopithecus* leading to *Homo sapiens*. (12)

7. Write short notes on **any three** of the following :

(a) K-T extinction

(b) Modern synthetic theory

(c) Biological species concept

(d) Geological time scale (3×4=12)