

(6)



[This question paper contains 4 printed pages]

Your Roll No. :

2019

Sl. No. of Q. Paper : **2288** IC

Unique Paper Code : 32231601

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

Name of the Paper : Developmental Biology

Semester : VI

Time : 3 Hours

Maximum Marks : 75

Instructions for Candidates :

- (a) Write your Roll No. on the top immediately on receipt of this question paper.
- (b) Attempt **five** questions including question **No.1** which is compulsory.
- (c) Attempt all parts of a questions together.

1. (a) Define the following terms (any **five**) :

5

- (i) Delamination
- (ii) Symmetry
- (iii) Capacitation

P.T.O.

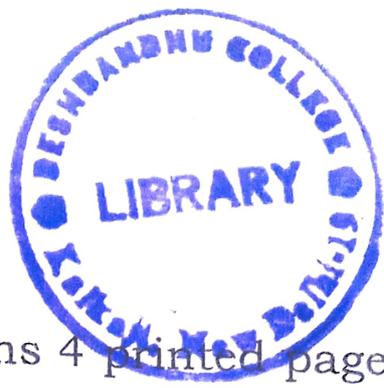


- (iv) Morphogen
 (v) Blastema
 (vi) Amphimixis
- (b) Distinguish between (any **four**) : $4 \times 2 = 8$
 (i) Epiboly and Emboly
 (ii) Fertilizin and Antifertilizin
 (iii) Epigenesis and Preformation
 (iv) Monospermy and Polyspermy
 (v) Epimorphosis and Morphallaxis
- (c) Indicate the exact location and function of each of the following : 3
 (i) Sertoli Cells
 (ii) Yolk Plug
 (iii) Theca interna
- (d) Expand the following abbreviations : 3
 (i) ART
 (ii) ICM
 (iii) JH
- (e) Give contribution of the following scientists in the field of developmental biology : 4
 (i) W. Vogt
 (ii) Wilhelm Roux
 (iii) Hans Spemann
 (iv) C. Waddington

- (f) Name the germ layer from which each of the following is derived : 4
 (i) Retina
 (ii) Kidney
 (iii) Liver
 (iv) Dermis
2. (a) Define placenta and classify on the histological basis with diagrams. 6
 (b) What are the various causes of ageing ? Describe in detail, any **two**. 6
3. (a) Differentiate between pre-metamorphosis and post-metamorphosis. Discuss hormonal control in different phases of amphibian metamorphosis. 6
 (b) Explain embryonic induction and enumerate the functions of primary organizer. 6
4. (a) Describe various gastrulatory movements with reference to gastrulation in chick. 6
 (b) Illustrate the process of fertilization, explaining in brief, the various changes taking place in zona pellucida. 6

5. (a) Describe the process of spermeiogenesis, with the help of suitable diagrams. 6
- (b) What are the properties of stem cells ? Enumerate different types of stem cells and their application in regenerative medicine. 6
6. (a) Describe, with diagrams, the formation and functions of extraembryonic membrane in birds. 6
- (b) Give examples of teratogens and describe their effect on human embryonic development. 6
7. Write short notes on any **three** of the following :
3×4=12
- (a) Fate maps
- (b) Types of blastula
- (c) Amniocentesis
- (d) Regeneration in Hydra

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[This question paper contains 4 printed pages]

Your Roll No. : 2019
Sl. No. of Q. Paper : 2289 IC
Unique Paper Code : 32231602
Name of the Course : **B.Sc. (Hons.) Zoology**
Name of the Paper : Evolutionary Biology
Semester : VI
Time : 3 Hours **Maximum Marks : 75**

Instructions for Candidates :

- (a) Write your Roll No. on the top immediately on receipt of this question paper.
- (b) Attempt any **five** questions including Question **NO.1**, which is compulsory.
- (c) Attempt all parts of a section together.

1. (a) Define each of the following terms :

5

- (i) Coprolites
- (ii) Sibling species
- (iii) Panmixis
- (iv) Bootstrap value
- (v) Coecervates

P.T.O.

(b) Differentiate between each of the following : 8

- (i) Body fossils and trace fossils
- (ii) Demes and clines
- (iii) Autopolyploidy and allopolyploidy
- (iv) Geographic and reproductive isolating mechanisms

(c) Mention the major contributions of the following Evolutionary Biologists : 4

- (i) Zuckerkandl and Pauling
- (ii) Theodosius Dobzhansky
- (iii) Ernst Mayr
- (iv) Lynn Margulis

(d) Justify any **three** of the following statements : 6

- (i) Deleterious alleles never get eliminated from the population.
- (ii) Molecular data can be used to predict evolutionary relationships.
- (iii) Mutations and gene flow lead to change in allele frequencies.
- (iv) Over-reproduction is the driving force in evolution.

(e) Fill in the blanks :

- (i) Camouflaging against the environment is called colouration. 4
- (ii) software is used to construct phylogenetic tree using molecular sequences.
- (iii) Increasing milk yield in cattle through artificial selection procedure is an example of
- (iv) The extent to which a population departs from a perfect genetic constitution is called.....

2. (a) What are the various sources of organic variations ? Discuss their role in evolution. 9

(b) What do you understand by 'Molecular clock hypothesis' ? 3

3. (a) 'Fossils present a strong evidence in support of evolution'. Justify the statement taking the example of horse phylogeny. 8

(b) What are the molecular evidences to support the view of hominid evolution from apes ? 4

4. (a) With suitable examples, explain various types of post-zygotic isolating mechanisms. 6
- (b) Discuss genetic drift in natural populations with respect to changes in allele frequencies. 6
5. (a) Discuss the causes and effects of mass extinctions. 6
- (b) Define natural selection. Derive the change in allelic frequency for a dominant allele through one unit of selection. 6
6. (a) Describe multiple sequence alignment and discuss its applications. 5
- (b) Write a note on 'Geological Time Scale'. 4
- (c) What is 'Kin Selection'? 3
7. Write short notes on any **three** of the following : 4+4+4
- (a) Modern synthetic theory
- (b) Chemogeny
- (c) Macroevolution
- (d) Globin gene family

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[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 2743

IC

2019

Unique Paper Code : 32237903

Name of the Paper : Animal Biotechnology

Name of the Course : B.Sc. (H) Zoology : DSE-3

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.
3. Question No. 1 is compulsory.

1. (a) Define : (5)

- (i) Reverse Transcriptase
- (ii) Episome
- (iii) Palindrome sequence
- (iv) Hayflick's limit
- (v) Shuttle vector

P.T.O.

(b) Distinguish between : (2×5=10)

- (i) Stringent and Relaxed Plasmid
- (ii) Colony and Plaque hybridization
- (iii) Cloning vector and Expression vector
- (iv) Isocaudomers and Isoschizomers .
- (v) Biosafety Cabinet I and II

(c) Expand the following : (3)

- (i) MAC
- (ii) VNTR
- (iii) pBR322
- (iv) CRY
- (v) SCID
- (vi) ORF

(d) Write the importance of following : (3)

- (i) Teminism
- (ii) Super bug
- (iii) Autoclave

(e) Give the name of the scientists related to the following : (4)

- (i) rDNA technology
- (ii) Humulin
- (iii) Microbial genetics
- (iv) DNA microarray

(f) Explain the role of (2)

- (i) Lac Z - alpha complementation
- (ii) Terminal deoxy-nucleotidyl transferase

2. (a) Explain the molecular diagnosis of Sickle cell Anaemia. (6)

(b) Describe the various viruses used as cloning vectors. (6)

3. (a) How is rDNA technology important in production of synthetic proteins. Explain the production of recombinant Growth Hormone. (6)

(b) What are genetic markers? How are they used for DNA fingerprinting? (6)

4. (a) Describe host restriction enzymes. Differentiate among various types. (6)

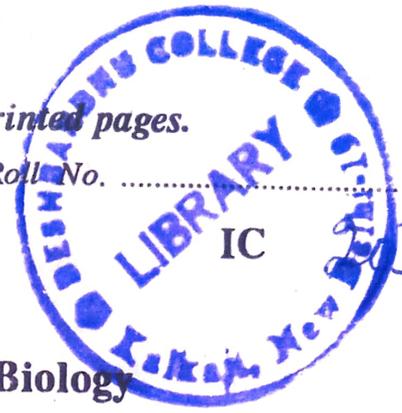
- (b) Discuss the applications of transgenic animals. (6)
5. (a) Differentiate between in-vivo & ex-vivo gene therapy. Describe viral and non-viral modes of gene delivery. (8)
- (b) Explain the principle of production of herbicide resistant plants in detail. (4)
6. (a) Describe the method of DNA microarray. Mention its application. (4)
- (b) Describe the principle and Application of PCR with suitable diagrams. (4)
- (c) What is cDNA library? Write down the method for screening of cDNA library. (4)
7. Write short notes (**Any THREE**): (4×3=12)
- (a) Ti plasmid
- (b) Western Blot
- (c) DNA sequencing
- (d) Media for cell culture

Library

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This question paper contains 4 printed pages.

Your Roll No.



Sl. No. of Ques. Paper: 2882

Unique Paper Code : 32237910

Name of Paper : Reproductive Biology

Name of Course : B.Sc. (H) Zoology : DSE - 4

Semester : VI

Duration : 3 hours

Maximum Marks : 75

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

*Attempt five questions in all.
Question No. 1 is compulsory.*

1. (a) Define:

1×5=5

- (i) Negative feedback regulation
- (ii) Aromatization
- (iii) Emergency contraception
- (iv) Ectopic pregnancy
- (v) Gynogenesis.

(b) Differentiate between:

2×3=6

- (i) Invasive and non-invasive implantation
- (ii) Necrospemia and asthenozoospermia
- (iii) Induced ovulation and spontaneous ovulation.

P. T. O.

(c) Expand the following:

1×4=4

(i) PROST

(ii) NCDT

(iii) RISUG

(iv) HSD

(d) Fill in the blanks:

1×4=4

(i) Receptors of gonadotropins are located

(ii) is the primary estrogen during pregnancy.

(iii) is the precursor molecule of steroid biosynthesis.

(iv) is the non-reversible mode of contraception in females.

(e) Give the location and mention any *one* function of the following:

1×4=4

(i) Sertoli cells

(ii) Gonadotrophs

(iii) Corona radiata

(iv) Prostate gland.

(f) Give the source and mention any *one* function of the following:

1×4=4

(i) LH

(ii) Oxytocin

(iii) Relaxin

(v) hPL.

2. Diagrammatically describe folliculogenesis and its hormonal control. 12

3. (a) Describe the role of prostaglandins in parturition. 6

(b) Give an account of maturation of spermatozoa in epididymus. 6

4. (a) Discuss the mechanism of classical mode of steroid action. 6

(b) Briefly give an account of feto-placental unit. 6

5. (a) Draw the schematic representation of stem cell renewal in testis of man and rat. Explain its significance. 7

(b) Describe the methods by which tubal transfer can be accomplished. 5

6. (a) Discuss the different means of hormonal contraception with examples and add a note on mode of action of hormonal contraception. 7

(b) Describe various causes of infertility in men. 5

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

(a) Blood-testis barrier

(b) Immuno-contraceptives

(c) Pearl's index

(d) Preimplantation genetic diagnostics.

$$3 \times 4 = 12$$

Sl No of Q.P. 3555A

(10)

2015
2019

~~SET-A~~

Unique paper code: 107693

Name of the paper: Genetics and Genomics II, GGHT 602

Name of the course: B.Sc. (H) Zoology, Botany, Anthropology, Microbiology, Biochemistry,
Biomedical Sciences ~~Key~~

Semester: VI

Duration: 3 hours

Maximum Marks: 75



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Instructions for Candidates

1. Write your Roll no. on the top immediately on receipt for this question paper.
2. Answer five questions in all.
3. Question 1 is compulsory.

Q.1 a) Define any **five** of the following terms:

(5x1=5)

- i. Allele
- ii. Sexduction
- iii. Conjugation
- iv. Indel
- v. Hybrid dysgenesis
- vi. Retro-transposons
- vii. Inbreeding depression

b) Differentiate between any **five** the following pairs:

(5x2=10)

- i. Simple and Composite transposon
- ii. Sequence Identity and Sequence Similarity
- iii. Transformation and Transduction
- iv. Genomics and Proteomics
- v. Prokaryotic and Eukaryotic genome
- vi. Sympatric and Allopatric Speciation
- vii. Episomes and Plasmids

c) State the contributions of: (any **two**)

(2x1=2)

- i. Barbara McClintock
- ii. E Wollman and F Jacob
- iii. J Lederberg and N Zinder

d) Expand any **four** of the following-

(4x1=4)

- i. LINEs
- ii. VNTR
- iii. ORF

iv. DTRs

v. NCBI

e) Enumerate the features that allow the following organisms to serve as model systems in biology (any **two**) (2x2=4)

- i. *Sachharomyces cerevisiae*,
- ii. *Arabidopsis thaliana*
- iii. *Drosophila melanogaster*

f) Cystic fibrosis is an autosomal recessive disorder with an incidence 4 in 10,000 in people of northern European ancestry. Calculate all the genotypic frequencies assuming that this population is under Hardy-Weinberg equilibrium. (2)

Q.2 Explain generalized and specialized transduction (include suitable diagrams). (12)

Q.3a) State the principle of Hardy-Weinberg Equilibrium. What are the basic assumptions of this theorem? (2+4=6)

b) Explain the role of Zygotic genes during development of *Drosophila*. (6)

Q 4 a) Give an account of Ac-Ds system in maize. (6)

b) How is Interrupted mating technique employed for gene mapping in bacteria? (6)

Q 5 a) Define bioinformatics. Briefly describe various types of databases. (8)

b) What are the key characteristics for identifying ORF from a given sequence? (4)

Q.6 Discuss the reproductive isolative mechanisms and their role in speciation. (12)

Q.7 Write short notes on any **three**:

(4,4,4)

- a) Microarray
- b) Genetic Drift
- c) Gene annotation
- d) Class ABC genes of *Arabidopsis*
- e) Homeotic genes