(1)

10/5/18

[This question paper contains 4 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **6745** **HC**

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 any **FIVE** questions in all.

(c) Question **NO.1** is compulsory.

1. (a) Define the following terms (any **five**) : 5

(i) Involution

(ii) Cytoplasmic determinants

(iii) Bilateral symmetry

(iv) Organiser

(v) Discoblastula

(vi) Morphogen

P.T.O.

(b) Distinguish between (any **four**) : 4×2=8

(i) Physiological and Pathological Polyspermy

(ii) Allometric & Isometric growth

(iii) Splanchnopleure and Somatopleure

(iv) Syncytiotrophoblast and Cytotrophoblast

(v) Area opaca and Area pellucida

(c) Indicate the exact location and function of each of the following : 3

(i) Koller's sickle

(ii) Archenteron

(iii) Chalazae

(d) Expand the following abbreviations : 3

(i) ESC

(ii) IMZ

(iii) GVBD

(e) Give the contribution of the following scientists in the field of developmental biology : 4

(i) H.C. Pander

(ii) F.R. Lillie

(iii) E.Conklin

(iv) R. G. Edwards

(f) Name the germ layer from which each of the following is derived : 4

(i) Notochord

(ii) Ovary

(iii) Bone

(iv) Heart

2. (a) Describe the process of oogenesis. How is yolk transported to the oocyte in vertebrates. 6

(b) Describe various morphogenetic movements with reference to gastrulation in frog. 6

3. (a) What are the different types of regeneration ? Add a note on regeneration of salamander's limb. 6

(b) Describe the various patterns of cleavage based on the amount and distribution of yolk. 6

4. (a) What are the different types of metamorphosis in insects ? Add a note on the role of hormones in insect metamorphosis. 6

(b) Enlist the various functions of placenta. Add a note on the hormones and their functions involved in the maintenance of placenta. 6

5. (a) What is ART ? Explain the process of *in vitro* fertilization. 6

   (b) What do you understand by embryonic induction ? Give experimental evidences for the occurrence of induction in amphibian embryos. 6

6. (a) What are fate maps ? Describe various methods to generate fate maps ? Draw well-labelled diagrams of the fate maps of frog and chick embryo. 6

   (b) State various theories of ageing. Give an example of premature ageing syndrome with its symptoms. 6

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

   (a) Cortical reaction

   (b) Teratogens

   (c) Karl Ernst von Baer's laws

   (d) Extraembryonic membranes in birds

(2)

This question paper contains 4 printed pages] 2018

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **6746**

Unique Paper Code : **32231602** **HC**

Name of the Paper : **Evolutionary Biology**

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

Semester : **VI**

Duration : **3 Hours** Maximum Marks : **75**

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

Attempt any *five* questions including,

Question No. **1**, which is compulsory.

1. (*a*) Define each of the following terms : 5

(*i*) Stromatolites

(*ii*) Ring species

(*iii*) Pangenesis

(*iv*) Gap penalty

(*v*) Orthologous genes

(*b*) Differentiate between each of the following : 8

(*i*) Allopatric and sympatric speciation

(*ii*) Homologous and analogous organs

(*iii*) Germinal and acquired variations

(*iv*) Background extinction and mass extinction

P.T.O.

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

(*i*) Stanley Miller

(*ii*) Henry Bernard Davis Kettlewell

(*iii*) Thomas Robert Malthus

(*iv*) Jonathan Leaky

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

(*i*) Prokaryotic cells have given rise to aerobic eukaryotic cells.

(*ii*) Incompleteness of fossil records does not disprove the theory of evolution.

(*iii*) Mutation and recombination lead to evolution.

(*iv*) Most of the organisms subjected to artificial selection are infertile.

(*e*) Fill in the blanks : 4

(*i*) The relative capacity of the carrier of a genotype to transmit its genes to the gene pool of subsequent generations constitutes the .....of that genotype

(*ii*) .....software is used to align multiple sequences.

(*iii*) Genetic load is accumulation of ..... characteristics.

(*iv*) The fossil hominins of the Pliocene epoch are called .....

2. (*a*) Describe Darwin's concept of Natural Selection. What were the main limitations of this concept ? How was the concept later modified to overcome these limitations. 9

(*b*) What do you understand by 'Three domains of life' ? 3

3. (*a*) Trace the phylogeny of horse in the form of flow chart with suitable diagrams; discuss its salient features. 5,3

(*b*) Enumerate unique hominin characteristics in contrast to primate characteristics. 4

4. (*a*) What do you understand by 'isolating mechanisms'? Discuss various types of isolating mechanisms that can prevent mating between potential mates. 8

(*b*) Give different types of natural selection with suitable examples. 4

5. (*a*) State the 'Hardy Weinberg law' and the conditions under it may operate in nature. Mention the evolutionary forces that can upset this equilibrium ? 8

(*b*) Explain K-T mass extinction with its biological consequences. 4

6. (*a*) Discuss chemical origin of life with an experimental proof in support of the same. 7

(*b*) What is a 'phylogenetic tree' ? Enumerate various methods used to construct a 'phylogenetic tree' using molecular markers. 3

(*c*) What do you understand by 'heterozygous superiority' ? 2

7. Write short notes on any *three* of the following : 4+4+4

(*a*) Neutral theory of evolution

(*b*) RNA world hypothesis

(*c*) Sewall Wright effect

(*d*) Adaptive radiation

Sl-No. 07 QP: 5539 SEM-3 17/5/18 400

Unique Paper Code : 107693

Name of the Paper : Genetics & Genomics II

Name of the Course : BSc(H) Hons: ~~Anthro/Biochem/BioMed/Microbiology/Botany/Zoology~~ H

Semester : VI

Duration : 3 hours

Maximum Marks : 75 Marks

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. Define any five of the following terms: (5)
   (a) Plasmid
   (b) Lysogeny
   (c) Structural genomics
   (d) MADS box
   (e) Systems biology
   (f) Retrotransposon

(ii) Differentiate between any four of the following pairs: (8)
   (a) Generalized and Specialized transduction
   (b) Maternal effect genes and Zygotic genes
   (c) Introns and Exons
   (d) Genomics and Proteomics
   (e) LINES and SINES

(iii) Give one important contribution of any six of following scientists: (6)
   (a) C.N. Volhard
   (b) F.Griffith
   (c) J. Lederberg and E. Tatum
   (d) F. Sanger
   (e) C. Darwin
   (f) Barbara Mc Clintock
   (g) Margaret Dayhoff

SET B

(iv) Expand **any five** of the following: (5)

(a) BLAST
(b) SNP
(c) SINE
(d) WGS
(e) Hfr
(f) PDB

(v) The following *E.coli* Hfr strains donate genes to F^- strain in the given order (3)

Strain1	trp^+	leu^+	pro^+	arg^+	met^+
Strain2	str^+	gal^+	his^+	met^+	arg^+
Strain3	ton^+	azi^+	tet^+	str^+	gal^+
Strain4	ton^+	trp^+	leu^+	pro^+	arg^+

All these Hfr strains were obtained from the same F^+ strain. Give order of genes on original F^+ strain.

2. (a) What are segmentation genes? Explain the role of the various segmentation genes in embryo development in *Drosophila*. (7)

(b) Comment on Ac-Ds system in maize. (5)

3. (a) Describe the Davis U-tube experiment to establish the importance of cell to cell contact for chromosome transfer. (7)
(b) With the help of diagram, explain bacterial transformation process. (5)

4. (a) Explain DNA sequencing by clone-by-clone approach . (7)
(b) Briefly describe annotation process to identify gene sequences. (5)

5 (a) Give a comparative account of directional selection and stabilizing selection with suitable examples. (7)
(b) Describe IS elements in bacteria. (5)

6. (a) Expalin Hardy-Weinberg Law and the conditions under which it is applicable. (7)
(b) Give the two different mechanisms of transposition of genetically mobile elements. (5)

7. Write short notes on any **three** of the following (4x3=12)
(a) Homeotic genes in *Arabidopsis*
(b) Neutral theory
(c) NCBI
(d) Human Genome Project
(e) *Drosophila* as a model system in genetics

[This question paper contains 4 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **5847** **H**

Unique Paper Code : 223603

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

Name of the Paper : Biotechnology

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 in all. Question **NO. 1** is compulsory.

1. (A) Define (Any **FIVE**) : 1×5=5

(i) Klenow Fragment

(ii) Episome

(iii) Insertional inactivation

(iv) Probe

(v) M13 phage

(vi) Expression vector

P.T.O.

(B) Distinguish between (Any **FIVE**) : 2×5=10

(i) Blunt and Cohesive ends

(ii) Isochizomers and Isocaudomers

(iii) Transformation and Transfection

(iv) Plasmid and Phagemid

(v) Alkaline phosphatase and Polynucleotide kinase

(vi) Gene knock out and Gene Knock down

(C) Expand the following (Any **FOUR**) : 4

(i) ORF

(ii) VNTR

(iii) SCID

(iv) ESTs

(v) PFGE

(D) Explain the importance of : 4

(i) Bt Cotton

(ii) Protropin

(iii) Multiple Cloning site

(iv) S1 nuclease

(E) Give the important contributions of the following scientists : 4

(i) Burke, D.T and Carle, G.F

(ii) Nancy Wexler

(iii) Temin and Baltimore

(iv) Ian Wilmut

2. (a) Describe the method of construction of genomic library. 6

(b) Explain Colony hybridization method for screening of genomic libraries. 6

3. (a) Write the principle and procedure of PCR. 4

(b) Explain the methods for production of transgenic animals. 8

4. (a) Describe the production of Humulin. 6

(b) Explain molecular diagnostic techniques to detect either Huntington **or** Cystic fibrosis. 6

5. (a) Write an account of production of Transgenic plants and their potential applications. 8

(b) Describe Type II restriction enzymes with examples. 4

6. (a) Describe the various methods used in gene therapy. 8

(b) Write an account of DNA microarray. 4

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

(a) DNA fingerprinting

(b) Western Blot

(c) Sanger's sequencing method

(d) Cloning vectors

[This question paper contains 8 printed pages]

Your Roll No. : .....

Sl. No. of Q. Paper : **5848** **H**

Unique Paper Code : 223605

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

Name of the Paper : Applied Zoology

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 **two** sections. Do any **three** Questions from each section including Questions No.**1** which is compulsory.

Section-A

1. (a) Differentiate between the following pairs of terms : 4.5

(i) Lymphangitis and lymphadenitis

(ii) Incubation period and Pre-patent period

(iii) Carrier and vector

P.T.O.

(b) Define the following terms : 3

(i) Pandemic disease

(ii) Nocturnal periodicity

(iii) Hepatomegaly

(c) Name the infective stage of the following pathogens : 3

(i) *Schistosoma haematobium*

(ii) *Ancylostoma duodenale*

(iii) *Wuchereria bancrofti*

(d) Name the pathogen of the following diseases : 3

(i) Swine flu

(ii) Black water fever

(iii) Syphilis

2. Describe the mode of transmission, clinical symptoms, epidemiology and control of malaria. 12

3. Discuss in detail and illustrate the life-cycle, pathogenicity and prophylaxis of *Fasciolopsis buski*. 12

4. (a) Write histopathological notes on alcoholic cirrhosis. 6

(b) Give a brief account of diseases caused by *Rickettsia*. 6

5. Write short notes on any **three** of the following : 12

(a) *Leptospira*

(b) Dengue fever

(c) *Borrelia*

(d) *Schistosoma*

Section - B

1. (a) Define the following terms : 4

(i) Decidualization

(ii) Varicoele

(iii) Birth Rate

(iv) Pearl index

(b) Distinguish between the following : 4

(i) Epithelio-chorial placenta and haemo-chorial placenta

(ii) COPs and POPs

(c) Fill in the blanks : 2

(i) _____ is the primary estrogen secreted during pregnancy.

(ii) _____ implantation occurs when the blastocyst remains in contact with luminal epithelium but does not penetrate it.

(d) Expand the following abbreviations : 1.5

(i) DHEA

(ii) HWY

(iii) BBT

(e) Write the contribution of following Scientists : 2

(i) Carl Djerassi

(ii) Patrick Steptoe

2. Discuss the changes associated with myometrium and cervix during parturition and the hormonal regulation of the same. 12

3. What is assisted reproductive technology ? Describe the various steps involved in IVF-ET. 12

4. (a) What are the primary causes of infertility in males ? 6

(b) Discuss the techniques involved in storage and cryopreservation of semen. 6

5. Write short notes on any **three** of the following : 12

(a) Delayed implantation

(b) Feto-placental unit

(c) Estrus synchronization in cattle

(d) MER

Section - C

1. (a) Differentiate between the following pairs of terms : 6

(i) Chewing–lapping mouth parts and piercing–sucking mouth parts

(ii) Mulberry and non-mulberry silk worms

(iii) Stomach poison and Contact poison

(b) Define the following terms : 4

(i) Bee pasturage

(ii) Fumigant

(iii) Halteres

(iv) Phytophagous insects

(c) Expand the following terms : 1.5

(i) ADI

(ii) SIRM

(iii) IARI

(d) State whether the following statements are **true** or **false** : 2

(i) Species of silkworm producing two generations per year are called bivoltine species.

(ii) Trenching is a good method for controlling locusts and nymphs.

(iii) Pyrethrum is an example of a biopesticide.

(iv) Greater wax moth is a major pest of silkworm.

2. (a) Give the scientific name of gram pod borer and pink boll worm. Write the damage caused by them. 5

(b) Describe the life history and suggest suitable control measures for any one of the above mentioned pest. 7

3. (a) Discuss the bionomics of any **one** of the coleopteran stored grain pest studied by you. 6

(b) Describe the various physical factors for the management and control of stored grain insects. 6

4. Outline the rearing methods and management of *Bombyx mori* in sericulture industry. 12

OR

Discuss the artificial rearing and management of honeybees for the apiary. Add a short note on the various products obtained from them.

5. Write short notes on any **three** of the following : 12

(a) Genetic control of insects

(b) IPM

(c) Microbial control of insects

(d) Merits and demerits of biological control over chemical control