(13) 11/5/17

Roll No._____

Sr. No. of the Question Paper: 1710
Unique paper code: ~~223160~~ 1 223601
Name of the paper: Principles of Genetics
Name of the Course: B.Sc. (Hons) Zoology
Semester: VI
Duration: 3 hours

P-8

Max. marks: 75

(Write your Roll No. immediately on receipt of this question paper.)
Attempt five questions in all including Question No. 1 which is compulsory.

1 (a) **Define:** 5
- i. Supressor mutation
- ii. Prophage
- iii. Merozygote
- iv. Pleiotropy
- v. Idiogram

(b) **Explain the following:** 4
- i. Drosophila flies that are XXY are fertile females.
- ii. 50% recovery of single-crossover products is the upper limit, even when crossing over always occurs between two linked genes.

(c) **Distinguish between:** 8
i). Composite and Non-composite Transposons
ii). Missense and nonsense mutations
iii) Narrow sense- and broad sense heritability
iv). Segregational and neutral petites in Saccharomyces

(d) **Expand the abbreviations:** 6
- i. PKU
- ii. SRY
- iii. QTL
- iv. RTF
- v. PEG

(e) **Write important contributions of the following:** 5
- i. Hermann J. Muller
- ii. Frederick Griffith
- iii. William Hayes
- iv. Hugo de Vries
- v. Margaret G. Kidwell

2. a). Explain the molecular basis of mutations caused by base analogues, nitrous acid and acridines.
b). Discuss with suitable diagrams, different mechanisms for the repair of DNA, operating in *E.coli*. 6,6

3. a) Give an experimental proof that crossing over occurs at the tetrad stage.
b) In Drosophila, the genes for cut wing (ct), yellow body (y), and vermilion eye (v) are three recessive mutations. A female heterozygous for these three markers was intercrossed and the following progeny was obtained:

Ct y v	4
Ct y +	93
Ct + v	54
Ct + +	349
+ y v	331
+ y +	66
+ + v	97
+ + +	6

I. How do you say that these genes are linked?
II. What is the sequence of the genes?
III. Determine the map distances and construct the chromosomal map
IV. Calculate the coefficients of coincidence and interference 4,8

4. a) Define epistasis. With the help of examples differentiate between dominant and recessive epistasis.
b). What is Bombay phenotype? Explain 8,4

5. a). Discuss and differentiate generalized and specialized transduction with suitable diagrams.
b). Discuss maternal effect with one suitable example. 8,4

6. a). Discuss the role played by Y-chromosome in human sex determination.

b). In *E. coli*, the following Hfr strains donate the genes in the following given order:

Hfr strain	Order of genes
1	G E B D N A
2	P Y L G E B
3	X T J F P Y
4	B E G L Y P

The Hfr strains were derived from the same F^+ strain. What is the order of genes in the original F^+ strain. 6,6

7. Write short note on **any three** of the following:
i. P element in Drosophila
ii. Criteria for extrachromosomal inheritance
iii. Lethal genes
iv. Somatic cell hybridization
v. Polygenic inheritance

This question paper contains 2 printed pages

~~SET B~~

Sl. No of Q.P : 1713

Your Roll No.....

Unique Paper Code : 2231604

Name of the Paper : Biotechnology: Microbes to Animals

Name of the Course : B.Sc. (H) Zoology [~~Erstwhile FYUP~~]

Semester : VI

Time: 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. Distinguish between (~~Any FIVE~~): the following : **2x5 =10**
   i) Adaptors and Linkers
   ii) Polymerase and Ligase
   iii) Cosmid and Fosmid
   iv) Isoschizomers and Neoschizomers
   v) Biosafety Cabinet I and II
   ~~vi) Primary and Secondary Metabolites~~

   B. Define (~~Any FIVE~~): the following : **1x5 =5**
   i) Expression vector
   ii) DNA Chip
   iii) Transfection
   iv) Episome
   v) Isocaudomers
   ~~vi) Fusion protein~~

   C. Expand the following (~~Any FOUR~~): **4**
   i) CFTR
   ii) SCID
   iii) SCNT
   iv) RFLP
   ~~v) MAC~~

   D. Write the importance of the following **4**
   i) rGH
   ii) S_1 Nuclease
   iii) Population Doubling Time (PDT)
   iv) Transformation Frequency

   E. Give the important contributions of the following scientists: **4**
   (i) Ian Wilmut and Keith H. S Campbell

This question paper contains 2 printed pages

(ii) J. W. Gordan and F. H. Ruddle
(iii) Kary Mullis
(iv) Stanley N. Cohen and Herbert Boyer

2. a) Discuss in detail different types of restriction endonucleases and their mode of action. 8
   b) What are the features and essential components of a desirable cloning vector. 4

3. a) Giving suitable examples discuss gene therapy for management of human genetic disorders. 6
   b) Give a brief account of recombinant humulin. 6

4. a) What is a bioreactor? Describe the major categories of the fermenters. 6
   b) Enumerate various methods used in the production of transgenic animals. 6

5. a) What are Genetic markers? Give a detailed account of DNA fingerprinting. 7
   b) Describe various screening methods for transformed cells. 5

Add a note to

6. a) How was Dolly produced ~~and~~ proved ~~to be~~ a clone? 6
   b) What is IPR? Write a note on its importance. that was 6

7. Write short notes on any ***THREE*** of the following: **3x4=12**
   a) DNA Sequencing
   b) Western Blot
   c) Growth kinetics of microbes
   d) Recombinant Vaccines

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 680 G

Unique Paper Code : 107693

Name of the Paper : Genetics and Genomics II (GGHT 602)

Name of the Course : **B.Sc. (Hons) Anthropology, Biochemistry, Biomedical Sciences, Botany, Microbiology and Zoology**

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** question in all including **Question No. 1** which is compulsory.

1. (a) Define the following (5)

   (i) Target site duplication

   (ii) Competent cells

   (iii) Selection coefficient

P.T.O.

(iv) Reverse Genetics

(iv) Clade

(b) Describe the function of the following : (3)

(i) Transposase

(ii) Resistance transfer factor

(iii) F factor

(c) Distinguish between: (8)

(i) Local and Global Sequence Alignment

(ii) Temperate and Virulent phages

(iii) Auxotroph and Prototroph

(iv) Genomics and Proteomics

(d) Expand the abbreviations: (4)

(i) EST

(ii) SINE

(iii) UTR

(iv) LTRs.

(e) Write important contributions of the following: (4)

(i) Davis Bernard

(ii) Seymour Benzer

(iii) Craig J. Venter

(iv) Th. Dobzhansky

(f) Fill in the blank with appropriate word: (3)

(i) The bithorax mutation in *Drosophila* is an example of a _____ mutation.

(ii) Lederberg and Zinder used _____ as an organism in the transduction experiment.

(iii) A map based on recombination frequency is called _____ map.

2. (a) With suitable diagram, describe phage λ mediated specialized transduction.

(b) Explain Hfr. Describe conjugation process between Hfr and F bacteria. (6+6)

3. (a) With suitable diagrams explain the distinctive features of various types of prokaryotic transposable elements.

(b) Describe the role of transposons in genome organization. (9+3)

4. (a) Describe key features of *Drosophila melanogaster* which allow it to be used as a model organism.

(b) Describe the function of homeotic genes in plants and animals.

(c) Write the phenotype of the following homeotic mutants of *Arabidopsis*

(i) Loss of B function

(ii) Loss of C function

(iii) Loss of A function

(iv) Complete loss of A, B, and C functions (4+4+4)

5. (a) Differentiate between 'Bottleneck effect' and 'Founder effect'.

(b) Explain 'Allopatric speciation' with the help of suitable examples.

(c) The incidence of recessive albinism in a human population is 0.0004. If mating for this trait is random in the population, find out the frequency of the recessive allele and carriers. (4+4+4)

6. (a) Explain and compare 'Structural Genomics' and 'Functional Genomics'.

(b) Give a comparative account of distinctive features of eukaryotic and prokaryotic genome. (6+6)

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

(a) Retrotransposons

(b) Human Genome Project

(c) NCBI

(d) Hardy-Weinberg's law (4+4+4)

(1000)

This question paper contains 4 printed pages]

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

S. No. of Question Paper : 902

Unique Paper Code : 223601 G

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.)

Answer *five* questions in all.

Question No. 1 is compulsory.

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

(*i*) Living fossil

(*ii*) Pseudogene

(*iii*) Gene flow

(*iv*) Heterosis

(*v*) Pseudoextinction.

P.T.O.

(*b*) Differentiate between the following pairs : 6

(*i*) Coacervates and microspheres

(*ii*) Batesian and Mullerian mimicry

(*iii*) Species and subspecies

(*c*) Justify the statement : 3

(*i*) The effect of genetic drift is observed in small population only.

(*ii*) Continuous inbreeding leads to homozygosity.

(*iii*) Finches show great variation in the Galapagos Islands.

(*d*) State the contributions of : 3

(*i*) Stanley Miller

(*ii*) Theodosius Dobzhansky

(*iii*) Motoo Kimura.

(*e*) Fill in the blanks : 5

(*i*) Similarities between marsupials in Australia and placental mammals elsewhere are examples of ..... .

(*ii*) The loss or gain of alleles in a population due to immigration or emigration is known as ..... .

(*iii*) ..... is a way to evaluate the reliability of the branches in a phylogenetic tree.

(*iv*) Species or populations occurring in the same geographical area, overlapping in range is termed ..... .

(*v*) Land tetrapods emerged during ..... period.

(*f*) Expand the following : 5

(*i*) OTU

(*ii*) PAUP

(*iii*) NCBI

(*iv*) ORF

(*v*) UPGMA

2. Enumerate the palaeontological and molecular evidences in favour of evolution. 12

3. (*a*) Discuss various isolating mechanisms with examples. 6

(*b*) What is natural selection ? Describe various types of natural selection, giving an example in each case. 6

4. (*a*) Tabulate the phylogeny of horse and enumerate its salient features. 6

(*b*) Describe multiple sequence alignment and its application. 6

5. What are the different sources of variation in higher organisms. 12

6. (*a*) Enumerate the various episodes of mass extinctions and its importance in evolution. 8

(*b*) Discuss the recent views of the origin of modern humans. 4

7. Write short notes on any *three* : 4,4,4

(*a*) RNA world

(*b*) Gene families

(*c*) Australopithecines

(*d*) Industrial melanism.

This question paper contains 4 printed pages] (17) 15/5/17

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

S. No. of Question Paper : 903

Unique Paper Code : 223603 G

Name of the Paper : Biotechnology

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.)

Answer *five* questions in all.

Question No. 1 is compulsory.

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

(*i*) Cloning vectors

(*ii*) *c*DNA

(*iii*) Transgenesis

(*iv*) Retroviruses

(*v*) Shotgun cloning

P.T.O.

(*b*) Differentiate between the following pairs : 8

(*i*) Cosmid and Plasmid

(*ii*) Transformation and Transfection

(*iii*) Blunt and Cohesive ends

(*iv*) Southern Blotting and Northern Blotting.

(*c*) Expand the following : 5

(*i*) BAC

(*ii*) HAT

(*iii*) CFTR

(*iv*) FISH

(*v*) ASO.

(*d*) State the contributions of : 4

(*i*) Lederberg

(*ii*) Morgan

(*iii*) Barbara McClintock

(*iv*) Boyer and Cohen.

(*e*) Explain the use of the following in biotechnology : 5

(*i*) Hind III

(*ii*) Taq Polymerase

(*iii*) Humulin

(*iv*) TI plasmid

(*v*) Radioactive Probe.

2. Elucidate the steps used in construction of a *c*DNA library. Discuss the advantages and limitations of *c*DNA library over Genomic DNA library. 6+6=12

3. (*a*) Give an account of DNA fingerprinting. Discuss its applications in Forensics. 7

(*b*) Write a short note on Microprojectile gun method. 5

4. (*a*) What are cloning vectors ? What are the important and desired features of a cloning vector ? 5

(*b*) Explain the approach used for production of *r*-insulin hormone with help of a well labelled diagram. 7

5. (*a*) Describe the steps used in development of transgenic cattle. 6

(*b*) Describe the development of insect resistant plants by Genetic engineering. 6

6. Write the characteristic features of DNA microarray. Discuss the production, types and applications of microarray. 12

7. Write short notes on any *three* : 4,4,4

(*i*) Chimeric DNA

(*ii*) Agarose gel electrophoresis

(*iii*) RAPD

(*iv*) DNA sequencing.

This question paper contains 7 printed pages]

(18)

May 2017

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

S. No. of Question Paper : 904

Unique Paper Code : 223605 G

Name of the Paper : Applied Zoology (ZOHT-612a)

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 *two* Sections.

Draw well-labelled diagrams wherever necessary.

Section A

Attempt any *three* questions. Question No. **1** is compulsory.

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

(*i*) Pulmonary and Extrapulmonary tuberculosis

(*ii*) Endemic and Epidemic disease

(*iii*) Carrier and Vector. 4½

(*b*) Define the following terms :

(*i*) Incubation period

(*ii*) Nocturnal periodicity

(*iii*) Prophylaxis. 3

P.T.O.

(*c*) Name the infective stage of the following organisms :

(*i*) *Wuchereria bancrofti*

(*ii*) *Plasmodium vivax*

(*iii*) *Ancylostoma duodenale.* 3

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

(*i*) Dengue shock syndrome

(*ii*) Tuberculosis

(*iii*) Elephantiasis. 3

2. Give an account of mode of infection, clinical symptoms, epidemiology and control of the malaria. 12

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

4. Write histopathological notes on :

(*a*) Biliary Cirrhosis

(*b*) Haemochromatosis.

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

(*a*) Rickettsia

(*b*) *Treponema*

(*c*) Swine flue

(*d*) *Schistosoma.*

Section B

Attempt any *three* questions. Question No. 1 is compulsory.

1. (*a*) Define the following terms : 4

(*i*) Colostrum

(*ii*) Superovulation

(*iii*) Infertility

(*iv*) Fergusson's Reflex

(*b*) Differentiate between the following pairs of terms : 6

(*i*) Post-coital contraceptives and Oral contraceptives

(*ii*) Azoospermia and Oligospermia

(*iii*) Endometrium and Myometrium

(*c*) Expand the following : 2

(*i*) FSH

(*ii*) AIH

(*iii*) PROST

(*iv*) hCG

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

(*i*) Lactation can be suppressed by dopamine agonists.

(*ii*) The placenta is unable to synthesize estrogens from cholesterol.

(*iii*) The Oral Contraceptive Pill contains DHT and Estrogen. 1½

2. (*a*) Discuss the role of various hormones in the process of lactation. 9

(*b*) What are the different stages of labour ? 3

3. (*a*) Describe the various factors affecting the onset of puberty in cattle. 4

(*b*) Write about the process of semen collection, preservation and insemination in cattle. 8

4. Describe the cause, diagnosis and management of female infertility. 12

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

(*a*) Milk Ejection Reflex

(*b*) IVF

(*c*) Types of placenta

(*d*) Sex selection.

Section C

Attempt any *three* questions. Question No. **1** is compulsory.

1. (*a*) Which of the following statements are *true* or *false* ?

(*i*) *Chrysanthemum* is the chief source of commercial parathion.

(*ii*) Aldicarb is carbamate insecticide.

(*iii*) When infested flower buds fail to open up completely due to webbing by the larva, it is called as flared squares.

(*iv*) Baygon is an organochlorine insecticide.

(*v*) Rarely complete eradication of the crop pest is aimed. 5

(*b*) Define the following terms :

(*i*) Heat spot

(*ii*) Antibiosis

(*iii*) Systemic insecticide 3

(*c*) Expand the following terms :

(*i*) BHC

(*ii*) ICAR

(*iii*) TEPP

(*iv*) FCI. 4

(*d*) Fill in the blanks :

(*i*) The sticky resin collected by honeybees from trees and mixed with nectar, their own enzymes and wax to make a sticky glue is called ..... .

(*ii*) A chemical compound used in its gaseous state as a pesticide is called a ..... .

(*iii*) *Heliothis armigera* is a serious pest of ..... in India. 1½

2. (*a*) Give the scientific name of spotted boll worm OR Khapra beetle. Describe the life cycle, damage caused and control of this pest. 8

(*b*) Describe biologieal OR mechanical measures for the control of insect pest. 4

3. (*a*) Giving a suitable example describe knipling method sterile male technique to bring down the pest population. 6

(*b*) What do you understand by integrated pest management ? How is integrated pest management superior to other methods in dealing with pest population ? 6

4. (*a*) Name any *one* species of honey bee found in India. Briefly explain the importance of honey bee. 6

(*b*) Explain the role of moisture in the spoilage of the stored food grain. 6

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

(*a*) Legislative methods

(*b*) Cultural control methods

(*c*) Pros and cons of chemical control

(*d*) Silkworm diseases

(*e*) Newton's bee hive.

This question paper contains 4 printed pages] (19) MAY 2017

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

S. No. of Question Paper : 906

Unique Paper Code : 216609 G

Name of the Paper : Environmental Management–BTHT-509

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

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 including

Question No. 1, which is compulsory.

Draw neat and labelled diagrams wherever necessary.

1. (*a*) Define the following : 6

(*i*) Eutrophication

(*ii*) Population explosion

(*iii*) Horticulture

(*iv*) Deforestation

(*v*) Gene Bank

(*vi*) Industrialization

P.T.O.

(*b*) Differentiate between the following : 8

(*i*) Conventional and Non-conventional sources of energy

(*ii*) Primary and Secondary pollutants

(*iii*) Endangered and Extinct species

(*iv*) Alpha and Beta diversity.

(*c*) Expand the following abbreviations : 2

(*i*) IUCN

(*ii*) BOD

(*d*) Write the names of any *two* NGO's working for the conservation of biodiversity in India. Enlist their significant contributions. 4

(*e*) Give the importance of the following : 3

(*i*) Narmada Bachao Andolan

(*ii*) Vienna Convention

(*iii*) ZSI

(*f*) State whether the following statements are *true* or *false* : 4

(*i*) Eutrophic lakes have high concentration of nitrates and phosphates.

(*ii*) Ozone hole formation is more pronounced over Antarctic.

(*iii*) Oil spills can be controlled if the ships are provided with double hull.

(*iv*) Establishment of Zoo for conservation of wildlife is an *Ex situ* conservation strategy.

2. (*a*) Briefly describe various types of wastes and their management strategies. 8

(*b*) Discuss the merits and demerits of nuclear energy. 4

3. (*a*) What is sustainable development ? Briefly describe the salient features of Brundlandt report. 8

(*b*) Add a note on IPCC. 4

4. (*a*) What is biodiversity ? Describe various *ex situ* conservation strategies to prevent loss of biodiversity. 9

(*b*) Write the significance of Kyoto protocol. 3

5. (*a*) What is air pollution ? Write the major sources of air pollution and methods for control of air pollution. 9

(*b*) Enlist major ozone depleting substances. 3

6. What are the causes and consequences of global warming ? Write various steps that can be taken to keep a check on global warming. 12

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

(*a*) Radioactive pollution

(*b*) Bioremediation

(*c*) Environmental impact assessment

(*d*) Hot spots

(*e*) Biosphere Reserves.