

Section – II**Attempt any four:**

- Q.2** Explain in detail: Events involved in somatic cell division. **14**
- Q.3** Describe X-linked inheritance with suitable example. **14**
- Q.4** Explain monohybrid and dihybrid crosses with suitable example. **14**
- Q.5** **Answer any TWO of the following:** **14**
- a) Add a note on complete linkage and incomplete linkage.
 - b) Describe life cycle of Human.
 - c) Add a note on Haemophilia.
- Q.6** **Answer any TWO of the following:** **14**
- a) Describe Synapsis of meiotic Crossing Over.
 - b) Explain Induced mutations.
 - c) Write a short on Mismatch repair in *E. coli*.

B) Answer the following terms.

07

- a) Z-test.
- b) Independent events.
- c) Variable.
- d) Habitat.
- e) Population genetics.
- f) Kin selection.
- g) Co-adapted genes.

Section - II**Q.2** Write an essay on different theories of evolution. **14****Q.3** Write an essay on speciation. **14****Q.4** Find the correlation coefficient between age and glucose level from the following data. **14**

Age (Yrs)	43	21	25	42	57	69
Glucose level (mg/dL)	99	65	79	75	87	81

Interpret the relationship between them.

Q.5 Answer any **TWO** of the following: **14**

- a) Single marker analysis and interval mapping.
- b) The following table shows the numbers of hours spent by a child on different events on a working day.

Activity	School	Sleep	Playing	Study	T.V	Other
No. of hours	6	8	2	4	1	3

Represent the above data by pie-chart.

- c) Explain in detail about genetic polymorphism.

Q.6 Answer any **two** of the following: **14**

- a) Write a note on standard deviation. Enlist the merits and demerits of using it.
- b) Associative mapping and Genomic selection.
- c) Calculate the arithmetic mean of the following data.

No. of fruits	1	2	3	4	5	7
Number of Plants	2	1	4	4	3	4

Seat No.	
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Set **P**

M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2017
Genetics

CYTOGENETIC AND GENOME ORGANIZATION

Day & Date: Tuesday, 21-11-2017
Time: 10.30 AM to 1.00 PM

Max. Marks: 70

- Instructions:** 1) All questions of Section-I are compulsory.
2) Answer any four questions from Section-II.
3) All questions carry equal marks.
4) Draw neat and labeled diagrams wherever necessary.

Section – I

Q.1 A) Rewrite the following sentences by using correct alternatives: 07

- 1) _____ is sex chromosomal disorder.
 - a) Colorblindness
 - b) Thalassemia
 - c) Sickle cell anemia
 - d) Down syndrome
- 2) Turner syndrome is _____.
 - a) XO
 - b) XX
 - c) XY
 - d) XYY
- 3) SINE requires _____ nearby to transpose in a genome.
 - a) Alu gene
 - b) LINES
 - c) P-element
 - d) Satellite DNA
- 4) _____ chromosomes appear rod-shaped during anaphase.
 - a) Metacentric
 - b) Acrocentric
 - c) Telocentric
 - d) Sub-metacentric
- 5) Sex determination in birds is _____.
 - a) XX-XY type
 - b) XX-XX type
 - c) ZZ-ZW type
 - d) XO-XX type
- 6) The end of chromosome are called as _____.
 - a) Telomere
 - b) Chromosome
 - c) Chromonemata
 - d) Centromere
- 7) _____ virus has eight segments of RNA as genome.
 - a) SV 40
 - b) Influenza
 - c) Adenovirus
 - d) HIV

B) Define the following terms. 07

- a) Minisatellite.
- b) Somaclonal variation.
- c) Nucleosome.
- d) Reverse transcriptase.
- e) Chromosome.
- f) Heterochromatin.
- g) Genomics.

Section - II**Answer any four:**

- Q.2** Describe chromosome banding with a labeled diagram. **14**
- Q.3** Describe extra nuclear inheritance with suitable examples. **14**
- Q.4** Explain Mechanisms of sex determination in animals. **14**
- Q.5** **Answer any two of the following:** **14**
- a) Write a note on – Meiotic Chromosomes.
 - b) Explain dosage compensation.
 - c) Write on – Microsatellite DNA.
- Q.6** **Answer any two of the following:** **14**
- a) Write a note on – Chromosome painting.
 - b) Write on – Alu family.
 - c) Explain fine structure of gene.

Section-II

Attempt any four:

- Q.2** Write an essay on DNA replication in prokaryotes. **14**
- Q.3** Describe in detail WNT signaling pathway. **14**
- Q.4** Explain chemical composition of plasma membrane. Add a note on fluid mosaic model. **14**
- Q.5** **Answer any two of the following:** **14**
- a) Describe the structure and function of endoplasmic reticulum.
 - b) Explain initiation of translation in prokaryotes.
 - c) Explain properties of genetic code.
- Q.6** **Answer any two of the following:** **14**
- a) Vesicular transport of protein from ER to Golgi.
 - b) Transcription.
 - c) Cell cycle phases.

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Set **P**

M.Sc. (Semester - I) (CBCS) Examination Oct/Nov-2017
Genetics
CLINICAL BIOINFORMATICS

Day & Date: Thursday, 23-11-2017
 Time: 10.30 AM to 1.00 PM

Max. Marks: 70

- Instructions:** 1) Part – I, Questions 1 is compulsory.
 2) Attempt any four questions from part –II.
 3) Figures to the right indicate full marks.
 4) Answer to the Part-I and Part-II are to be written in same answer Booklet only.

Section-I

- Q.1 A) Rewrite the following sentences by using correct alternatives: 07**
- 1) _____ also known as drug safety is the pharmacological science relating to the collection, detection, assessment, monitoring, and prevention of adverse effects with pharmaceutical products.
 - a) Clinical trial
 - b) Pharmacovigilance
 - c) CDM
 - d) Pharmacology
 - 2) _____ is an affordable mapping and spatial analysis tool that allows you to easily produce publication-quality thematic maps.
 - a) Microarray
 - b) MapViewer
 - c) Ensemble
 - d) GEO
 - 3) CPT is a registered trademark of the _____ Medical Association.
 - a) American
 - b) Indian
 - c) Australian
 - d) All of above
 - 4) _____ resource provides *viral* and viroid genome sequence data and related information.
 - a) ViPR
 - b) Ensembl
 - c) dpSNP
 - d) OMIM
 - 5) _____ can be used to filter, reformat, or trim your genomic and metagenomic sequence data.
 - a) HTQC
 - b) QPLOT
 - c) PRINSEQ
 - d) FASTX
 - 6) R is an _____ language; users typically access it through a command-line interpreter.
 - a) Object oriented
 - b) Structure oriented
 - c) Interpreted
 - d) All
 - 7) _____ is the total number of metabolites present within an organism, cell or tissue.
 - a) Proteome
 - b) Metabolome
 - c) Genome
 - d) Pharmacogenomics

B) Answer the following terms.

07

- a) R scripting.
- b) Comparative genomics.
- c) Metabolome.
- d) Pharmacovigilance.
- e) Parasitic diseases.
- f) Genome Mapping.
- g) NGS.

Section-II**Attempt any four:**

- Q.2** Define clinical trial. Add a note on different stages. **14**
- Q.3** Write in detail various methods of NGS. **14**
- Q.4** Explain different types of host pathogen interactions. **14**
- Q.5 Answer any two of the following:** **14**
- a) Add a note on Ensemble and Mapviewer.
 - b) Write a note Medical coding.
 - c) Explain the Human Genome Project.
- Q.6 Answer any two of the following:** **14**
- a) Pharmacogenomics.
 - b) Applications of metabolomics.
 - c) Systems biology.

Seat No.	
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Set **P**

M.Sc. (Semester - III) (New) (CBCS) Examination Oct/Nov-2017
Genetics

IMMUNOLOGY & IMMUNOTECHNOLOGY

Day & Date: Thursday, 16-11-2017
Time: 02.30 PM to 05.00 PM

Max. Marks: 70

Instructions: 1) Section-I compulsory.
2) Attempt any four from Section-II.

Section – I

Q.1 A) Choose the correct alternative and rewrite the sentences. 07

- 1) MHC genes in human are present on _____ chromosome.
 - a) 7
 - b) 14
 - c) 6
 - d) 12
- 2) Phycoerythrin is used in _____ test
 - a) Radioimmunoassay
 - b) Immune-fluorescence
 - c) ELISA
 - d) Complement fixation
- 3) Active immunization is done by using _____.
 - a) Vaccines
 - b) Hyper immune sera
 - c) Immune sera
 - d) Convelescent
- 4) _____ antibody in called as secretary antibody.
 - a) IgG
 - b) IgM
 - c) IgA
 - d) IgE
- 5) _____ is primary lymphoid organ.
 - a) Spleen
 - b) Lymphnode
 - c) Peyer's patch
 - d) Thymus
- 6) The incomplete antigen is called as _____.
 - a) Epitope
 - b) Adjuvant
 - c) Hapten
 - d) Antibody
- 7) The first step in the classical complement activation pathway is _____.
 - a) Binding of C1 to antigen-antibody
 - b) Binding of C3b to an activator
 - c) Binding of C2 to an activator
 - d) Binding of antigen of C1

B) Define the following terms. 07

- a) Define acute and hyper acute graft rejection
- b) Properties of cytokines
- c) Enlist factors affecting innate immunity
- d) ELISA
- e) Difference atopy
- f) Give any two organ non-specific autoimmune diseases
- g) Function of B cells

Section – II

Answer any four of the following

- Q.2** Give structural, morphological, cultural, life cycle and pathogen city characters, Lab diagnosis, Prophylaxis of HIV virus. **14**
- Q.3** Explain mechanism of processing and presentation of endogenous antigen. **14**
- Q.4** B cell activation, proliferation and differentiation. **14**
- Q.5** **Answer any two from the following.** **14**
- a) Explain structure of MHC class II molecule.
 - b) Explain factors affecting antigen city and types of antigens.
 - c) Mechanism of allograft recognition.
- Q.6** **Answer any two from the following.** **14**
- a) New trend vaccines
 - b) Classical complement pathway
 - c) Write an essay on principle of antigen and antibody interaction

Seat
No.Set **P**

M.Sc. (Semester - III) (New) (CBCS) Examination Oct/Nov-2017

Genetics

GENETIC ENGINEERING

Day & Date: Saturday, 18-11-2017

Max. Marks: 70

Time: 02.30 PM to 05.00 PM

- Instructions:** 1) Section-I compulsory.
 2) Attempt any four from Section-II.
 3) Draw neat and labeled diagrams.

Section-I

Q.1 A) Rewrite the sentence after choosing the correct answer from the given alternatives. 07

- 1) Which of the following DNA polymerase don't have 5' to 3' exonuclease activity?
 - a) Klenow
 - b) Kornberg
 - c) Klenew
 - d) Korenberg
- 2) _____ is the technique used for characterizing large region of chromosome.
 - a) RAPD
 - b) Chromosome walking
 - c) PCR
 - d) RFLP
- 3) In Maxam's Gilbert's method guanine is methylated by _____.
 - a) Dumethyl Sulphonate
 - b) Dinethy Succinate
 - c) Dimethyl Sulphate
 - d) Dimethyl Acetate
- 4) Blue – white selection method is an example of _____ type of screening method.
 - a) Direct
 - b) Immunological
 - c) Hybridization
 - d) Indirect
- 5) _____ is a source of Ribonuclease A.
 - a) Bovine pancreas
 - b) *Aspergillus niger*
 - c) Horse pancreas
 - d) *Pseudomonas Putida*
- 6) Colony hybridization technique has been developed by _____.
 - a) Murashigue & Skoog
 - b) M. Grustein & D. S. Hogness
 - c) Mertz & Davis
 - d) Hugh & Birnstil
- 7) _____ vector is used in both prokaryotes & eckaryotes.
 - a) M 13
 - b) Cosmid
 - c) Shuttle
 - d) Phagemid

B) Definitions. 07

- a) Genomic library
- b) Microinjection
- c) Endonucleases
- d) Donar DNA
- e) Exonucleases
- f) Cosmid
- g) Plasmid

Section – II

- Q.2** Explain chain termination method of DNA sequencing. **14**
- Q.3** Explain in detail RFLP & add a note on its applications. **14**
- Q.4** Explain with example plasmid as a cloning vector. **14**
- Q.5** **Answer any two from the following.** **14**
- a) Explain how will you produce salt tolerant plant.
 - b) Describe direct DNA transfer method by using syringe & needle.
 - c) Explain direct screening method for recombinants.
- Q.6** **Write short notes on. (Any two)** **14**
- a) Explain the methods of labeling of probes.
 - b) Write a note on synthesis of human interferon.
 - c) Explain production of Hepatitis B recombinant vaccine.

Seat
No.Set **P**

M.Sc. (Semester - III) (New) (CBCS) Examination Oct/Nov-2017
Genetics

MOLECULAR MEDICINE

Day & Date: Tuesday, 21-11-2017

Max. Marks: 70

Time: 02.30 PM to 05.00 PM

- Instructions:** 1) All question of Section-I are compulsory.
2) Answer any Four questions from Section-II.
3) All questions carry equal marks.
4) Draw neat and labeled diagrams wherever necessary.

Section-I

Q.1 A) Rewrite the sentence after choosing the correct answer from the given alternatives. 07

- 1) _____ gene is mutated in cystic fibrosis.
 - a) CFTR
 - b) Actin
 - c) Cadherin
 - d) Fibrin
- 2) Nerve tangles in alzheimer's disease is caused due to _____ protein.
 - a) Ameloid beta
 - b) Tau protein
 - c) Sigma
 - d) Delta
- 3) Stem cell exhibits _____ properties.
 - a) Only potency
 - b) Potency and self renewable
 - c) Potency and non renewable
 - d) Only self-renewable
- 4) The α -globin gene of haemoglobin is located on chromosome number _____.
 - a) 11
 - b) 12
 - c) 16
 - d) 18
- 5) MHC Antigen is human is known as _____.
 - a) ASB
 - b) ALC
 - c) HLA
 - d) HSB
- 6) Mutation in BTK gene leads to condition known as _____.
 - a) Phenylketonuria
 - b) Haemoglobinopathies
 - c) Agammaglobulinemia
 - d) Marfan syndrome
- 7) _____ is defined as compounded that desired biological activity on molecular target.
 - a) Lead
 - b) Genome
 - c) Mercury
 - d) Iron

- B) Definitions.** **07**
- a) DNA fingerprinting.
 - b) Pharmacogenetics.
 - c) Stem cells.
 - d) Positional cloning.
 - e) Lead optimization.
 - f) In-vivo gene therapy.
 - g) Microarray.

Section-II

Answer any of the following.

- Q.2** Explain in detail steps involved in drug discovery and its design. **14**
- Q.3** Write a note on different types of gene therapies. **14**
- Q.4** Explain in detail process of gene transfer by viruses and other methods. **14**
- Q.5** **Answer any TWO from the following.** **14**
- a) Give an account on phenylketonuria.
 - b) Describe the difference between adult and embryonic stem cells.
 - c) Explain in detail prenatal diagnosis and its methods.
- Q.6** **Write short notes on any TWO of the following.** **14**
- a) Describe disease related to permanent memory loss.
 - b) Describe in detail route of administration of drugs.
 - c) Write a note on Parkinson's disease.