HUMAN GENOMICS
(BIOT 4165)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) The term Genomics was coined by
(a) Thomas Cech (b) T.H. Morgan
(c) Thomas Roder (d) Craig Venter.

(ii) What is alphoid DNA?
(a) Large sized DNA (b) Sequences that are unique
(c) DNA repeats found in centromere region (d) Highly repetitive DNA

(iii) Small cDNA sequences that represent an unique segment of an active gene is called
(a) SNPs (b) snRNAs (c) ESTs (d) contigs.

(iv) Where are minisatellite DNA found in chromosomes?
(a) Dispersed throughout the chromosome
(b) Telomeric end
(c) Centromere
(d) Mainly at metacentric region

(v) Which of the following is a single gene disorder?
(a) Obesity (b) Sickle cell anaemia
(c) Diabetes (d) Cardiovascular disease.

(vi) Which of the following information is not directly obtained by microarray analysis?
(a) genes expressed at a particular stage of the cell cycle
(b) genes expressed at a particular stage of developmental cycle of an organism
(c) genes depleted at a particular time
(d) Genes that respond to a given environmental signal to the same extent

(vii) Genetic markers are _____ portions of a _____ whose inheritance patterns can be followed.
(a) unidentifiable, genes
(b) unidentifiable, chromosome
(c) identifiable, chromosome
(d) identifiable, genes

(viii) Which of the following is incorrect regarding gene ontology?
(a) It exists because there is a need to standardize protein functional descriptions
(b) It uses a limited vocabulary to describe molecular functions
(c) Biological processes are not described though
(d) The cellular components are described using limited vocabulary

(ix) Which one of the following is NOT a gene expression database?
(a) Flyview
(b) GenBank
(c) Bodymap
(d) None of these

(x) RNA microarrays
(a) Make use of SNPs
(b) Utilize microsatellites
(c) Monitor 1000s of genes simultaneously
(d) Monitor 100s of genes simultaneously

Group – B

2. (a) What are the advantages of automated DNA sequencing over conventional methods?

(b) What do you mean by clone contigs? How are they helpful in genome mapping?

(c) Illustrate the process of Pyrosequencing with a flow diagram.

4 + (2 + 2) + 4 = 12

3. (a) Describe briefly how gene annotation of human genome can be done and name one web server for protein sequence annotation.

(b) Describe the gene identification technique using positional and functional cloning approach.

(4 + 2) + 6 = 12

Group – C

4. (a) Mention in detail the procedure of SAGE along with a suitable diagram.

(b) Discuss its drawbacks.

(c) Give examples of two SAGE databases.

(5 + 3) + 2 + 2 = 12

5. (a) In functional genomics EST serves as a primary high throughput approach to genome wide profiling of gene expression - explain how it is achieved. Mention briefly the drawback of these approaches.

(b) Explain the process of EST Index construction.

(4 + 4) + 4 = 12

Group – D

6. (a) How do the findings of the HGP shed knowledge on bioarchaeology and human migration?

(b) Explain how the HGP results can help in forensic science and medicine.

(c) How can we trace human evolution with the help of mitochondrial and Y chromosomal DNA.

4 + 4 + 4 = 12

7. (a) Give an account of the rRNA genes in human genome..

(b) Give a comparative analysis between satellite, minisatellite and microsatellite DNA.

(c) What is a pseudogene and snRNA gene?

4 + 4 + (2 + 2) = 12

Group – E

8. (a) What do you mean by synonymous and non-synonymous SNPs?

(b) How does haplotype mapping help in finding disease association in a population?

(c) What do you mean by Linkage disequilibrium?

(2 + 2) + 4 + 4 = 12

9. (a) Write the role of the candidate genes reported by genomics research in a polygenic disorder.

(b) Comment on the innovations in pharmacogenomics and its effects on human health care.

6 + 6 = 12

Department & Section	Submission Link
BT	https://classroom.google.com/c/MTQzNzgyMDg2NTc0/a/Mjg4NDM5NDIxNTc3/details