B.TECH/BT/7TH SEM/BIOT 4165/2018
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) Which of the genetic markers are present in highest numbers in the human genome?
(a) RFLP (b) Minisatellite (c) Microsatellite (d)VNTR.

(ii) SNPs are formed as a result of
(a) point mutation (b) transition
(c) deletion (d) duplication.

(iii) Which of the following is obtained via cDNA clones?
(a) EST (b) STS (c) VNTR (d) STR.

(iv) Short DNA sequence having single occurrence in genome is
(a) expressed sequence tag (b) sequence tagged site
(c) Contig (d) YAC.

(v) Which of the following is untrue about Whole Genome Alignment?
(a) This helps to reveal the presence of conserved functional elements.
(b) It doesn't help to understand sequence conservation between genomes.
(c) It be accomplished through direct genome comparison or genome alignment.
(d) The alignment at the genome level is fundamentally no different from the basic sequence alignment.

(vi) Which of the following is untrue about Gene Order Comparison?
(a) When the order of a number of linked genes is conserved between genomes, it is called synteny.
(b) Generally, gene order is much more conserved compared with gene sequences.
(c) Generally, gene order is much less conserved compared with gene sequences.
(d) It is in fact rarely observed among divergent species.

(vii) The first completed genome sequencing project is of
(a) E. Coli
(b) Haemophilus influenza
(c) X174
(d) Drosophila melanogaster .

(viii) Human Genome Project was initiated by
(a) NIH (b) DOE (c) NIH and US DOE (d)Celera Genomics.

(ix) Which of the following is not a gene expression database?
(a) GenBank
(b) Fly view
(c) SeedGenes
(d) BodyMap.

(x) The process of introduction of foreign DNA into an animal cell is called
(a) transversion (b) conversion
(c) inversion (d) transfection

Group – B

2. (a) What do you mean by high throughput sequencing? Explain with examples.

(b) Describe the technique of 454 sequencing.

(c) Illustrate the process of pyrosequencing.

4+ 4 + 4 = 12

3. (a) Mention the approach followed for identification of a specific disease gene where nothing is known except its approximate chromosomal location.

(b) Describe briefly the steps in above approach. Name the disease which was identified first following this approach.

(c) State the logic of this approach in a step wise manner.

2 +(6 + 1)+ 3= 12

Group – C

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

(b) Mention the drawbacks of this technique.

(c) Give examples of two SAGE databases.

(5 + 3) + 2 + 2= 12

5. (a) "Standardization of protein functional description has been spurred due to usage of different terminologies for same type of protein or gene in different organisms" - name the project which has been developed. Describe it on the basis of a specific protein.

(b) Describe the steps of the different levels of genome sequence assembly along with its constraints.

(1 + 5) +(4 + 2)=12

Group – D

6. (a) Mention the implications of Human Genome Project on medical diagnostics.

(b) Give a brief description of the mitochondrial genome.

(c) Discuss how one can trace human migration with the help of genetic markers.

4+ 4 + 4 = 12

7. (a) What do you mean by gene family and superfamily?

(b) Discuss about partially overlapping genes.

(c) Give a comparative account of satellite, minisatellite and microsatellite genes.

4+ 4 + 4 = 12

Group – E

8. (a) Discuss the importance of SNPs in genomics research.

(b) What are the applications of molecular beacons in genomics research?

(c) What do you mean by linkage disequilibrium?

4+ 4 + 4 = 12

9. (a) Define selectable marker gene. Briefly describe each category of selectable markers for animal cells with suitable examples for those categories.

(b) Mention three genes along with the chromosomal location linked to obesity.

(1 + 5)+(3× 2) = 12