| Name : | |
|---------------------------|---------------------------------|
| Roll No. : | An American State and Confident |
| Invigilator's Signature : | |

CS/B.Sc.(H)BT/MOLBIO/MICROBIO/GENETICS/ SEM-6/MHG-601/2012

2012

MODEL ORGANISMS IN HUMAN GENOME PROJECT

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

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

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

 $10 \times 1 = 10$

- i) Of the Human Genome Project objectives which of the following is not one of the objectives of the Human Genome Project ?
 - a) Create a detailed genetic map of every human chromosome, with an average of 2–5% recombination frequency between markers.
 - b) Obtain a detailed physical map of every human chromosome, based on overlapping recombinant DNA molecules cloned as yeast artificial chromosomes.
 - c) Clone human beings.

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d) Determine the sequence of all expressed human genes by *c*DNA cloning and sequencing.

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- e) Determine the complete DNA sequence of each human chromosome.
- ii) Human Genome Project began in
 - a) 1990 b) 1980
 - c) 1994 d) 1991.
- iii) Microarrays
 - a) are used for analysis of transcriptomes
 - b) are made of glass
 - c) contain RNA sequences
 - d) contain DNA sequences
 - e) are smaller than DNA chips.
- iv) Which of the following statements are not true ?
 - a) The yeast genome contains about 6000 genes
 - b) Proteomes consist of proteins
 - c) RNA interference is not possible in prokaryotes
 - d) DNA chips contain oligonucleotides.
- v) Whole genome shotgun method was discovered by
 - a) Celera Genomics b) Nexia Biotechnologies
 - c) Medarex d) none of these.
- vi) Number of autosomes in *C. elegans* is
 - a) 5 pairs b) 8 pairs
 - c) 10 pairs d) none of these.
- vii) Medical benefits of HGP include
 - a) improved diagnosis of diseases
 - b) gene therapy
 - c) rational drug design
 - d) all of these.

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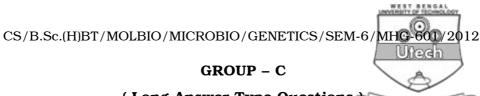
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|---|---|----------------|----|----------------|--|
| viii) | | | | | |
| | a) | 20% epiboly | b) | 30% epiboly | |
| | c) | 50% epiboly | d) | none of these. | |
| ix) | Yeast artificial chromosome (YAC) can accommodate | | | | |
| | foreign DNA inserts of about | | | | |
| | a) | 100-200 Kb | b) | 200-500 Kb | |
| | c) | 500-1000 Kb | d) | none of these. | |
| X) | Total length of repeated sequence in S. cerevisae | | | | |
| | genome is about | | | | |
| | a) | 1 Mb | b) | 4 Mb | |
| | c) | 7 Mb | d) | 13 Mb. | |
| xi) | EST stands for | | | | |
| | a) Expressing Sequencing Technology | | | | |
| | b) Express Sequencing Technology | | | | |
| | c) Expressed Sequence Tag | | | | |
| | d) | none of these. | | | |
| xii) | STR is an example of | | | | |
| | a) | Microsatellite | b) | Minisatellite | |
| | c) | Macrosatellite | d) | None of these. | |
| | | | | | |
| GROUP – B | | | | | |
| (Short Answer Type Questions) | | | | | |
| Answer any <i>three</i> of the following. $3 \times 5 = 15$ | | | | | |

- 2. Discuss the embryonic development of Danio rario.
- 3. Discuss the characteristics of the genome of *C. elegans*.
- 4. Discuss the essential features of Human genome.
- 5. Why *Arabidopsis* has been taken as a model organism ? Discuss with reasons.
- 6. What is the basic principle of Sanger dideoxy sequencing ?

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(Long Answer Type Questions)

 $3 \times 15 = 45$

7. Discuss why Drosophila melanogaster is regarded as a model organism. Briefly discuss its life cycle. How is sex determined in drosophila ? Discuss the characteristics of Drosophila melanogaster's genome. 3 + 3 + 3 + 6

Answer any three of the following.

- 8. Discuss the methods of reproduction in *E. coli*. Explain impacts of *E. coli* in biotechnogy. Most *E. coli* strains are harmless, but some are pathogenic Explain in the light of their genome characteristics. Discuss the essential genomic features of *E. coli*. 5 + 3 + 3 + 4
- Discuss the medical and scientific benefits of Human genome project.
 9 + 6
- 10. Write short notes on any *three* of the following : 3×5
 - a) Gene annotation
 - b) Sequence tagged sites
 - c) RFLP
 - d) DNA microarray.
- 11. Why is Arabidopsis thaliana regarded as model organism ?
 Discuss the biological features of A. thaliana. Discuss the essential features of A. thaliana genome.
 5 + 5 + 5