



Name :
Roll No. :
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.



- d) Determine the sequence of all expressed human genes by cDNA cloning and sequencing.
- 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.



- viii) Onset of gastrulation in zebra fish is represented by
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. cerevisiae* 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 *three* of the following. 3 × 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 ?



GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

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. $3 + 3 + 3 + 6$
8. Discuss the methods of reproduction in *E. coli*. Explain impacts of *E. coli* in biotechnology. 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*. $5 + 3 + 3 + 4$
9. 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. $5 + 5 + 5$

