

**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.  $3 \times 5 = 15$

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 ?

### **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

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