

CS/B.Sc.(H)/BT/GEN/MICRO-BIO/

MOL-BIO/SEM-6/MHG-601/2013

2013

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 × 1 = 10

i) Blastula period of zebra fish embryo lasts for

a) $2^{1/4}$ h to $5^{1/4}$ h b) $3^{1/4}$ h to $5^{1/4}$ h

c) $4^{1/4}$ h to $5^{1/4}$ h d) none of these.

ii) *Saccharomyces cerevisiae* genome contains

a) 10 pairs chromosomes

b) 12 pairs chromosomes

c) 14 pairs chromosomes

d) 16 pairs chromosomes.

iii) Amount of introns out of the total genome in

Saccharomyces cerevisiae is nearly

a) 2% b) 4%

c) 6% d) 8%.

iv) The first complete DNA sequence of an *E.coli* genome
was published in

a) 1996 b) 1997

c) 1998 d) 1999.

- v) In *E.coli* 4288 annotated protein-coding genes are organized into
- a) 2584 operons b) 2250 operons
c) 1800 operons d) 1500 operons.
- vi) The size of zebra fish zygote at the time of fertilization is approximately
- a) 0.1 mm b) 0.3 mm
c) 0.7 mm d) 1.5 mm.
- vii) The size of the *D.melanogaster* genome is
- a) 100-megabase b) 150-megabase
c) 180-megabase d) none of these.
- viii) The average number of exons per gene in *Drosophila melanogaster* is
- a) 4 b) 7
c) 9 d) 12.
- ix) In *Drosophila melanogaster* if the ratio of X chromosomes and the number of haploid sets of autosomes is 1.5, the sexual phenotype will be
- a) male b) female
c) metafemal d) metamale.
- x) In *Drosophila melanogaster* the locus of eyeless gene is in
- a) X chromosome b) chromosome 2
c) chromosome 3 d) chromosome 4.
- xi) In *Drosophila melanogaster* which chromosome is the smallest one ?
- a) X chromosome b) chromosome 2
c) chromosome 3 d) chromosome 4.

- xii) *Arabidopsis* genome is organized into
- a) 6 chromosomes b) 5 chromosomes
 - c) 4 chromosomes d) 10 chromosomes.
- xiii) The complete sequencing of the *Arabidopsis* genome was done in the year
- a) 2000 b) 1995
 - c) 2002 d) 2005.
- xiv) *Arabidopsis thaliana* belongs to
- a) Solanaceae b) Malvaceae
 - c) Zingiberaceae d) Brassicaceae.
- xv) The total genome size of *Arabidopsis* is about
- a) 125 mb b) 135 mb
 - c) 175 mb d) 225 mb.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. What are microsatellites ? What are their uses ? 3 + 2
3. What is Expressed Sequence Tag (EST) ?
4. What is RFLP ? What are their uses ? 3 + 2
5. Write a short note on single nucleotide polymorphism.
6. Write a short note on *Arabidopsis* genome.

GROUP – C

(Long Answer Type Questions)

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

7. Discuss the essential features of zebra fish genome ? Discuss the embryogenesis of *Drosophila*. How does it correlate with human genome ? 5 + 7 + 3
8. What is comparative genomics ? Briefly describe the process

and applications of comparative genomic hybridization. Write in brief about structural genomics. 2 + 8 + 5

9. What do you understand by HGP ? State the benefits and risks involved in human genome project. Explain briefly the ethical, legal and social issues related to Human Genome Project. What are the goals of HGP ? 2 + 5 + 5 + 3

10. Explain Bridges genic balance theory. Discuss the sexual reproduction in *E.coli*. Why mouse is regarded as a model organism. 5 + 5 + 5

11. Write short notes on any *three* of the following : 3 × 5

- a) Chromosome walking
- b) FISH
- c) VNTR
- d) Beneficial mutation in human
- e) Chemical cleavage method of DNA sequencing.

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