CS/B.Sc.(H)(Genetics/BT/Mol.Bio/Microbio)/SEM-6/MHG-601/2011

2011

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)   Research in molecular and developmental biology of *C. elegans* was provided by

a)   Sydney Brenner   b)   Andrew Fire

c)   Craig Mellow   d)   Craig Venter.

ii)   'Dauer' state in *C. elegans* is alternative to

a)   1st larval stage   b)   2nd larval stage

c)   3rd larval stage   d)   4th larval stage.

iii)   Number of protein coding genes in *C. elegans* is approximately

a)   10000   b)   20000

c)   25000   d)   30000.

6701   [Turn over

iv) The number of metacentric chromosomes in zebra fish is

    a)   2   b)   8

    c)   15   d)   20.

v) .... , such as restriction maps, are based on molecular distances separating sites on a DNA molecule.

    a)   Physical maps   b)   Vector maps

    c)   Structural genomics   d)   Comparative genomics

    e)   None of these.

vi) GC rich repetitive sequence in zebra fish is mainly

    a)   Centromeric   b)   Telomeric

    c)   Paracentromeric   d)   None of these.

vii) Distance betwen two STS markers should be

    a) 10×2 bases   b) 10×3 bases

    c) 10×4 bases   d) 10×5 bases.

viii) Determination of repetitive DNA size by whole genome shotgun technique requires DNA fragment size of

    a)   2 kb   b)   3 kb

    c)   5 kb   d)   10 kb.

ix) A good model organism exhibits all the characteristics below *except*

    a)   ease of cultivation   b)   long gestation period

    c)   small size   d)   a sequenced genome.

x) Which of the following statements about the yeast genome is not true ?

    a) Haploid chromosome number is 16

    b) Relative distances of genes on the genetic and physical maps may differ

    c) Relative order of genes on the genetic and physical maps may differ

    d) The genetic map was determined by counting meiotic crossovers.

xi) Who first described *C. elegans* as model organism ?

    a) Sydney Brenner   b) Harsley and Chase

    c) Tatum   d) None of them.

xii) …………… allow researchers to study the transcription of thousands of genes simultaneously.

    a) Gel electrophoresis   b) Northern blots

    c) Dot blots   d) Microarrays

    e) None of these.

xiii) The number of cells present in hermaphrodite is

    a) 959   b) 1000

    c) 1031   d) None of these.

xiv) The number of cells present in male is

    a) 959   b) 1000

    c) 1031   d) None of these.

xv) Protein array includes interactions of

    a) protein legand   b) protein-drug

    c) protein-antibody   d) all of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.   3 × 5 = 15

2. What are the features of microsatellites ? What are their importances in genome mapping ?   4 + 1

3. Write a short note on gene antology.

4. What are model organisms ? Discuss the essential features of model organisms.   2 + 3

5. Give a brief account of E. coli genome.

6. What is AFLP ? What are their uses ?

7. What is expressed sequence tag (EST) ?

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following.   3 × 15 = 45

8. Discuss how STS markers were used in Human Genome Project for physical mapping of genome. Discuss the principle of whole genome shotgun technique.   10 + 5

9. Discuss in brief the embryonic development of zebra fish. Discuss the essential features of zebra fish genome wtih a special note on its homology with the human genome.   8 + 7

10. Discuss why mouse is regarded as a model organism. What are the essential features of its genome.   5 + 10

11. What is Human Genome Project (HGP) ? What are its goals ? Discuss how HGP was initiated, progressed and ended. Discuss the essential features of the genome of the worm used in HGP as a model organism.   1 + 2 + 7 + 5

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

    a) Gene annotation

    b) VNTRs

    c) RFLP

    d) DNA microarray.

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