2018

BIOTECHNOLOGY

BIT 104

GENETICS

Full Marks : 80

Time: 3 Hours

The figures in the margin indicates full marks for the questions

1. Answer the following questions (any eight). 8 X 1=8

a) Escherichia coli has seven ribosomal RNA operons which are almost identical. In a closely related species, Haemophilus influenzae its six ribosomal RNA operons are entirely identical. The divergence among the two species with respect to the operon across the two species is 5.90%. If this is considered as a case of progressive evolution, then it is an example of_____

i) Parallel evolution ii) Convergent evolution

iii) Divergent evolution iv) Concerted evolution

b) Crossing of F1 hybrid with homologous recessive individual is a popular practice to ascertain type of linkage and is known as

i) Back Cross ii) Test Cross

iii)Linkage Cross iv) Crossing Over

c) Nucleosome comprise of_____base pair of DNA on it in absence of H1

i)166 bp ii)146-147 bp

iii)200±40 iv)All of these (in different conditions)

d) The phenotypic ratio of a dihybrid cross is 9:7 in F2 generation which is

i) Complementary Gene Interaction

ii) Supplementary Gene Interaction

iii) Epistasic Gene Interaction

iv) Pleiotropic Gene Interaction

e) Split genes are characteristic of

i) Eukaryotic Cells Genome ii) Prokaryotic Cell Genome

iii) PPLO Genome iv) Random Occurrence

f) GOBASE is a database related to

i) Protein Database ii) Nucleotide Database

iii) SNP iv) Organelle Genome Database

g) Fingerprinting experiment with 16SrRNA and 23sRNA is also known as

i) Chlorotyping ii) Mitotyping

iii) Ribotyping iv) None of these.

h) The result of Chromosomal non-disjunction is cell divisions result

i) Euploidy ii) Aneuploidy

iii) Minichromosome iv) Giant Chromosome

i) In sickle cell anemia, name the aminoacid that replaces glutamic acid as a result of transversion mutation?

j) What are tumour suppressor gene?

2. Distinguish between (any six) 6X2=12

a) Organelle Genome and Nuclear Genome

b) Autopolyploids and Allopolyploids

c) Population and Community

d) Paternal Inheritance and Maternal Inheritance

e) Karyotype and Idiotype

f) F+ and F- Bacterial strain

g) Synonymous and nonsynonymous mutation

h) Apoptosis and Metastasis

3. Write short notes (any four) 5X4=20

a) Comparative genomics

b) Transposons

c) Molecular Taxonomy

d) Linkage

e) DNA Packaging

f) Metastasis

g) 16S rRNA typing

4. Answer the following questions (any two) 2X8=16

a) 'Population genetics runs on wheels of gene flow accross the population ' Justify 8

b) Role of 16S rRNA in ribotyping and evolutionary studies. 8

c) Describe the role of Homeotic Gene, Hox Gene, Gap Gene & pair rule gene in the pattern formation in early development of embryo 2X4=8

d) Describe maternal inheritance by suitable example. 4X2=8

e) 'Phenotype is dictated by genotype' Justify 8

5. Answer the following questions (any two)

a) Describe how bacteria has adopted the mechanism for recombination in spite of being primarily asexually reproducing organisms. 12

or

What are molecular markers? Describe the different molecular markers in pursuit of genomic and proteomic study. 3+9=12

c) Mention the role of Exon shuffling on evolutionary process. Also signifies the importance of introns in stabilizing the rate of mutation in active genes. 7+5=12

Or

What is Hardy-Weinberg Law? Mention the importance of Hardy-Weinberg Law with reference to gene frequency and allele frequency distribution. Mention the prime limitations of the law. 2+2+7+1=12

e) What is molecular taxonomy? Mention its role in the study of phylogenetic relationships. 5+7=12

Or

Describe different types of non-mendelian inheritance with suitable examples 12

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