2018

M.Sc. 2nd Semester Examination

MICROBIOLOGY

PAPER—MCB-202

Subject Code—31

Full Marks : 40

Time : 2 Hours

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Group–A

[20 Marks]

Answer any *two* questions. 10×2

1. (a) What is epistasis ? Cite an example. 2

(b) A true-breeding plant with narrow and yellow pods (aabb) was crossed with a true-breeding plant with normal and green pods (AABB). The F_1 offspring (AaBb) were then test crossed to plants with narrow and yellow pods (aabb). The offspring resulting from this cross as follows :

Phenotype	*Number*
Normal and green pods (AaBb) :	445
Narrow and yellow pods (aabb) :	455
Normal and Yellow pods (Aabb) :	51
Narrow and green pods (aaBb) :	49

Find out the distance in centimorgan between these two gene ? 3

(c) Explain dosage compensation with example. 3

(d) Illustrate the genetic basis of ABO blood grouping. 2

2. (a) Write the significance of telomere region in enkaryotic chromosome. What is kinetochore ? 2+1

(b) In a population of Hardy-Weinberg equilibrium the genotype frequency are : $f(A_1A_1) = 0.59$; $f(A_1A_2) = 0.16$; $f(A_2A_2) = 0.25$. What are the frequency of the two allele at this locus ? 2

(c) Based upon the position of centromere represent diagramatically atleast four different types of enkaryotic chromosome. 2

(d) Write the significance of extrachromosomal DNA found in eukaryotes. 3

3. Write short notes on (any *four*) : $2\frac{1}{2} \times 4$

(a) Histone acetylation-deacetylation ;

(b) Heteromorphic chromosome ;

(c) Y-linked inheritance ;

(d) Non-disjunction ;

(e) Recombination hot spot ;

(f) Polygenic trait.

Group–B

[20 Marks]

Answer any *two* questions.

4. (a) What do you mean by Kornberg enzyme ? Differentiate between Kornberg enzyme and Klenow fragment.

(b) Mention the role of poly-nucleotide kinase in DNA repair. 1+2+1

(c) Elucidate the role of NHEJ (Non-homologous end joining) in the repair of double-strand breaks. Write the major participating factors in NHEJ — with suitable diagram. 3+3

5. (a) Define epigenetics. Critically evaluate the pros and cons of epigenetic regulation with suitable examples. 1+4

(b) Define RNAi (RNA interference). Elucidate the role of RNAi when applied to human therapeutic uses. 1+4

6. (a) Write short notes (on any *two*) : $2\frac{1}{2} \times 2$

(i) NER and its utility ;

(ii) Genomic Imprinting ;

(iii) ATM (Ataxia Telangiectasia Mutated) ;

(b) In a tabular format compare prokaryotic and enkaryotic

(a) DNA replication ; (b) transcription. $2\frac{1}{2} \times 2$