

(c) In rats black color (B) is dominant to brown (b), while full color (C) is dominant to chinchilla (c^{ch}). The genes controlling these traits are linked. Rats that are heterozygous for both traits and express black, full color were crossed with rats that express brown, chinchilla with the following results.

31 brown, chinchilla

34 black, full color

16 brown, full color

19 black, chinchilla

Determine the arrangement of alleles in the heterozygous parents and the map distance between the two genes. (5)

6. (a) Describe the cis-trans complementation test. (5)

(b) In a dihybrid cross in pea, two randomly selected plants with purple flowers were crossed and in the F_2 population, 105 purple, 40 red and 52 colorless flowers bearing plants were obtained. Use the given information to find out probable segregation ratio. Also, explain the genetic basis of segregation. Write down the genotypes and phenotypes of parents, F_1 and F_2 . (10)

(1000)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4019 H

Unique Paper Code : 2162521201

Name of the Paper : Genetics and Molecular Biology

Name of the Course : **B. Sc. Life Sciences Botany-DSC**

Semester : II

Duration : 2 Hours Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **four** questions in all including Question No. 1 which is compulsory.
3. **All** parts of a question must be answered together.
4. **All** questions carry equal marks.

1. (a) Fill in the blank (**Any five**) : (5×1=5)

(i) 2,4 dioxy-5-methyl pyrimidine is _____.

(ii) When a second mutation restores the lost original phenotype, the process is known as _____.

(iii) Tetraploid method for seedless watermelon production was invented by _____.

(iv) _____ occurs in a genome when a one nucleotide is replaced by other.

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(v) _____ is the enzyme that relieves supercoiling in DNA.

(vi) Class of genetic elements that moves from one location to another within a genome are known as _____.

(vii) Linkage was discovered by _____.

(b) List the contribution of the following (**any five**) :
(5×1=5)

(i) G. Beadle and E. Tatum

(ii) Barbara McClintock

(iii) J. D. Watson

(iv) T.H. Morgan

(v) Hugo de Vries, K. Correns, E. Tschermak

(vi) Karl Landsteiner

(c) Define (**Any five**) :
(5×1=5)

(i) Okazaki fragments

(ii) Polygenic inheritance

(iii) Sex linkage

(iv) Haploids

(v) codominance

(vi) t RNA

(vii) lethal genes

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2. Write short notes on (**Any three**) : (5×3=15)

(i) Extrachromosomal inheritance

(ii) Central dogma

(iii) Translocation

(iv) Frameshift mutations

(v) Multiple allelism

3. Differentiate between (**Any three**) : (5×3=15)

(i) Translation in Prokaryotes and Eukaryotes

(ii) Incomplete dominance and codominance

(iii) Aneuploids and euploids

(iv) A-DNA form and B-DNA form

(v) Transition and transversion

4. Explain with the help of diagrams (**Any three**) :
(5×3=15)

(i) DNA replication

(ii) Meselson and Stahl Experiment

(iii) Para and pericentric inversions

(iv) Transcription

(v) Lactose operon

5. (a) Explain the salient features of genetic code. (5)

(b) What are mutagens? Explain how UV light functions as mutagens. (5)

P.T.O.