P. P. SAVANI UNIVERSITY

Third Semester of B.Sc. Examination
December-2021
SSMB2070–Microbial Genetics-I

07.12.2021, Tuesday **Time: 09:00 a.m. to 11:30 a.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

Section-I (Total Marks - 30)

Q.1 Short Questions **[10]**

1.1 Objectives **[05]**

1.1a How many pairs of contrasting characters in pea pod were chosen by Mendel?

A 2
B 3
C 4
D 7

1.1b The percentage of crossing over will be more if_____.

A Genes are not linked
B Linked genes are located close to each other
C Linked genes are located far apart from each other
D Genes are located in a different cell

1.1c In a linear chromosome, map distance between 4 loci is as follows: a – b 10%, a – d 3%, b – c 4% and a – c 6%. The crossing over frequency between c and d is ___.

A 4 – 12 %
B 3 or 9%
C 9%
D 3%

1.1d The number of types of gametes in genetic cross is determined by ____.

A n-2
B 2n
C 2^n
D n+2

1.1e A gene for corn has two alleles, one for yellow kernels and one for white kernels. Cross pollination of yellow corn and white corn results in ears of corn that have an approximately even mix of yellow and white kernels. Which term best describes the relationship between the two alleles?

A Assorted dominance
B Co dominance
C Incomplete dominance
D Complete dominance

1.1f A pair of genes are linked if their recombination frequency in test cross is___.

A 75%
B 50%
C 100%
D Lower than 50%

1.1g Who proposed the chromosomal theory of inheritance?
A Bateson & Punnet
B Sutton & Boveri
C T. H. Morgan
D Mendel

1.1h When alleles of two contrasting characters are present together, one of the characters express and the other remains hidden. This is the _____.
A Law of purity of gametes
B Law of segregation
C Law of dominance
D Law of independent assortment

1.1i The eye color of drosophila is_____.
A X linked
B Codominant
C Y linked
D Autosomal

1.1j Multiple alleles control inheritance of ____.
A Phenylketonuria
B Colour blindness
C Sickle cell anemia
D Blood groups

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a The tendency of linkage is directly proportional to the rate of crossing over between two genes. TRUE/FALSE

1.2b An allele whose trait only shows up when no dominant allele is present is known as _____.

1.2c Multiple alleles arise from the same allele by mutation. TRUE/FALSE

1.2d Who proposed the theory of sex-linked inheritance?

1.2e 10 centimorgan = _____ map unit.

Q.2 Short Notes (Attempt any two) **[06]**

A Write Laws of inheritance

B Describe in detail about types of dominance.

C Explain: Types of linkage.

Q.3 Explain in detail (Attempt any two) **[14]**

A Write a note on crossing over.

B Explain: Mendel's dihybrid cross.

C Write a note on multiple alleles.

Section-II (Total Marks - 30)

Q.1 Short Questions **[10]**

1.1 Objectives **[05]**

1.1a Colchicine is used to cause_____.

- **A** Mitotic non-disjunction
- **B** Meiotic non-disjunction
- **C** Mitotic disjunction
- **D** Meiotic disjunction

1.1b What will be the effect of the deletion mutation of a gene at the telomere?

- **A** Organism will die
- **B** Organism will develop serious hazard due to absence of gene and its product
- **C** Mild effect on the phenotype
- **D** No effect

1.1c Cri du chat is caused due to:

- **A** Duplication
- **B** Deletion
- **C** Inversion
- **D** Translocation

1.1d What are the results of pericentric inversion with single crossing over?

- **A** Two dicentric and 2 acentric chromosomes
- **B** Four normal chromosomes with centromere in different positions
- **C** Two normal, one dicentric and one acentric chromosome
- **D** Three normal chromosome, one abnormal acentric chromosome

1.1e If duplication occurs in long arms of chromosome 7, then it is designated as ____.

- **A** 7p-
- **B** 7q-
- **C** 7p+
- **D** 7q+

1.1f Aneuploidy can be defined as _____.

- **A** Inheriting an extra chromosome
- **B** Lacking a chromosome
- **C** Both A and B
- **D** Neither A nor B

1.1g How many autosomal chromosomes do you normally inherit from a single parent?

- **A** 1
- **B** 22
- **C** 23
- **D** 46

1.1h An individual that has polyploidy with an additional set of chromosomes from other species is called ____.

- **A** Auto-Polyploids

B Allopolyploids
C Segmental autopolyploid
D Auto-allopolyploids

1.1i Which of the following represents Klinefelter syndrome?

A 45, Y
B 47, XXY
C 47, XXX
D 47, XYY

1.1j Which human chromosome are involved in Down's syndrome?

A 6
B 14 and 21
C 8 and 12
D X and Y

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a The wheat (Tritium aestivum) is an allohexaploid. TRUE/FALSE

1.2b A condition in which the organisms have more than two complete sets of chromosomes is called _____.

1.2c Nullisomy is a type on hyper ploidy. YES/NO.

1.2d Give difference between haploid & monoploid.

1.2e Chromosome _____ trisomy leads to Edward's syndrome.

Q.2 Short Notes (Attempt any two) **[06]**

A Describe about types of polyploidy.

B What is trisomy? Explain in detail about hyper ploidy

C Write a short note on duplication mutation.

Q.3 Explain in detail (Attempt any two) **[14]**

A Describe in detail about Loss of chromosomal part mutation.

B Write a detailed note on monoploidy.

C Explain: Inversion mutation with its types.