PG (CBCS) EVEN SEMESTER EXAMINATION, 2023

LIFE SCIENCE & BIOINFORMATICS

4th Semester

Course No. : LSCC - 402(B)

(Molecular Genetics and Plant Breeding)

Full Marks : 70

Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

(Answer all questions)

1. Answer the following questions.
   (a) With the help of suitable diagram, describe the structure of chromatin. Differentiate between euchromatin and heterochromatin. [2+6=8]
   (b) Write about the important features of split gene [6]

OR

2. Answer the following questions.
   (a) Describe different steps of post-transcriptional modifications. [8]
   (b) Discuss the importance of post-transcriptional modifications. [6]

3. Write notes on the following. [2x7=14]
   (a) Pseudoalleles and linkage maps

(Turn Over)

(b) RFLP and its significance

OR

4. Answer the following:

(a) What do you mean by complementation? Describe the process of complementation with examples and models. [1+7=8]

(b) What is a molecular marker? Differentiate between marker assisted breeding and marker assisted selection. [1+5=6]

5. Describe the mechanism of plant gene expression. How expression of plant gene is regulated? [8+6=14]

OR

6. Write notes on the following:

(a) mi RNA and DICER [6]

(b) Differentiate between nuclear inheritance and cytoplasmic inheritance. Giveone example of plastidial inheritance with suitable model. [2+6=8]

7. Differentiate between phenotypic and genotypic variance. Describe different components of genotypic variance. Add a note on polygenic inheritance. [2+5+7=14]

OR

8. Answer the following questions:

(a) Derive Hardy-Weinberg equation and prove 'p + q = 1'. [5]

(b) In corn, kernel color is governed by a dominant allele for white color (W) and by a recessive allele (w). A random sampling of 100 kernels from a population that is in H-W equilibrium reveals that 9 kernels are yellow (ww) and 91 kernels are white. Now calculate - [3+3+3=9]

(i) The frequencies of yellow and white alleles in the populations

(ii) Percentage of this population that is heterozygous

(iii) The percentage of the population that is homozygous

9. Write notes on the following. [2x7=14]

(a) Mutation breeding

(b) Male sterility in crops

OR

10. Answer the following questions.

(a) What is heterosis? How it differs with inbreeding depression? Write about important features of heterosis. [1+2+5=8]

(b) Self incompatibility in plants [6]

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