U.G. 6th Semester Examination-2021

BOTANY

[HONOURS]

Course Code : BOT-H-CC-T-13

(Genetics)

Full Marks : 40 Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.
Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **five** of the following questions: 2×5=10

   a) Differentiate between dominance and epistasis . 2

   b) Define an allele. When will it be lethal? 1+1

   c) What is test cross? Mention its significance in Genetics. 1+1

   d) What is polygenic inheritance? 2

   e) Define point mutation. How does it differ from chloroplast mutation. 1+1

   f) Diagrammatically represent the concept of Central Dogma. 2

   g) What are Okazaki fragments? Mention its most significant role. 1+1

   h) What is wobble hypothesis? 2

2. Answer any **two** questions: 5×2=10

   a) Meiotic consequences of translocation. (Diagrammatic)

   b) Five distinguishing features of B-DNA.

   c) Experimental evidence of Cytological basis of Crossing Over. (Diagrammatic)

   d) CIB method. (only diagrammatic)

3. Answer any **two** of the following questions: 10×2=20

   a) What is a base analog? Illustrate the molecular mechanism of mutation induced by base analogs and alkylating agents. 2+4+4

   b) What do you mean by a linkage group? 2+8

   In a test cross during the year 1922, C. B. Hutchinson involved three characters of maize endosperms— i) coloured aleurone(C) vs. colourless aleurone(c), ii) full endosperm(Sh) vs. shrunken endosperm(sh), and iii) non-waxy or starchy endosperm(Wx) vs. waxy endosperm (wx) and he obtained following progenies-

   Coloured, shrunken, non-waxy 2777

   Colourless, full, waxy 2708

Coloured, full, waxy 116

Colourless, shrunken, non-waxy 123

Coloured, shrunken, waxy 643

Colourless, full, non-waxy 626

Coloured, full, non-waxy 04

Colourless, shrunken, waxy 03

Total 7000

Calculate the recombination values and prepare a linkage map in linear order. Mention coefficient of coincidence.

c) What is operon? Explain the structure and mode of control of an inducible operon in prokaryotes. 2+4+4

d) Do you consider ability of DNA to replicate itself a property of genetic material? Give reasons in support of your answer. Provide experimental evidence that DNA replicates in semi-conservative mode. (only diagrammatic) 1+3+6

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