

PG CBCS
M.Sc. Semester-III Examination, 2020
BOTANY
PAPER: BOT 301

CELL BIOLOGY, GENETICS & BIOTECHNOLOGY

Full Marks: 40

Time: 2 Hours

Write the answer for each unit in separate sheet

BOT 301.1

CELL BIOLOGY & GENETICS

1. Answer any two questions from the following:

10 x 2 = 20

- I. What is codominance? Is map distance always the same as recombination frequency? What is the benefit of calculating recombination frequency? Why are the recombinant gamete types rare? 2+3+2+3
- II. What are the phenomena of explanation must accommodate for any molecular model of crossing over? Explain briefly different hypothesis for mechanism of Crossing Over. 4+6
- III. What is cell cycle checkpoint? What are importance of cell cycle checkpoints? Discuss the role of cyclin and cdk in cell cycle regulation. 2+2+6
- IV. Write the general features of transposable elements. Illustrate the structure of *Ac* autonomous transposable element of corn. Represent diagrammatically the *Ac* transposition mechanism. 2+3+5
- V. What is a Hardy-Weinberg assumption? Illustrate the general rule for estimating allele frequencies from genotype frequencies. What is the implication of the Hardy-Weinberg principle? If the genotypes AA, Aa, and aa have frequencies 0.5, 0.25, and 0.25 (respectively), what are $p = \text{freq}(A)$? $q = \text{freq}(a)$? After a single generation of random mating, what is the expected frequency of AA, Aa and aa? If the genotypes AA, Aa, and aa have fitnesses 1: 1.5: 1.6, what allele is fixed? 2+3+2+3

(P.T.O.)

(2)

BOT 301.2**BIOTECHNOLOGY****2. Answer any two questions from the following:****10 x 2 = 20**

- I. What is Recombinant DNA? Write the steps of making of recombinant DNA. Discuss the applications of recombinant DNA technology in agriculture. 2+5+3
- II. What is promoter? Differentiate the eukaryotic- and prokaryotic- promoter. Discuss the mechanism for termination of transcription in bacteria and eukaryotes. 2+3+5
- III. Describe the steps for a PCR reaction. What is the function of thermostable DNA Polymerases in PCR reaction? What is the appropriate primer length for a PCR reaction and why? 5+3+2
- IV. What do you mean by Cellular totipotency and plant regeneration? What are the basic requirements of plant tissue culture? Discuss different protoplast isolation methods for protoplast culture. 2+3+5
- V. What is the aim and objectives of plant breeding? Discuss the breeding methods in asexually propagated crop. What is the importance of asexually propagated crops? 4+4+2
