QE-5750

M. Sc. (Sem. III) Examination,
December, 2023

BOTANY

PAPER - XII

CYTOGENETICS

Time Allowed : Three Hours

Maximum Marks : 70

Minimum Marks : 28

Note : This question paper is divided into three sections as under :

SECTION - A **Max. Marks 10**

Will carry 10 marks with 01 compulsory question comprising 10 short answer type questions (maximum 20 words answer) taking two questions from each unit. Each question shall be of one mark.

SECTION - B **Max. Marks 25**

Will carry 25 marks with equally divided into five long answer type questions (answer about in 250 words). Students are instructed to attempt five questions by selecting one question from each unit.

SECTION - C **Max. Marks 35**

Will carry 35 marks with five long answer type questions comprising one complusory question (question no. 07) of 15 marks and four questions of 10 marks each. Students are instructed to attempt total three questions with one compulsory question (answer about in 500 words) and any two more questions (answer about in 400 words) out of remaining four questions.

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SECTION - A

$10 \times 1 = 10$

1 (i) What is the basic unit of Chromatin Organization ?

(ii) Who discovered chromosome ?

(iii) What do you mean by chromosomal alterations ?

(iv) What is monosomics ?

(v) Define Transcription.

(vi) What is alternative splicing ?

(vii) DNA finger printing.

(viii) Name two Inherited diseases.

(ix) Write full form of FISH.

(x) Define Microdissection.

SECTION - B

UNIT - I

2 Describe the structure of telomere and centromere in a chromosome.

OR

Give a brief account of Lampbrush chromosome and its utility in cytogentic studies. 5

UNIT - II

3 Discuss the role of polyploidy in evolution using examples of some natural polyploids. 5

OR

Differentiate paracentric inversion and pericentric inversion. 5

UNIT - III

4 Describe different types of chemical mutagens utilized for induction and mutation. 5

OR

Write short notes :

(a) Induction

(b) Repression 5

UNIT - IV

5 Describe different mechanisms for DNA repair. 5

OR

What are sex chromosomes ? Explain Sex determination with an example. 5

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UNIT - V

6 What is Molecular cytogenetics ? Write the types and application of Molecular cytogenetics. 5

OR

Write short notes :

(a) Flow cytometry

(b) Microcloning 5

SECTION - C

7 What is synaptonemal complex ? Describe its structure and functional role in Meiotic chromosomal pairing, synapsis and recombination. 15

8 What is "Feedback Inhibition" ? Compare it with the mechanism of regulation based on operon model. 10

[Contd...

9 Explain the following :

(a) Euchromatin and Heterochromatin

(b) Evolution of wheat

(c) Colchicine treatment 10

10 Describe Induced and spontaneous mutation. Give a brief account of role of mutation in plant breeding and evolution. 10

11 Discuss the following :

(a) Isoalleles and multiple alleles

(b) Blood groups in man. 10
