

GURUDAS COLLEGE

B. Sc. SEMESTER IV (Honours) Examination Online Internal Examination, 2020

Subject: BOTA
Subject Category: Honours
Course: CC 10
Course Name: Genetics

Full Marks: 50
Date of Examination: 4th December, 2020

The figures in the margin indicate full marks
Candidates are required to give their answers in their own words as far as practicable

Answer each group in a new page

GROUP-A: (THEORY) GENETICS (BOT-A-CC-4-10-TH)

1. Answer any ten of the following questions: 2X10
- a) Define complete and incomplete linkage. 1+1
 - b) Differentiate between Dominance and Epistasis. 2
 - c) State the role of RecA in crossing over. 2
 - d) What is FISH? 2
 - e) A cross was made between purple leaf (pl), glossy seedling (g), dwarf variety (t) and wild (++++) type. F1 plants were test-crossed and following proportions were obtained when a sample of 1000 plants were counted:

Wild	310
Purple leaf, Glossy seedling, Dwarf	305
Purple leaf	140
Glossy seedling, Dwarf	145
Purple leaf, Dwarf	42
Glossy seedling	43
Dwarf	9
Purple leaf, Glossy seedling	6

Find out the gene order.

- f) Differentiate between paracentric inversion and pericentric inversion.
- g) Differentiate between Autopolyploid and Allopolyploid.
- h) Define Amphidiploidy.
- i) What are the Mutagens- mention two examples.

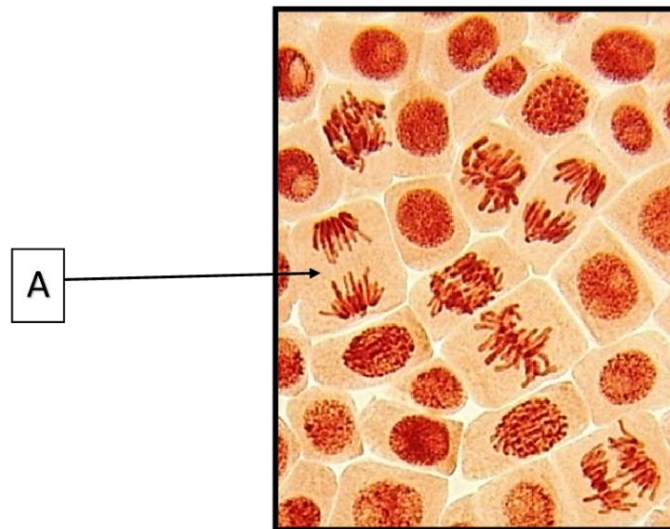
- j) What are alkylating agents- give two examples.
- k) What is mismatch repair system of DNA? 2
- l) What is the function of DNA glycosylases in DNA base excision repair mechanism? 2
- m) What is the function of transposase enzyme? Where the gene of this enzyme is located? 1+1
- n) The size of the pigmented sector of corn depends on the stage of floral development-- comment on this. 2
- o) What is split gene? Give an example. 2

2. Write short note on any one of the following:

- a) Cytological basis of crossing over.
- b) Differences between deletion and duplication in chromosomal aberration.
- c) Frame shift mutation.

GROUP-B: (PRACTICAL) GENETICS (BOT-A-CC-4-10-P)

- 3. a) Write down the full form of PDB. Write down the composition of 2% aceto-orcein stain. Give one example of Fixative agent. 2+2+1
- b) Identify the given specimen (cell divisional stage) in the photograph with reasons: 5



- b) To study the metaphase chromosome from the root tip of *Allium cepa* by stained and squash technique, what are the different steps that you will follow? 5

GROUP-C: (INTERNAL ASSESMENT)

4. Select the correct answer (any five).1X5=5

I). If the percentage of crossing over between two genes is 10, then the distance between two genes will be

- a) 5 morganoid
- b) 10 centimorgans
- c) 20 centimorgans
- d) 40 map units

II). 9:7 ratio in the F₂ generation represents

- a) Incomplete dominance
- b) Co-dominance
- c) Epistasis
- d) Complementary interaction

III). Polygenes exhibit

- a) Different phenotypes
- b) Different genotypes
- c) Similar genotypes and phenotypes
- d) Both (a) and (b)

IV) Paracentric inversion

- a) Centromere absent
- b) Centromere present
- c) Only found in dicentric chromosome.
- d) None of the above.

V) *Triticum aestivum* (common wheat plant) is

- a) Amphidiplody
- b) Allopolyploidy
- c) Diploidy
- d) None of the above.

VI). In DNA repair mechanism nucleotides are not replaced in

- a) Base excision repair
- b) Nucleotide excision repair
- c) Direct repair
- d) Mismatch repair

VII). The size of pigmented sector in corn will be large –

- a) If the excision of transposable elements from the pigment encoding allele is early in development
- b) Does not depend upon the stage of development
- c) If the excision of transposable elements from the pigment encoding allele is late in development
- d) None of the above

VIII). Which type of mutations of the following cause maximum changes in the gene product

- a) Transition
- b) Deletion
- c) Transversion
- d) None of the above

Instructions for submission of answer scripts

1. Write the front page/top sheet as per instruction. Give page numbers to each page.
2. Scan the pages in sequence and make a single PDF file.
3. Rename file as per instruction.
4. Email the PDF file within the stipulated time to **botasem4GDC@gmail.com** and also give CC email to **gdcexamhons@gmail.com**