

B.Sc. Semester - 6 (CBCS) Examination
March/April-2025 (NEW COURSE)
Cytogenetics, Molecular - Bio. (Core (New))

Time: 2:30 Hours**Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

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- Que-1(A) Answer in very short. (04)**
- 1) Fill in the blank: Nuclear pores form passage ways between _____ and _____.
 - 2) In which layer of cell wall cellulose micro fibrils are densely packed and arranged in parallel orientation?
 - 3) Give the terms: The finger like projection is produced by inner mitochondrial membrane into the inner chamber.
 - 4) True or False: Quantosomes are particles found in thylakoid membrane of Chloroplast.
- Que-1(B) Answer in brief (Any One) (03)**
- 1) Discuss the difference between primary and secondary cell walls of plant cell.
 - 2) Write notes on: Function of Mitochondria.
- Que-1(C) Answer in very details (Any One) (07)**
- 1) What is nuclear pore? Explain the entire structure of nuclear pore complex.
 - 2) Explain: Ultra structure of Chloroplast.
- Que-2(A) Answer in very short. (04)**
- 1) Fill in the blank: The points of contact between non-sister chromatids are called ____.
 - 2) True or False: The number of linkage group in an organism is equal to the number of pairs of Chromosomes.
 - 3) Which enzyme is synthesized by structural gene 'Y' in Lac operon?
 - 4) Complete the statement: In substitution mutation, replacement of purine by pyrimidine or vice versa is called.....
- Que-2(B) Answer in brief (Any One) (03)**
- 1) Define Hardy-Weinberg law with formula and write the significance of it.
 - 2) What is chromosome map? Discuss the procedure for chromosome mapping.
- Que-2(C) Answer in very details (Any One) (07)**
- 1) What is crossing over? Explain the types crossing over.
 - 2) Explain: The coupling and repulsion phase in *Lathyrus odoratus*.
- Que-3(A) Answer in very short. (04)**
- 1) Name the DNA repair process in which Thymine dimers are corrected by the enzyme DNA photolyase.
 - 2) Fill in the blank: Protein synthesis stop before _____ codon, _____ codon, _____ codon. This indicates they are stop codon.
 - 3) Name the reagent which is used in DNA extraction as chelating the ions and decreases the activity of enzyme DNases.
 - 4) Complete the statement: The TΨC loop of tRNA contains a modified base, 'Ψ' which stands for _____.

- Que-3(B) Answer in brief (Any One) (03)**
1) Explain: Deciphering the code using Heteropolymers.
2) Discuss the steps necessary for isolation procedure of DNA.
- Que-3(C) Answer in very details (Any One) (07)**
1) Explain: The lac operon in Bacterium *E. coli*.
2) What is m-RNA? Discuss its structure, types and biosynthesis.
- Que-4(A) Answer in very short. (04)**
1) Complete the statement: Some restriction enzymes cut one strand at left side of the axis of symmetry and other at the right side of axis, the single-stranded DNA extension is called.....
2) Which Bacterium is used for the production of insect-resistant cotton plants?
3) Define: Adaptor as a coupling tool.
4) True or False: The cosmid is not naturally found in living cells, it is a constructed vector.
- Que-4(B) Answer in brief (Any One) (03)**
1) Explain: Characteristics features of an ideal plasmid vector with diagrams.
2) Writes note on: Transgenic plants with improved storage proteins.
- Que-4(C) Answer in very details (Any One) (07)**
1) Explain: Steps involved in construction of recombinant DNA.
2) Describe the useful enzymes in genetic engineering.
- Que-5(A) Answer in very short. (04)**
1) In which type of HPLC, the separating columns is composed of non-polar materials and solvent is polar?
2) Which type of stationary phase is used in TLC?
3) How many DNA copies are theoretically produced after 5 cycles of PCR starting from a single DNA molecule?
4) What type of gel is used in protein electrophoresis?
- Que-5(B) Answer in brief (Any One) (03)**
1) Discuss the procedure of PCR to propagate DNA.
2) Explain the principle of TLC and discuss how to prepare TLC slide.
- Que-5(C) Answer in very details (Any One) (07)**
1) What is paper electrophoresis? Explain steps of Amino acids separation.
2) Describe instrument setup and application of GLC.
