

[Time: 2½ Hours]

[ Marks:60]

Please check whether you have got the right question paper.

**N.B:** 1. All questions are **compulsory**.

- Q.1 Answer any two of the following 12
- Discuss use of transgenic plants for production of biopharmaceutical products.
  - Write a short note on 'therapeutic hormones'
  - Write a short note on 'Recombinant blood products'.
  - Discuss methods used for post-translational modifications of proteins.
- Q.2 Answer any two of the following 12
- write a short note an 'Concerns about consuming products of GMOs'
  - Patent filing is a multistep process.' Justify
  - Discuss the criteria to assess whether biotechnological research is ethical.
  - Write a note on 'Environmental Ethics'.
- Q.3 Answer any two of the following 12
- Write a short note on marine organism as habitats for microorganism
  - Write a short note on marine inspired biomimetics.
  - Write applications of various marine enzyme.
  - Discuss marine bioprospecting
- Q.4 Answer any two of the following 12
- Explain how gene expression is controlled by the p<sup>l</sup> ptomotor also explain the concept of regutable promotor with one example.
  - Explain random mutagenesis with degenerate oligonucleotide primers.
  - How enzyme activity and metal confactor requirements for enzyme activity are altered using protein engineering.
  - Write applicaions of syntherized oligonucleotides.
- Q.5 Do as Directed : 04
- Define : (Any FOUR)
    - Monoclonal antibodies
    - Teratogen
    - Autonomy
    - Trademark
    - Bioremediation

(P.T.O)

- vi) Marine biominerals
- vii) Kozak sequence
- viii) Fusion protien

b) Give two examples : (Any FOUR)

- i) Therapeutic enzymes
- ii) Lectins used in affinity chromatography
- iii) GMOs
- iv) Patents under USPTO
- v) marine derived alkaloids
- vi) Enzymes modified to make them heat stable
- vii) Activity of Exo III
- viii) Marine biopolymers

04

c) Glve the significance.use of : (Any two)

- i) Bioavailability of a drug
- ii) licensing of IP
- iii) Marine Collagen
- iv) Tandem gene array

04