Total No. of Questions :6]

SEAT No. :

P1823

[Total No. of Pages :2

[5232] - 11

M.Sc. - I

BIOTECHNOLOGY

BT-11: Advanced Biological Chemistry

(2008 Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Question no. 1 is compulsory.***
2) ***Answer any four from the remaining questions.***
3) ***Marks are given in parantheses.***

Q1) Answer any four of the following : **[4×5=20]**

a) Discuss the differences between glycolysis and gluconeogenesis.

b) Define metabolic flux analysis and give its significance.

c) Give the principle of NMR with its applications.

d) How does a folded protein attain stability.

e) Explain the pharmacological activities of flavonoids.

Q2) Answer the following :

a) Describe the structural features of motifs and domains. **[8]**

b) Explain how site directed mutagenesis can be helpful for protein engineering. **[7]**

Q3) Answer the following :

a) With the help of schematic diagram explain the working of IR spectroscopy. **[8]**

b) Discuss the methods used for isolation of flavonoids. **[7]**

P.T.O.

Q4) Answer the following : **[3×5=15]**

a) Explain the quaternary structure of proteins.

b) Discuss the regulations laid down for the use of herbal medicines in India.

c) Define allosterism. Explain with an representative example of haemoglobin.

Q5) Answer the following :

a) Explain the role of acetyl CoA for the synthesis of primary & secondary metabolities. **[8]**

b) Explain the Mevalonate pathway for the synthesis of secondary metabolities. **[7]**

Q6) Explain how chromatographic methods can be used for the phytochemical investigation of secondary metabolite. **[15]**

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Total No. of Questions : 6]

SEAT No. :

P1824

[Total No. of Pages : 2

[5232]-12

M.Sc.

BIOTECHNOLOGY

BT-12 : Molecular and Cell Biology

(2008 Pattern) (Semester-I) (New)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***Answer to the sections must be written in separate answer sheets.***
2) ***All questions are compulsory.***
3) ***Figures to the right indicate full marks.***
4) ***Use of colour pencil restricted to diagrams.***

SECTION-I

Q1) Attempt the following in two to three sentences: **[8]**

a) Write the name of cell organelle involved in phospholipids biosynthesis.

b) Draw the ultra structure of chloroplast.

c) Active transport.

d) Light harvesting complex and reaction center in Z-scheme.

Q2) Write self explanatory note on any two of the following: **[16]**

a) RTKase signal transduction.

b) Electron transport chain and oxidative phosphorylation.

c) Hormones of parathyroid.

Q3) Explain any two of the following in details with suitable illustrations: **[16]**

a) Cell signaling by G-protein coupled receptor.

b) Cholesterol and membrane fluidity.

c) Microfilaments and their motor proteins.

P.T.O.

SECTION-II

Q4) Attempt the following in two to three sentences: **[8]**

a) Enlist the applications of molecular biology in medicine.

b) Draw the structure of initiation complex of RNA polymerase III*i*.

c) Distinguish between prokaryotic and eukaryotic RNA polymerase.

d) Write four post transcriptional modifications of primary transcript and/ or hn-RNA.

Q5) Write self explanatory note on <u>any two</u> of the following: **[16]**

a) Leading and lagging stands in DNA Replication.

b) Transition transversion and frame shift mutations.

c) X-linked immunodeficiency.

Q6) Explain <u>any two</u> of the following in details with suitable illustrations: **[16]**

a) Ultra structure of DNA polymerase III.

b) Natural defenses against diseases.

c) Protein synthesis in prokaryotes.

Total No. of Questions :6]

SEAT No. :

P1825

[Total No. of Pages :2

[5232] - 13

M.Sc.

BIOTECHNOLOGY

BT - 13 : Environmental Biotechnology

(2008 Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Question 1 is compulsory. Solve any four out of remaining five questions.***
2) ***Draw neat and labelled diagrams wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) Write short notes on (any four): **[4 × 5 = 20]**

a) Wind energy.

b) Ecomark.

c) Public liability Act.

d) Disposal of biosolids.

e) Biosensors.

Q2) a) What are air quality standards? Add a note on policies of air pollution control in India. **[7]**

b) Discuss the role of biotechnology for clean environment. **[8]**

Q3) a) Explain the role of GMOs for soil remediation. **[7]**

b) Write principle and applications of remote sensing. **[8]**

P.T.O.

Q4) Write short notes on (Any Three): **[3 × 5 = 15]**

a) Physical unit operation in Municipal waste water treatment plant.

b) Environmental Policies in India.

c) Thermal inversion.

d) Biomedical waste disposal.

Q5) What is GIS? Write its principle and various applications in detail. **[15]**

Q6) a) Discuss various non-conventional energy sources with special emphasis on bioenergy. **[7]**

b) Explain the role of biotechnology in biodiversity conservation. **[8]**

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Total No. of Questions :8]

SEAT No. :

P1826

[Total No. of Pages : 2

[5232]-21
M.Sc.
BIOTECHNOLOGY
BT - 21 : Genetic Engineering
(2008 Pattern) (New) (Semester - II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***Attempt a total of five questions selecting at least two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION-I

Q1) a) Compare and contrast the screening and preservation procedures of Genomics and c-DNA libraries? **[8]**

b) Draw a neat labeled schematic map of pUC vector. **[8]**

Q2) Explain giving reasons, M13 bacteriophages are male specific and their vectors suitable for gene sequencing. **[16]**

Q3) a) With two suitable examples, explain the expression of industrially important products in *E.coli.* **[8]**

b) Describe in detail the biological, physical, mechanical and chemical methods of Gene transfer. **[8]**

Q4) Write self - explanatory notes on any two of the following: **[16]**

a) Biopharming - Plants as bioreactors.

b) Mung bean nuclease

c) RNase A and RNase H

P.T.O.

SECTION-II

Q5) Explain the use of capillary electrophoresis made whole genome sequencing faster. **[16]**

Q6) Compare and contrast the following **[16]**

a) Real time and reverse transcriptase PCR

b) Symmetric and asymmetric PCR.

Q7) Write self-explanatory notes on any two of the following: **[16]**

a) Gene annotation.

b) Type II restriction endonucleases

c) Edible vaccines

Q8) a) Explain giving reasons the pros and cons of Gene therapy. **[8]**

b) Describe Agrobacterium is Nature's own genetic Engineer. **[8]**

Total No. of Questions :8]

SEAT No. :

P1827

[Total No. of Pages :2

[5232] - 22

M.Sc.

BIOTECHNOLOGY

BT - 22 : Bioinformatics

(2008 Pattern) (Old) (Semester - II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Attempt a total five questions selecting at least two questions from each section.***
2) ***Answers to the sections must be written on separate answer book.***
3) ***Neat diagram must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) What are biological databases? Explain tools used for database similarity search in detail. **[16]**

Q2) a) Explain any one method of energy optimization in detail. **[8]**

b) Discuss the acquisition of molecular structure from databases. **[8]**

Q3) What is structure based drug designing? Explain the role of bioinformatics in drug designing with appropriate example. **[16]**

Q4) Write a note on any two of the following. **[16]**

a) Simulation of molecular interaction.

b) Gene finding.

c) Chemo informatics.

P.T.O.

SECTION - II

Q5) Explain any two methods used in protein structure prediction. **[16]**

Q6) a) Discuss bioinformatics business model with example. **[8]**

b) What is immunoinformatics? Explain any one method of epitope prediction. **[8]**

Q7) Explain bioinformatics research with a case study. Discuss the routes of research finding in bioinformatics. **[16]**

Q8) Write a note on any two of the following. **[16]**

a) Protein structure - Function relationship

b) Conformational energy calculation

c) SCOP

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Total No. of Questions : 8]

SEAT No. :

P1828

[Total No. of Pages : 2

[5232]-23

M.Sc. - I
BIOTECHNOLOGY
BT-23 : Plant Biotechnology
(2008 Pattern) (Semester-II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***Attempt a total of five questions selecting at least two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Draw neat labelled diagrams wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION-I

Q1) Give an account of regeneration of plants by organogenesis and somatic embryogenesis. **[16]**

Q2) a) How transgenic plants can be developed to attain drought tolerance. **[8]**

b) Why haploids are sterile? How they can be made fertile? Mention applications of haploids in agriculture. **[8]**

Q3) a) Manipulation of nitrogen fixation used to increase yield - Justify. **[8]**

b) How metabolic engineering can be used for enhanced production of secondary metabolites? **[8]**

Q4) Write notes on any two of the following: **[16]**

a) Quantitative improvement in algae.

b) Ti plasmid.

c) Pharmaceuticals and Neutraceuticals.

P.T.O.

SECTION-II

Q5) Give a comparative account for crop improvement using the conventional methods and the modern biotechnological methods. Add note on biosafety precautions taken while releasing transgenic crops. **[16]**

Q6) a) Explain virus mediated gene transfer in plants. **[8]**

b) Write in detail significance of salt tolerant transgenic plants. **[8]**

Q7) a) Mention causes and consequences of somaclonal variations. Add note on its applications. **[8]**

b) Explain how transgenic technology can be used to improve lipid quality. **[8]**

Q8) Write notes on any two of the following: **[16]**

a) Antisense RNA technology.

b) Economically important fungi.

c) Somatic hybrids.

Total No. of Questions :8]

SEAT No. :

P1829

[Total No. of Pages :2

[5232] - 31

M.Sc. - II

BIOTECHNOLOGY

BT-31: Animal Biotechnology

(2008 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***Attempt a total of five questions selecting atleast two questions from each section.***
2) ***Answer to the section must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) Explain in detail any one method of establishment of cell line. **[16]**

Q2) a) Write a note on gene banking. **[8]**

b) Describe artificial insemination. **[8]**

Q3) Explain :

a) Purification of stem cells. **[8]**

b) Livestock breeding and their productivity. **[8]**

Q4) Write short note on any two : **[16]**

a) Media formulation in ATC.

b) Cell sorting.

c) Therapeutic Application of stem cells.

P.T.O.

SECTION - II

Q5) Explain in detail method to generate transgenic animals. **[16]**

Q6) Describe any one mouse model to study human disease. **[16]**

Q7) Explain : **[16]**

a) Germ cell storage.

b) histotypic culture.

Q8) Write short notes on any two : **[16]**

a) Characterization of cells in culture.

b) Any two methods to detect mycoplasma contamination.

c) Problems associated with transgenic animals.

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Total No. of Questions : 8]

SEAT No. :

P1830

[Total No. of Pages : 2

[5232]-32

M.Sc.

BIOTECHNOLOGY

BT-32 : Fermentation Technology

(2008 Pattern) (Semester-III)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***Answer a total of five questions selecting atleast two questions from each section.***
2) ***Answer to the two sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION-I

Q1) With the help of suitable diagram describe different designs of immobilised cell reactors. **[16]**

Q2) a) Define K_{La}. Explain 'gassing out' method of measurement of K_{La}. **[8]**

b) What is continuous culture? How is continuous culture established using chemostat? **[8]**

Q3) Write explanatory notes on any two of the following: **[16]**

a) Types of values and seals used in fermentor.

b) Applications of plant cells in Bioprocess.

c) Different types of Rheology demonstrated by Non-Newtonean fluids.

Q4) Discuss different methods of measurement and control of **[16]**

a) Dissolved oxygen and

b) Temperature during fermentation

P.T.O.

SECTION-II

Q5) Explain different methods of cell lysis for recovery of intracellular product. **[16]**

Q6) a) Discuss steroid biotransformation. **[8]**

b) Describe different phases during biomethanation and explain the role of different organisms in these phases. **[8]**

Q7) a) Discuss the application of strain improvement in industry by giving suitable example. **[8]**

b) Describe the process of recovery of any one antibiotic from fermented both. **[8]**

Q8) Write explanatory notes on any two of the following: **[16]**

a) Application of yeast in fermentation.

b) Cultivation systems for anaerobes.

c) Role of inhibitors in improving product quality.

Total No. of Questions :6]

SEAT No. :

P1831

[Total No. of Pages :2

[5232] - 33

M.Sc.

BIOTECHNOLOGY

BT - 33a : Principles of Virology

(2008 Pattern) (Semester - III)

Time : 1½ Hours] *[Max. Marks :40*

Instructions to the candidates:

1) ***Answer a total of four questions selecting at least two questions from each section.***
2) ***Answers to the sections must be written on separate answer book.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Classify and characterize any five RNA virus families with example. **[5]**

b) Explain ultrastructure of Rabies virus. **[5]**

Q2) a) Discuss lytic cycle of bacteriophages. **[5]**

b) Explain replication of Pox Virus. **[5]**

Q3) Write explanatory note on: **[10]**

a) Plaque assay.

b) DNA Vaccine.

SECTION - II

Q4) a) Discuss the epidemiology of HIV. **[5]**

b) Write a note on emerging and Re- Emerging viral diseases. **[5]**

P.T.O.

Q5) a) Explain immunopathogenesis of Herpes Simplex Virus. **[5]**

b) Discuss mode of transmission of plant viruses. **[5]**

Q6) Write explanatory note on: **[10]**

a) Swine flu.

b) Ranikhet disease.

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Total No. of Questions :6]

SEAT No. :

P1832

[Total No. of Pages : 2

[5232] - 34

M.Sc.

BIOTECHNOLOGY

BT - 33b : Advanced Immunology

(2008 Pattern) (Semester - III)

Time : 1½ Hour] *[Max. Marks : 40*

Instructions to the candidates:

1) ***Attempt a total of four questions selecting atleast two questions from each section.***
2) ***Answer to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) a) Describe the structure and role of Lymph node. **[5]**

b) Give a brief account of B - cell and signal transduction. **[5]**

Q2) a) Explain Inflammation physiology. **[5]**

b) Write the role of regulatory proteins in complement activation. **[5]**

Q3) Write explanatory notes on:

a) Hyperacute rejection of graft. **[5]**

b) Diabetes mellitus. **[5]**

P.T.O.

SECTION - II

Q4) a) Give a concise account of SCID - Mouse Model. **[5]**

b) Write importance of phage display technology. **[5]**

Q5) a) What are chimeric antibodies? Describe various types of chimeric antibodies in brief. Write their applications. **[5]**

b) How Recombinant Vector Vaccines are produced? Give an example of Recombinant Vaccine for human use. **[5]**

Q6) Write explanatory notes on:

a) Molecular Mimicry. **[5]**

b) Application of Stemcells. **[5]**

Total No. of Questions :8]

SEAT No. :

P1833

[Total No. of Pages : 2

[5232]-41
M.Sc.
BIOTECHNOLOGY
BT - 41 : Genomics and Proteomics
(2008 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks : 60*

Instructions to the candidates:

1) ***Attempt a total of five questions selecting atleast two questions from each section.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

SECTION-I

Q1) What is structural Genomics? Explains methods applied & scope of structural genomics. **[12]**

Q2) Discuss steps performed in short gun sequencing. Explain its merits and demerits. **[12]**

Q3) Write short note on : Any two. **[2×6=12]**

a) SAGE

b) Genome annotation

c) Pyrosequencing.

Q4) a) What are microarrays? Explain SNP microarray. **[6]**

b) Explain the scope and applications of functional genomics. **[6]**

P.T.O.

SECTION-II

Q5) Explain strategies applied in functional proteomics. **[12]**

Q6) What are the methods used for identification and characterization of novel proteins. **[12]**

Q7) Write short notes on: Any two **[2×6=12]**

a) MALDI -TOF

b) IEF

c) Structural Proteomics.

Q8) a) Explain: How are microarray useful in proteomics. **[6]**

b) Give role of proteomics in identifying diagnostic markers. **[6]**

Total No. of Questions :8]

SEAT No. :

P1834

[Total No. of Pages :2

[5232] - 42

M.Sc.

BIOTECHNOLOGY

BT - 42 : Legal and Ethical Aspects in Biotechnology and Ipr

(2008 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks :60*

Instructions to the candidates:

1) ***Attempt a total of five questions selecting atleast two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION - I

Q1) What is an industrial design? Explain registration procedure for obtaining a design patent with its flowchart. **[12]**

Q2) Give the basic requirement for patenting an invention. Explain in detail the patenting of biological product. **[12]**

Q3) Write short notes on-

a) Rights of a patentee. **[6]**

b) IPR agencies. **[6]**

Q4) a) Write the salient features of Indian Patent Act 1970. **[6]**

b) Comment on different forms of copyright and its authorities. **[6]**

P.T.O.

SECTION - II

Q5) Describe the major changes in Indian Patent System after TRIPS. **[12]**

Q6) Explain the contribution of Budapest Treaty in Biotechnological intellectual properties with an example. **[12]**

Q7) Write short notes on-

a) Copyright infringement. **[6]**

b) TRIPS Agreement. **[6]**

Q8) a) Give the significance of geographical indications with appropriate examples. **[6]**

b) Discuss the controlling parameters of infringement of a patent. **[6]**

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Total No. of Questions : 6]

SEAT No. :

P1835

[Total No. of Pages : 2

[5232]-43

M.Sc. - II

BIOTECHNOLOGY

BT-43 : Clinical Research and Database Management

(2008 Pattern) (Semester-IV)

Time : 1½ Hour] *[Max. Marks : 40*

Instructions to the candidates:

1) ***Attempt a total of four questions selecting atleast two questions from each section.***
2) ***Answers to the sections must be written on separate answer books.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION-I

Q1) What is FDA? Discuss the contributions of FDA in Clinical Research. **[10]**

Q2) Discuss different steps involved in approval of a drug for clinical use starting from its discovery in the laboratory. **[10]**

Q3) Write notes on any two of the following: **[10]**

a) Preclincal trials.

b) Principles of data base management.

c) Reporting serious adverse events.

SECTION-II

Q4) What is Clinical Research database? Explain the query resolution process in detail. **[10]**

P.T.O.

Q5) Discuss the draft of case report from a patient. **[10]**

Q6) Write notes on any two of the following: **[10]**

a) Safety of human subjects in clinical trials.

b) Managing essential documents.

c) GLPs for manufacture of pharmaceuticals.

Total No. of Questions : 3]

SEAT No. :

P1836

[Total No. of Pages : 1

[5232]-44

M.Sc. - II

BIOTECHNOLOGY

BT-44A :Nanobiotechnology

(2008 Pattern) (Semester-IV)

Time : 1½ Hours] *[Max. Marks : 40*

Instructions to the candidates:

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

Q1) Answer the following (any 4): **[20]**

a) Nano sensors.

b) Metal onide nanoparticles.

c) Chemical vapour deposition.

d) Applications of nanoparticles in chemical sciences.

e) Green synthesis of nanoparticles.

f) Energy bond structure in metals.

Q2) Answer the following (any 1): **[10]**

a) Explain how electron microscope is more superior than optical microscope.

b) What are the different processes that control the subsequent growth of nuclei during nanoparticle synthesis.

Q3) Answer the following (any 1): **[10]**

a) Explain how biomolecules can be utilized as nanostructures.

b) Discuss why (surface area/volume) ratio is very large for nanoparticles compared to bulk material.

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Total No. of Questions : 8]

SEAT No. :

P1837

[Total No. of Pages : 2

[5232]-45

M.Sc.

BIOTECHNOLOGY

BT-44b : Stem Cell Technology & Regenerative Medicines

(2008 Pattern) (Semester-IV)

Time : 3 Hours] *[Max. Marks : 60*

Instructions to the candidates:

1) ***Answer a total of five questions selecting at least two questions from each section.***
2) ***Answer to the sections must be written in separate answer sheets.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION-I

Q1) Describe the process of spermiogenesis. Add a note on structure of sperm. **[12]**

Q2) a) Write in detail fast block to polyspermy. **[6]**

b) Write a note on vitellogenesis. **[6]**

Q3) a) Give the role of homeotic genes in pattern formation of Drosophila. **[6]**

b) Give an account on embryonic induction. **[6]**

Q4) Write short notes on any two of the following: **[12]**

a) Cell lineage.

b) Pattern of cleavage.

c) Metabolic activation of ovum.

P.T.O.

SECTION-II

Q5) Enlist different methods of transgenesis. Add a note on development of any transgenic mouse model. **[12]**

Q6) Write a note on gene therapy & its application in medicine. **[12]**

Q7) Describe in brief bioethical issues involved in human cloning. **[12]**

Q8) Write short notes on any two of the following: **[12]**

a) ESE technology.

b) Knock out animal model.

c) Progenitor cells.

Total No. of Questions : 8]

SEAT No. :

P1838

[Total No. of Pages : 2

[5232]-46

M.Sc. - II

BIOTECHNOLOGY

BT-44C : Agricultural Biotechnology

(2008 Pattern) (Semester-IV)

Time : 3 Hours] *[Max. Marks : 60*

Instructions to the candidates:

1) ***Answer a total of five questions selecting atleast two questions from each section.***
2) ***Answer to the two sections should be written on separate answer sheets.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***

SECTION-I

Q1) Define micropropagation. Elaborate various stages of micropropagation. Add a note on advantages and limitations of micropropagation. **[12]**

Q2) Describe in detail, the methodology used to produce homozygous plants through anther culture. **[12]**

Q3) What is polyembryony? Explain the significance of induced polyembryony in agriculture. **[12]**

Q4) Write notes on any two of the following: **[12]**

a) Embryo rescue technique.

b) Applications of endosperm culture in agriculture.

c) Types of apomixis.

P.T.O.

SECTION-II

Q5) What is transgenic technology? Explain in detail, how it is used to produce herbicide resistant crops. **[12]**

Q6) Discuss importance of marker assisted selection in crop improvement. **[12]**

Q7) Write notes on: **[12]**

a) Somaclonal variations.

b) Edible vaccines.

Q8) Attempt any two of the following: **[12]**

a) Discuss production of novel plant products through metabolic engineering.

b) Describe various methods of virus indexing.

c) Write advantages of biofertilizers.