Total No. of Questions : 7]

SEAT No. : ____

PD3605

[Total No. of Pages : 2

[6485]-101

M.Sc. - I

BIOTECHNOLOGY

BT-501MJ: Bacteriology, Parasitology and Virology

(2023 Credit Pattern) (Semester - I)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Question 2 to 7 carry equal marks.***

Q1) Solve any Five of the following: **[10]**

a) What is evolutionary chronometer?

b) Explain concept of genetic recombination in bacteria.

c) State various modes of parasitic transmission.

d) Enlist any two examples of diseases caused by helminths.

e) Explain the terms

i) Eclipse phase

ii) Burst size

f) Explain with suitable example any one type of capsid symmetry.

Q2) a) Discuss with suitable example the significance of metabolic diversity in bacteria. **[7]**

b) Explain role of parasitic vectors in infectious diseases. **[5]**

Q3) a) What is bacterial cell wall? State it's function. Compare and contrast cell wall of Gram positive and Gram negative bacteria. **[7]**

b) Describe any two re-emerging viral diseases of public health concern. State the cause for it's re-emergence. **[5]**

Q4) a) Give an account on molecular approaches to bacterial taxonomy. **[7]**

b) Discuss molecular techniques used for the diagnosis of viral infections. **[5]**

P.T.O.

Q5) a) Give an account on pathogenesis and treatment of enteric fever. Add a note on importance of emergence of antibiotic resistance among the members of family enterobacteriaceae. **[7]**

b) Illustrate with suitable example replication of virus from group-III of Baltimore classification. **[5]**

Q6) a) Discuss with suitable example in-vivo and in-vitro methods for cultivation of viruses. **[7]**

b) What is bacterial capsule? Describe different types and importance of bacterial capsule. **[5]**

Q7) Write short notes on any Two of the following: **[12]**

a) Molecular adaptations in Archaebacteria.

b) Therapeutic antiviral agents.

c) Parasitic evasion of host defence mechanisms.

ⓘⓘⓘⓘ

Total No. of Questions : 5]

SEAT No. : ____

PD3606

[Total No. of Pages : 2

[6485]-102

M.Sc. - I

BIOTECHNOLOGY

BT - 502 - MJ : Advanced Cell Biology

(2023 Credit Pattern) (Semester - I)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) Enlist four characters of prokaryotic cell.

b) What are secondary messangers.

c) What are Anchoring Junction.

d) Define Casposes.

e) Enlist cyclins involved in cell cycle.

f) Define passive transport.

Q2) a) Describe mechanism of protein targeting to mitochondrial Matrix. **[6]**

b) Give detailed account on assymetry of lipid bilayer of plasma membrane.**[4]**

Q3) a) Explain RASMAP kinase pathway of signal transduction with example.**[6]**

b) Justify role of cell-matrix interactions in cell communication with proteins involved in it. **[4]**

P.T.O.

Q4) a) Discuss role of protooncogenes and antioncogenes in etiology of cancer. **[6]**

b) Write process of cell division via meiosis and its significance. **[4]**

Q5) Write short notes on any two of the following. **[10]**

a) Organization of eukaryotic cells.

b) Assembly and disassembly of microtubules.

c) Fibronectin.

Total No. of Questions : 5]

SEAT No. : ____

PD3607

[Total No. of Pages : 2

[6485]-103
M.Sc. - I
BIOTECHNOLOGY
BT 503 MJ : Advanced Molecular Biology
(2023 Credit Pattern) (Semester - I)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to Q.5 carry equal marks.***

Q1) Solve any five (5) of the following. **[5]**

a) What is polytene chromosome?

b) What is 3'→5' extension activity?

c) Define mutagen with examples.

d) What is photoreactivation?

e) What is splicing?

f) Give any two properties of genetic code.

Q2) a) Describe in detail sequential steps involved in bacterial DNA replication. **[6]**

b) Explain the process 'Replicative recombination'. **[4]**

Q3) a) Enlist and explain different methods of DNA repair. **[6]**

b) Explain the regulation of Lac operon in bacteria. **[4]**

P.T.O.

Q4) a) Define translation. Explain in detail post translational modification in prokaryotes. **[6]**

b) Comment on the role of micro RNA in gene silencing. **[4]**

Q5) Write short notes on any two of the following. **[2×5=10]**

a) Lamphbrush chromosome

b) Bead on string model

c) RNA polymerase

✪ ✪ ✪

Total No. of Questions : 5]

SEAT No. :

PD3608

[Total No. of Pages : 1

[6485]-104
M.Sc. - I
BIOTECHNOLOGY
BT-504-MJ: Advanced Immunology
(2023 Credit Pattern) (Semester - I)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***

Q1) Solve any Five of the following. **[5]**

a) Define ADCC.
b) What is millionaire molecule?
c) State the properties of cytokines.
d) What are the types of grafts used in transplantation?
e) State principle of RIA.
f) What are chimeric antibodies?

Q2) a) What is the role of complement system in immune regulation? Elaborate classical pathway of complement activation. **[6]**

b) Give a brief account on endogenous antigen processing and presentation. **[4]**

Q3) a) What is transplantation? State its importance and mechanism of graft rejection. **[6]**

b) Explain the structure and functions of any two secondary lymphoid organs. **[4]**

Q4) a) What is cell - mediated immunity? Explain in detail activation and differentiation of T cells. **[6]**

b) Give a brief account on multigene organization of heavy chains of immunoglobulin. **[4]**

Q5) Write short notes on any Two of the following. **[10]**

a) Roles and properties of Adjuvants
b) Principle and types of ELISA
c) Type - I Hypersensitivity

ⓘⓘⓘⓘ

Total No. of Questions : 5]

SEAT No. :

PD3609

[Total No. of Pages : 1

[6485]-105
M.Sc. - I
BIOTECHNOLOGY
BT-507-MJ : Environmental Biotechnology
(2023 Credit Pattern) (Semester - I)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any five of the following : **[5]**

a) Write any two major outcomes of Rio conference.

b) What is xenobiotic degradations?

c) Define biostimulation.

d) What is rhizofiltration?

e) Give causes of formation of hole in the ozone layer.

f) What are non-conventional energy sources?

Q2) a) Describe in detail the biological waste water treatment. **[6]**

b) What role does biotechnology play in solving environmental issues? **[4]**

Q3) a) Discuss in detail the role of biological agents used in pollution control, their advantages and applications. **[6]**

b) Write the reasons for global warming and rise in sea level. **[4]**

Q4) a) Describe in detail the principle and methods used in phycoremediations. **[6]**

b) What are the objectives of stockholm conference. **[4]**

Q5) Write short notes on any two of the following : **[10]**

a) Air Pollution

b) Vermicomposting

c) Biomining

Total No. of Questions : 5]

SEAT No. :

PD3610

[Total No. of Pages : 1

[6485]-106
First Year M.Sc.
BIOTECHNOLOGY
BT-508-MJ : Food Biotechnology
(2023 Credit Pattern) (Semester - I)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any five of the following : **[5]**

a) What are Intentional food additives?

b) Define Mycotoxin.

c) What is pasteurization?

d) Define Nutrigenomics.

e) What are functional foods? State its characteristics.

f) What is FSSAI?

Q2) a) Write about control of various microbes causing food spoilage. **[6]**

b) Write detail production of beer using microbes. **[4]**

Q3) a) Describe mechanism of action of prebiotics with examples. **[6]**

b) Explain in detail processing of oil seeds. **[4]**

Q4) a) What is TQM? Explain principles of TQM. **[6]**

b) What are duties and responsibilities of food safety authorities? **[4]**

Q5) Write short notes any two of the following : **[10]**

a) Thermal treatments in food processing

b) Application of proteases in food preservation

c) Bioactive peptides as nutraceuticals

☯☯☯☯

Total No. of Questions : 5]

SEAT No. :

PD3611

[Total No. of Pages : 2

[6485]-107
M.Sc. - I
BIOTECHNOLOGY
BT-509-MJ : Biostatistics
(2023 Credit Pattern) (Semester - I)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Use of scientific calculator is allowed.***

Q1) Solve any five of the following : **[5]**

a) Define : 'level of significance'.

b) Define : 'Treatment' in experimental design.

c) Following are the heights of 10 plants in a garden (in cm) : 60, 72, 75, 55, 65, 70, 77, 80, 85, 87 calculate average height of the plants.

d) Calculate coefficient of Kurtosis (γ_2) if $\mu_4 = 1.16$ and $\mu_2 = 0.85$ comment on your result.

e) State any two assumptions for *t* test.

f) Write the formula for 'Variance' in ungrouped data.

Q2) a) Describe the term 'skewness'. Explain it's types and coefficient of skewness based on moment. **[6]**

b) Calculate Karl Pearson's correlation coefficient for the following data by using. **[4]**

$n = 8$ $\Sigma x = 544$, $\Sigma y = 552$, $\Sigma x^2 = 37028$

$\Sigma y^2 = 38132$, $\Sigma xy = 37560$ comment on results.

P.T.O.

Q3) a) Explain one way ANOVA technique. **[6]**

b) Before and after giving medicine, blood pressure (BP) of 5 patients was measured. Is the medicine effective. [Table value : 2.776] **[4]**

Patient	1	2	3	4	5
B.P. Before Medication	120	122	143	110	109
B.P. After Medication	122	120	141	109	109

Q4) a) Discuss the test procedure for testing the independence of attributes. **[6]**

b) The following are the weights (in mg) of 10 dry leaves of a plant : 18, 20, 22, 27, 21, 29, 27, 29, 28, 29 Calculate coefficient of variation of the above data. **[4]**

Q5) Write short notes on any two of the following : **[10]**

a) Simple Random Sampling.

b) 'Randomization' in design of experiment.

c) 'Negative correlation' with an illustration.

Total No. of Questions : 5]

SEAT No. :

PD3612

[Total No. of Pages : 1

[6485]-108
M.Sc. - I
BIOTECHNOLOGY
BT-510-MJ : Rasayana : An Ancient Gerontology
(2023 Credit Pattern) (Semester - I)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Answer any five of the following : **[5]**

a) Define Gerontology
b) Enlist Tridosha
c) Enlist types of Rasayana
d) Define Rasayana
e) Define Ajasrika
f) Define Kamya

Q2) a) Explain the Neuroendocrine theory. **[6]**

b) Explain Rasayana preparation for pranakamya with example of the herbs used. **[4]**

Q3) a) Explain how calorie restriction theory illustrate longevity. **[6]**

b) Explain the Rasayana preparation for srikamya with examples of the herbs used. **[4]**

Q4) a) How the Glycation theory of ageing is utilized for longevity? **[6]**

b) Rasayana provides immunity against disease give reasons. **[4]**

Q5) Write short note on. (Any two) **[10]**

a) Immunostimulant
b) Churn and Bhasma
c) Tilomere and aging theory

Total No. of Questions : 5]

SEAT No. :

PD3613

[Total No. of Pages : 1

[6485]-109
M.Sc. - I
BIOTECHNOLOGY
BT-511-RM : Research Methodology
(2023 Credit Pattern) (Semester - I)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***

Q1) Answer any five of the following : **[5]**

a) What is h-index?

b) State use of iThenticate.

c) Define logic in research.

d) What is alternative hypothesis?

e) Enlist any two softwares used in reference manager.

f) What is reductionist approach?

Q2) a) Explain in detail steps involved in biological experiment design. **[6]**

b) Discuss various biosafety issues related to biotechnological research. **[4]**

Q3) a) Give an account on statistical tools used in biological experiments. **[6]**

b) Elaborate on various types of scientific communication. **[4]**

Q4) a) Explain in detail the research data management. **[6]**

b) What is patent? Comment on it's importance. **[4]**

Q5) Write short notes on any two of the following : **[10]**

a) Literature review

b) Research philosophy

c) Laboratory data book and it's importance

Total No. of Questions : 7]

SEAT No. : [ ]

PD3614

[Total No. of Pages : 2

[6485]-201
M.Sc. -I
BIOTECHNOLOGY
BT-551 MJ: Advanced Biological Chemistry
(2023 Pattern) (CBCS) (Semester-II)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Solve any 5 questions from Q.2 to Q.7.***
3) ***Question 2 to 7 carry equal marks.***

Q1) Answer any five of the following. **[10]**

a) Define mutarotation.

b) Role of cholesterol.

c) Isoelectric point.

d) Give the role of prostaglandin.

e) Transamination.

f) Role of pyridoxal phosphate coenzyme.

Q2) a) Discuss glycogenolysis. Add a note on its regulation. **[7]**

b) Explain Ramachandran plot for analysis of protein. **[5]**

Q3) a) Explain in detail fatty acid synthase complex catalyzing de NOVO synthesis of fatty acid. **[7]**

b) Discuss Glucose-Alanine cycle. **[5]**

Q4) a) Explain in detail the pH, Temperature and substrate concentration factors affecting on enzyme activity. **[7]**

b) Discuss tertiary structure of protein with suitable example. **[5]**

P.T.O.

Q5) a) Discuss the storage polysaccharides in detail with suitable examples. **[7]**

b) Give the regulation of Urea cycle. **[5]**

Q6) a) Give the classification of aminoacids with suitable examples. **[7]**

b) Discuss Eadie-Hofstee Plot. **[5]**

Q7) Write short notes on any two of the following. **[12]**

a) Spingolipids.

b) Acid-Base catalysis of enzyme.

c) Inborn errors in aminoacid metabolism.

Total No. of Questions : 7]

SEAT No. : ____

PD3615

[Total No. of Pages : 2

[6485]-202
M.Sc. - I
BIOTECHNOLOGY
BT - 552 -MJ : Genetic Engineering
(2023 Credit Pattern) (Semester -II)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Question 1 is Compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Questions 2 to 7 carry equal marks.***

Q1) Solve any five of the following. **[10]**

a) PCR Cocktail

b) Role of Alkaline phosphatase

c) Enlist two features of PCR primers

d) Define shuttle vector with example

e) Give the role of polynucleotide kinase enzyme

f) Blue-White screening of recombinant

Q2) a) What are Restriction endonuclease enzymes? Explain different types of restriction enzymes **[7]**

b) Discuss M13 bacteriophage as vector in molecular cloning. **[5]**

Q3) a) Describe in details “designing of PCR primers. **[7]**

b) Describe Agrobacterium mediated method of gene transfer. **[5]**

Q4) a) Describe indetail colony hybridization method for recombinant selection. **[7]**

b) Explain in brief conjugation based method of gene transfer. **[5]**

P.T.O.

Q5) a) What are DNA ligases? Explain it's mechanism of action. **[7]**

b) Describe the structure & application BAC in genetic engineering. **[5]**

Q6) a) Describe the application of gene manupulation techniques in the field of forensic & medical science. **[7]**

b) Give brief account on development of PCR technique. **[5]**

Q7) Write short notes on any two of the following. **[12]**

a) Immunological assay

b) Transgenic plants

c) Real time PCR

Total No. of Questions : 5]

SEAT No. : ____

PD3616

[Total No. of Pages : 2

[6485]-203
M.Sc.- I
BIOTECHNOLOGY
BT-553-MJ : Advanced Genetics
(2023Credit Pattern) (Semester - II)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q2 to Q5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Answer any five of the following. **[5]**

a) What is Recombination frequency?

b) Write the Phenotypic ratios of Monohybrid and Dinybrid crosses.

c) Define allele.

d) What are Muller's Neomorph alleles?

e) What is meant by incomplete linkage?

f) Write the meaning of nonsense mutation.

Q2) a) What is gene interaction? Explain complementary gene interaction with suitable example. **[6]**

b) Explain the reasons for the success of Mendel in formulating the laws of inheritance. Write any four characteristics of Pea plants. Which helped him? **[4]**

Q3) a) What are structural abberations of chromosomes? Explain any two types in detail. **[6]**

b) Explain the concept of multiple allele with suitable example. **[4]**

P.T.O.

Q4) a) What is sex linked inheritance? How Morgan discovered it using Drosophila Melanogaster? **[6]**

b) Write a note on Autosomal dominant inheritance. **[4]**

Q5) Write short notes on any two from following. **[10]**

a) Restriction mapping.

b) Mutations.

c) Genetics disorders.

Total No. of Questions : 5]

SEAT No. :

PD3617

[Total No. of Pages : 1

[6485]-204
M.Sc. - I
BIOTECHNOLOGY
BT-560 MJ: Nanotechnology
(2023 Credit Pattern) (Semester - II)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***

Q1) Answer any five of the following. **[5]**

a) What is ferrofluids and quantum dots?

b) Define surface plasmon resonance.

c) What are metal oxide nanoparticles?

d) What is microemulsion?

e) Which technique is commonly used for the fabrication of nanoparticles?

f) Who is first used the term nanotechnology?

Q2) a) Explain chemical method using sol gel method for nanoparticle synthesis. **[6]**

b) How to use nanoparticles in water remediation. **[4]**

Q3) a) How to characterize nanomaterial using electron microscope. **[6]**

b) Describe antifungal activity of nanoparticles. **[4]**

Q4) a) Explain synthesis of nanoparticles using plant based biological method and its application in drug delivery. **[6]**

b) Environmental and health impact of isotropic and magnetic nanoparticles. **[4]**

Q5) Write short notes on any two. **[10]**

a) Lipid nanoparticles and it's properties

b) Genotoxicity and cytotoxicity

c) Fluorescence spectroscopy

ⓘⓘⓘⓘ

Total No. of Questions : 5]

SEAT No. :

PD3618

[Total No. of Pages : 1

[6485]-205
M.Sc. - I
BIOTECHNOLOGY
BT-562 MJ: Stem Cells and Regenerative Technology
(2023 Credit Pattern) (Semester - II)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***

Q1) Answer any five of the following. **[5]**

a) What does iPSc stand for?

b) Name one major source of adult stem cells.

c) Mention one function of the stem cell niche.

d) What is the role of neural stem cells?

e) What is pluripotency?

f) What is organ specific stem cells?

Q2) a) Describe the key characteristics of stem cells and their significance in regenerative medicine. **[6]**

b) Explain how stem cell therapy is used in the immune system to treat autoimmune diseases. **[4]**

Q3) a) Describe the derivation and culture process of embryonic stem cells. **[6]**

b) Discuss the principle of stem cell self renewal & how it differs from differentiation. **[4]**

Q4) a) Explain how signalling pathways regulate stem cell behavior. **[6]**

b) Discuss cutting - edge research and emerging technologies in stem cell biology. **[4]**

Q5) Write short notes on any Two of the following. **[10]**

a) Signalling pathways for stem cell differentiation.

b) Stem cells in cancer immunotherapy.

c) Clinical applications and challenges associated with adult stem cells.

ⓘⓘⓘⓘ

Total No. of Questions : 5]

SEAT No. :

PD3619

[Total No. of Pages : 1

[6485]-206
M.Sc. (Part - I)
BIOTECHNOLOGY
BT-564 MJ: Tissue Engineering
(2023 Credit Pattern) (Semester - II)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) Define biomaterial and biocompatibility.
b) What is Alexis carrels Theory?
c) Write in brief about computational modelling.
d) Define Rheology.
e) Mention any two applications of tissue Engineering.
f) What is the role of patent in tissue Engineering?

Q2) a) What are Scaffolds? Describe the methods which are used for synthesis of Scaffolds. **[6]**

b) Explain the structure and function of collagen in tissue Engineering. **[4]**

Q3) a) Define biodegradable biopolymer? How the properties of biopolymer are Evaluated. **[6]**

b) Comment on organ on chip and give its application in cartilage and bone regeneration. **[4]**

Q4) a) Explain in detail the guidlines and regulation for tissue Engineering. **[6]**

b) Write in detail the methods of studying cell and tissue mechanics. **[4]**

Q5) Solve any two. **[10]**

a) Micro fluids
b) Hydrogel
c) PEG and Paramatrix

ⓘⓘⓘⓘ

Total No. of Questions : 5]

SEAT No. :

PD3620

[Total No. of Pages : 1

[6485]-207
M.Sc. - I
BIOTECHNOLOGY
BT-566 MJ: Herbal Medicine
(2023 Credit Pattern) (CBCS) (Semester - II)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) Enlist any four cardiac glycoside drugs.

b) What is difference between primary and secondary metabolites.

c) Define pigments.

d) Name the analytical technique used in analysis of secondary metabolites.

e) Explain role of morphine in herbal medicine.

f) Define flavanoids.

Q2) a) Give detail account on technologies used for analyzing plant secondary metabolites. **[6]**

b) What are alkaloid drugs, give some example. Mention its specific therapetic uses. **[4]**

Q3) a) Explain in-vitro and in-vivo experiments to evaluate the efficacy of secondary metabolites. **[6]**

b) Define term: Terpenes, sesquiterpenes and triterpenes. **[4]**

Q4) a) Explain role of AYUSH as regulatory authority in the manufacturing and marketing of herbal drug. **[6]**

b) Elaborate, salicin and salicylic derivatives and its medicinal properties. **[4]**

Q5) Write short notes on any two. **[10]**

a) Essential oil and ole - Gum resins

b) “Schedule T”

c) Plant secondary metabolites a key drivers of pharmacological action in herbal medicine.

ⓘⓘⓘⓘ

Total No. of Questions : 7]

SEAT No. : ____

PD3621

[Total No. of Pages : 2

[6485]-301
M.Sc. - II
BIOTECHNOLOGY
BT-601MJ: Physiology
(2023 Credit Pattern) (Semester - III)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Questions 2 to 7 carry equal marks.***

Q1) Solve any Five of the following: **[10]**

a) Magnetoreceptor.

b) Atropy.

c) Neurotransmitters.

d) Photomorphogenesis.

e) Enlist environmental cues that trigger floral evocation.

f) Primary functions of cryptochromes.

Q2) a) Comment on neural tissue. Explain its contribution in overall function of nervous system. **[7]**

b) Explain the regulation of blue light stimulated response in plants. **[5]**

Q3) a) Explain the molecular structure of phytochromes and its types. **[7]**

b) Describe the synthesis, storage and release mechanism of hormones in the endocrine system. **[5]**

Q4) a) Explain the structure of skeletal muscle. Add a note on its structure related to their function in movement. **[7]**

b) Define vernalization. How does it promotes flowering? **[5]**

Q5) a) Explain the key mechanism of temperature stress tolerance in plants. **[7]**

b) Discuss the role of hormones in maintaining salt and water balance in animals. **[5]**

P.T.O.

Q6) a) Discuss the adaptive significance of nevigation in animals. **[7]**

b) Explain the mechanism of adaptation to high light stress in plants. **[5]**

Q7) Write a short notes on any Two of the following: **[12]**

a) Ionic basis of membrane potential.

b) Neuroendocrine mechanism in mammalian stress response.

c) Long distance signaling involved in flowering.

ⓘⓘⓘⓘ

Total No. of Questions : 5]

SEAT No. :

PD3622

[Total No. of Pages : 2

[6485]-302

M.Sc. - II

BIOTECHNOLOGY

BT - 602 - MJ : Plant Biotechnology

(2023 Credit Pattern) (Semester - III)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is comulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) Define 'Cryopreservation'.

b) What is somatic hybridization?

c) Give two examples of methods of plant transformation.

d) What is molecular farming?

e) Enlist two promoters used in plant vectors.

f) Define 'Herbicides'.

Q2) a) Describe method of chemical transformation in detail. **[6]**

b) Give approaches to marker free transgenics. **[4]**

Q3) a) Explain the role of biotechnology in qualitative improvement in algae with one example. **[6]**

b) Explain somaclonal variation. **[4]**

P.T.O.

Q4) a) Discuss the role of cloning of plant defense responsegene in developing disease resistance in plant with suitable example. **[6]**

b) Discuss protoplast isolation methods in detail. **[4]**

Q5) Write short notes on any two of the following. **[10]**

a) Identification of hybrid cells using markers.

b) Limitations of somatic hybrids.

c) Micropropogation.

Total No. of Questions : 5]

SEAT No. :

PD3623

[Total No. of Pages : 2

[6485]-303
M.Sc. - II
BIOTECHNOLOGY
BT-603-MJ : Animal Biotechnology
(2023 Credit Pattern) (Semester - III)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any five of the following : **[5]**

a) Write down difference between somatic and germ-line derived stem cells?

b) Give features of Enviro-pig.

c) Write down the components of medium used for capacitation of sperm in vitro.

d) What is bioink?

e) Give any two markers for positive selection of recombinant animal cells.

f) Mention any two successful initiatives to conserve animals using cloning approach.

Q2) a) Describe the process of generation of transgenic frog using REMI. Add a note on its advantages and disadvantages. **[6]**

b) Enlist methods of artificial insemination in livestock. Explain any one of them. **[4]**

Q3) a) Discuss generation of knock out mouse model to study neurodegenerative diseases. **[6]**

b) Explain cell-based approach of vaccine production. What are some common bioreactors used in this process. **[4]**

P.T.O.

Q4) a) Describe embryo transfer technology in livestock in detail. Write its advantages and disadvantages inner traditional breeding methods. **[6]**

b) Give ideal features of biomaterials for tissue engineering Add a note on different types of biomaterials. **[4]**

Q5) Write short notes any two of the following : **[10]**

a) Biosafety issues and bioethics associated with human cloning.

b) Cryopreservation of germ cells.

c) Somatic cell reprogramming.

Total No. of Questions : 5]

SEAT No. : ____

PD3624

[Total No. of Pages : 1

[6485]-304
M.Sc. - II
BIOTECHNOLOGY
BT-604-MJ: Emerging Trends in Biotechnology
(2023 Credit Pattern) (CBCS) (Semester - III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.No.2 to Q.No.5.***
3) ***Q.2 to Q.5 carry equal marks.***

Q1) Solve any Five of the following. **[5]**

a) What is single cell sequencing?

b) Enlist the applications of Metagenomics.

c) What is meant by precision medicine?

d) Define bioprinting of tissue.

e) Define LMO'S.

f) What is CAR-T cell therapy?

Q2) a) Explain the application of genetically modified crops with respect to B-l cotton, Flavr Savr Tomato and innote potato. **[6]**

b) Comment on hydroponics and urban agriculture. **[4]**

Q3) a) Discuss in detail the workflow of Microbiome identification. **[6]**

b) Write different phases involved in 3D bioprinting. **[4]**

Q4) a) Discuss in detail Mesenchymal cell therapy and Enlist its applications. **[6]**

b) Explain smart farming using JOT. **[4]**

Q5) Write a short note on any two of the following. **[10]**

a) Methods of single cell sequencing

b) Algorithms used for disease subtypes

c) Applications of stem cell therapy

ⓘⓘⓘⓘ

Total No. of Questions : 5]

SEAT No. : ____

PD3625

[Total No. of Pages : 1

[6485]-305
M.Sc. - II
BIOTECHNOLOGY
BT - 610 - MJ : Molecular Diagnostics
(2023 Credit Pattern) (Semester - III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question No 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) State scope of molecular diagnostics.
b) What is post-analytical quality control?
c) Enlist any two physiological disorders.
d) What is retinitis pigmentosa?
e) State any two congenital disorders.
f) What is microbial polymorphism?

Q2) a) Elaborate on different types of biomarkers with suitable example. **[6]**

b) Describe in detail SSCP in diagnostics. **[4]**

Q3) a) Give an account on molecular methods used for diagnosis of infectious diseases. **[6]**

b) What is down syndrome? Describe methods for it's early detection. **[4]**

Q4) a) What are different types of cancers? Describe any two methods used in the diagnosis of cancer. **[6]**

b) Discuss advantages and applications of real - time PCR. **[4]**

Q5) Write short notes on any two of the following. **[10]**

a) Rheumatoid arthritis.
b) Diagnostic applications of DNA sequencing.
c) Importance of molecular diagnosis of metabolic disorders.

✪ ✪ ✪

Total No. of Questions : 5]

SEAT No. : ____

PD3626

[Total No. of Pages : 1

[6485]-306
M.Sc. - II
BIOTECHNOLOGY
BT - 612 - MJ : Infectious Diseases and Vaccine Technology
(2023 Credit Pattern) (Semester - III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) State any two types of infectious.

b) Explain the concept of active and passive immunization.

c) What is the role of vectors in infectious diseases?

d) Enlist any two examples of bacterial infectious.

e) Explain the concept of vaccine preventable diseases.

f) What is GI mapping of infectious diseases?

Q2) a) What are adjuvants? Elaborate on their classification, properties and role in vaccine technology. **[6]**

b) Justify the risk of infectious disease in transplant recipients. **[4]**

Q3) a) Comment on impact of environmental factors on epidemiology of infectious diseases. **[6]**

b) Explain with suitable example any two protozoal diseases. **[4]**

Q4) a) Elaborate on molecular methods for diagnosis of viral infections. **[6]**

b) Discuss different reasons for reemergence of infectious diseases. **[4]**

Q5) Write short notes on any two of the following. **[10]**

a) Geo sentinel network

b) Antibody engineering

c) Prevention and control of infectious diseases.

✪ ✪ ✪

Total No. of Questions : 5]

SEAT No. :

PD3628

[Total No. of Pages : 1

[6485]-308
M.Sc. - II
BIOTECHNOLOGY
BT - 616 - MJ : Biotechnology for Sustainable Development
(2023 Credit Pattern) (Semester - III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) Write two main categories of natural resources.

b) Give two examples of biopolymer.

c) Give application of glucerol.

d) What is MEOR?

e) What is biopesticide? Give two example.

f) What is nanosensor?

Q2) a) What is bioleaching? How it contribute to sustainable mining practices? **[6]**

b) Explain steps involved in microbial acetic acid production. **[4]**

Q3) a) Discuss significance of biodegradation in the context of environmental pollution caused by chlorinated hydrocarbons. **[6]**

b) What are biofuels? How do they differ from fossil fuels? **[4]**

Q4) a) Describe methods used for production of biofertilizers. **[6]**

b) How waste material served as substrate in citric acid production? **[4]**

Q5) Write a short notes on any two of the following. **[10]**

a) BT cotton

b) Sustainable pesticide

c) Bioplastic

✪ ✪ ✪

Total No. of Questions : 5]

SEAT No. :

PD3630

[Total No. of Pages : 1

[6485]-310
M.Sc. - II
BIOTECHNOLOGY
BT-620- MJ : Intellectual Property Right
(2023 Credit Pattern) (Semester - III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question No 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) What is patent?

b) Name one type of work that can be protected under copyright law.

c) In which section of Indian patent act, 1970 filing patent application is mentioned?

d) Which act includes protection of plant varieties & Farmer Rights?

e) What is trade mark?

Q2) a) What are the criteria for patentability? Describe in detail types of patent. Add a note on transfer of patent. **[6]**

b) "Trade secret" explain with example. **[4]**

Q3) a) Discuss the importance of protecting plant varieties and expalin the role of plant breeders right and farmers right in this context. **[6]**

b) Describe patent Granting procedure. **[4]**

Q4) a) Explain the concept of Patenting microorganisms and genes, including the criteria for Novelty. **[6]**

b) Explain need and importance of industrial designs in biotechnology with example. **[4]**

Q5) Write short notes on any two of the following. **[10]**

a) Indian copyright Act

b) Diamond v/s Chakraborty : case study

c) TRIPS

✪ ✪ ✪

Total No. of Questions : 5]

SEAT No. :

PD3632

[Total No. of Pages : 1

[6485]-312
M.Sc. - II
BIOTECHNOLOGY
BT - 624 - MJ : Machine Learning and Data Science
(2023 Credit Pattern) (Semester - III)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question No 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) What do you mean by machine learning?
b) What is artifical intelligence?
c) Different types of DNS are example of which type of data?
d) State any two techniques to handle missing data.
e) What do you mean by descriptive task in machine learning?
f) What is histogram?

Q2) a) Differentiate between qualitative and quantitative data. **[6]**
b) Discuss the concept of neuron with suitable diagram. **[4]**

Q3) a) Explain supervised learning in detail. **[6]**
b) Discuss two examples of nominal data. **[4]**

Q4) a) Explain reinforcement learning with eamples. **[6]**
b) Explain predictive tasks in machine learning. **[4]**

Q5) Write short notes on any two. **[10]**

a) Applications of machine learning in Biotechnology.
b) Different data visualization techniques.
c) Dimensionality Reduction.

✪ ✪ ✪

Total No. of Questions : 5]

SEAT No. : ____

PD3633

[Total No. of Pages : 1

[6485]-401

M.Sc. -II

BIOTECHNOLOGY

BT-651-MJ: Bioprocess Engineering

(2023 Credit Pattern) (CBCS) (Semester-IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) Define bioprocess. Enlist various applications of bioprocess.

b) Enlist objectives of primary screening.

c) Define power number.

d) What is scale up?

e) Enlist inducers used in industrial fermentation media.

f) Enlist low volume-high value products.

Q2) a) Discuss the role of recombinant DNA technology in strain improvement. **[6]**

b) Describe fluidized bed bioreactor with well labelled diagram. **[4]**

Q3) a) Explain the continuous sterilization process used in fermentation. **[6]**

b) Explain how dissolved oxygen is monitored and control infermenter. **[4]**

Q4) a) Define kLa? Explain in detail factors affecting kLa. **[6]**

b) Give detail account on extractors used in liquid -liquid extraction. **[4]**

Q5) Write short note on any two of the following. **[10]**

a) Various modes of heat transfer.

b) Ultra-Filtration.

c) Broth-Rheology.

✠ ✠ ✠

Total No. of Questions : 5]

SEAT No. :

PD3634

[Total No. of Pages : 2

[6485]-402
M.Sc. (Part- II)
BIOTECHNOLOGY
BT - 652 -MJ : Genomics
(2023 Credit Pattern) (Semester -IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is Compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) Enlist any two techniques used to study chromosome structure & organization.

b) Who coined the term “Genomics”?

c) What is ‘Confocal microscopy’?

d) Enlist any two NGS-platforms.

e) What is genome assembly process?

f) Enlist any two data-analysis tools used in genomics.

Q2) a) Describe the fundamental principles underlying FISH. And give the application of it in Genomics. **[6]**

b) What is “Western blotting”? Explain it’s role in studying histone modification. **[4]**

Q3) a) Describe the application of “ChIP-Seq’’ technology in the field of epigenetics. **[6]**

b) Describe the pharmacogenomics in details. **[4]**

P.T.O.

Q4) a) What is "Super-resolution microscopy". Explain it's role in studying chromosome structure. **[6]**

b) Describe the role of "RNA sequencing" (RNA-seq) technology in epigenetics. **[4]**

Q5) Write short notes on any two of the following. **[10]**

a) Genetic counseling

b) Milestones in Genomics

c) Personalized Genomics

Total No. of Questions : 5]

SEAT No. :

PD3635

[Total No. of Pages : 2

[6485]-403
S.Y. M.Sc.
BIOTECHNOLOGY
BT-653-MJ : Proteomics
(2023 Pattern) (CBCS) (Semester - IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q2 to Q5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Answer any five of the following. **[5]**

a) Define functional proteomics.

b) Enlist the methods used for protein seperation.

c) Comment on GAPPED - BLAST.

d) Types of Mass spectrometer.

e) Mention the role of Isotope coded affinity tags.

f) Types of protein - protein interactions.

Q2) a) Explain different techniques used in characterisation of protein phosphorylation and their significance in proteomics. **[6]**

b) What is SEQUEST? How it is used to identify proteins from MS/MS data? **[4]**

Q3) a) Differentiate between structural proteomics, Expression proteomics and functional proteomics? **[6]**

b) Discuss the application of protein array in proteomics research. **[4]**

P.T.O.

Q4) a) Describe the integration of Bioinformatics tools and database in analysis of protein sequence, structure and function. **[6]**

b) Explain the principle and workflow of peptide Mass Fingerprinting. **[4]**

Q5) Write short note on any two of the following. **[10]**

a) RP-HPLC and its applications.

b) Genome annotation.

c) 2D electrophoresis in protein expression profiling.

Total No. of Questions : 5]

SEAT No. :

PD3636

[Total No. of Pages : 1

[6485]-404
M.Sc. (Part - II)
BIOTECHNOLOGY
BT-654-MJ: Bioinformatics and Structural Biology
(2023 Pattern) (CBCS) (Semester - IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) What is hydropholic interaction?

b) What is EM?

c) What is integrative modelling?

d) Elaborate MSA.

e) Define motif.

f) Name types of bonds in proteins.

Q2) a) Describe different approches of protein structure prediction along with their applications. **[6]**

b) Describe any tool for predicting binding pocket in protein. **[4]**

Q3) a) Describe 4 level of protein structure & how these level contribute to overall function of protein. **[6]**

b) What are validation checks in structural biology? Why are they essential. **[4]**

Q4) a) Discuss the steps involved in predicting protein functions from its 3D structure with the help of suitable tool. **[6]**

b) List and briefly describe two algorithms used in RNA secondary structure prediction. **[4]**

Q5) Write a short notes on any two of the following. **[10]**

a) Energy profile

b) X-ray

c) Structural organization in carbohydrate

ⓘⓘⓘⓘ

Total No. of Questions : 5]

SEAT No. : ____

PD3637

[Total No. of Pages : 1

[6485]-405
M.Sc. (Part - II)
BIOTECHNOLOGY
BT-660-MJ : System Biology
(2023 Credit Pattern) (CBCS) (Semester - IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) What is biological network?

b) Name python library used for multi-objective optimization.

c) Define constraint in metabolic modelling.

d) Enlist direct search method used in parameter estimation.

e) What is PyGMO?

f) Mention softwares used for network visualization.

Q2) a) Explain metabolic flux analysis using mass spectrometry? **[6]**

b) What are biological networks and why are they important? **[4]**

Q3) a) Explain principle of constraint - based metabolic modelling and flux balance analysis in MATLAB with example. **[6]**

b) Why are ordinary differtial equation (ODE) used in dynamic modelling? **[4]**

Q4) a) Describe the concept of genetic algorithms and their applications in optimization problems? **[6]**

b) What is the effect of gene deletion on metabolic network. **[4]**

Q5) Write short note on any two. **[10]**

a) FBA based MATLABS.

b) Robustness in biological systems.

c) COBRA tool box.

✪ ✪ ✪

Total No. of Questions : 5]

SEAT No. :

PD3638

[Total No. of Pages : 2

[6485]-406
M.Sc. (Part - II)
BIOTECHNOLOGY
BT-662-MJ : Synthetic Biology
(2023 Credit Pattern) (CBCS) (Semester - IV)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) Give any two example of Restriction endonuclease. Enzyme.

b) Define promoters.

c) What is database?

d) What is biofuel?

e) What is Whole - Cell Bio sensore?

f) Give two dignostic methodes of synthetic biology.

Q2) a) With suitable example descibe the role of PCR in synthetic Biology & its application. **[6]**

b) Describe the evolutions of synthetic biology from genetic engineering.**[4]**

Q3) a) Discuss the bioinformatics tools used for DNA sequence analysis & design. **[6]**

b) Which laboratory techniques & standard lab protocols maintain in synthetic biology studies. **[4]**

P.T.O.

Q4) a) What is xenobiology & how does it relate to synthetic biology? Discuss the potential applications of xenobiology in biotechnology industry? **[6]**

b) Describe the Function of synthetic vaccines. **[4]**

Q5) Write short note on any two.

a) DNA structure and function

b) Bioplastics

c) Synthetic genomics

Total No. of Questions : 5]

SEAT No. : ____

PD3639

[Total No. of Pages : 1

[6485]-407
M.Sc. (Part - II)
BIOTECHNOLOGY
BT-664-MJ : Biologics and Biosimilars
(2023 Credit Pattern) (Semester - IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***

Q1) Answer any five of the following. **[5]**

a) What is biosimilars?

b) What is a generic drug?

c) What does CAR in CAR-T therapy?

d) Write the role of EMA in biologics.

e) What does BLA stand for

f) Define Biobetters

Q2) a) Explain the production process of biologics. **[6]**

b) Describe any two drug targets for biologics. **[4]**

Q3) a) Discuss the global regulatory pathways for biologics and biosimilars. **[6]**

b) What is the role of downstream processing in biologics production. **[4]**

Q4) a) Compare and contrast Biosimilars and Biobetters. **[6]**

b) Discuss ethical consideration in biologics development. **[4]**

Q5) Write short note on any two. **[10]**

a) Immune checkpoint antagonism.

b) Economic impact of biosimilars on health care system.

c) Pharmacovigilance of new biologics.

✪ ✪ ✪

Total No. of Questions : 5]

SEAT No. :

PD3640

[Total No. of Pages : 2

[6485]-408

M.Sc. - II

BIOTECHNOLOGY

BT-666-MJ : Quality Control and Biosafety

(2023 Credit Pattern) (Semester-IV)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***

Q1) Answer any five of the following. **[5]**

a) What is role of RCGM?

b) Enlist elements of validation.

c) State difference between Quality Control and Quality Assurance.

d) State importance of SOP.

e) Write the significance of class II Biosafety cabinate.

f) Enlist two safety considerations in clinical trails.

Q2) a) Describe the role of testing and calibration in ensuring product quality. **[6]**

b) Why safety considerations are essential in clinical trail. **[4]**

Q3) a) Explain guidelines and regulations of GMO's and LMO's for National and International level. **[6]**

b) What are the rules and regulations for startup companies? **[4]**

P.T.O.

Q4) a) What are laboratory associated interactions? How can laboratory workers protect themselves from LAI's? **[6]**

b) What is the importance of Internal and External Audit? **[4]**

Q5) Write short note on any two of the following: **[10]**

a) Biological safety cabinets

b) Roles of Institutional Biosafety Committee

c) Industrial hygiene and toxicology

Total No. of Questions : 5]

SEAT No. :

PD3641

[Total No. of Pages : 2

[6485]-409

M.Sc. (Part-II)

BIOTECHNOLOGY

BT-668-MJ : Bio Entrepreneurship

(2023 Pattern) (CBCS) (Semester-IV)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) ***Question 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question No.2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) Define enterprise.

b) Imitative entrepreneur.

c) Role of MSME.

d) Innovative efforts of an entrepreneur.

e) Bioentrepreneurship. Define.

f) What is patent?

Q2) a) With a real-time bio entrepreneurial success story, highlight key strategies and challenges faced by an entrepreneur. **[6]**

b) Comment on governmental schemes to boost women entrepreneur. **[4]**

Q3) a) Compare & constrast different types of Intellectual property protection available to entrepreneur. **[6]**

b) Comment on factors affecting biotechnology business development. **[4]**

P.T.O.

Q4) a) Elaborate on conceptual framework and characteristics for being an entrepreneur. **[6]**

b) Comment on the inter relationship between business, industry and commerce. **[4]**

Q5) Write short note on any 2 of the following: **[10]**

a) Bioentrepreneurship in drug development.

b) Convergent thinking.

c) Identification and evalution of market potential of bioentrepreneur sector.

Total No. of Questions : 5]

SEAT No. :

PD3642

[Total No. of Pages : 1

[6485]-410
M.Sc. (Part - II)
BIOTECHNOLOGY
BT-670-MJ : Rational Drug Discovery and Development
(2023 Credit Pattern) (Semester - IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) What are the advantages of rational drug design over traditional methods.

b) What does "druggability" refer in context of drug developement?

c) State the role of pubchem in drug discovery.

d) State the role of pharmacophore in virtual screening.

e) What is mean by Docking?

f) What does QSAR stands for?

Q2) a) What are drug targets? How does relate to protein structure & function. **[6]**

b) Differentiate between SBDD and LBDD. **[4]**

Q3) a) Explain any two animal model & state their need in drug discovery. **[6]**

b) Explain the process of drug approval. **[4]**

Q4) a) Elaborate on molecular docking & virtual screening for drug designing. **[6]**

b) Compare and contrast between in vivo and in vitro assays. **[4]**

Q5) Write short notes on any two of the following. **[10]**

a) Drug Repurposing.

b) High - throughput screening.

c) Pharmacophore design.

✪ ✪ ✪

Total No. of Questions : 5]

SEAT No. :

PD3643

[Total No. of Pages : 1

[6485]-411
M.Sc. (Part - II)
BIOTECHNOLOGY
BT-672-MJ : Agriculture Biotechnology
(2023 Credit Pattern) (CBCS) (Semester - IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***

Q1) Answer any five of the following. **[5]**

a) Enlist commercially available GMO's.

b) What is Golden rice?

c) What are edible vaccines?

d) Define micropropagation.

e) Enlist various carrier materials for production of bioinoculants.

f) Define gamatoclonal variations.

Q2) a) Explain the role of Agricultural Biotechnology in crop improvement. **[6]**

b) Comment on opportunities in the agricultural biotechnology. **[4]**

Q3) a) Explain the role of virus indexing in production of virus free plants. **[6]**

b) Comment on development of pureline using plant tissue culture technology. **[4]**

Q4) a) Elaborate a case study on any one ornamental plant. **[6]**

b) Discuss production of biofertilizer. **[4]**

Q5) Write short notes on any two of the following. **[10]**

a) In-vitro plant propogation.

b) Production of triploids.

c) Agricultural biotechnology as a agribusiness.

✪ ✪ ✪

Total No. of Questions : 5]

SEAT No. : ____

PD3644

[Total No. of Pages : 1

[6485]-412
M.Sc. (Part - II)
BIOTECHNOLOGY
BT-674-MJ : Medical Biotechnology
(2023 Credit Pattern) (CBCS) (Semester - IV)

Time : 2 Hours] ***[Max. Marks : 35***

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***

Q1) Solve any five of the following. **[5]**

a) Define Antisense therapy.

b) What is genetic counselling?

c) Enlist any 2 Chromosomal disorders.

d) Name enzyme markers used in discase diagnosis.

e) What are embryonic stem cells?

f) Define ex-vivo gene therapy.

Q2) a) Describe structural disorders with suitable examples. **[6]**

b) Discuss the application of enzyme probe Glucose oxidase. **[4]**

Q3) a) Explain the use of Nucleic acid probes in disease diagnosis. **[6]**

b) What is thalassemia? How medical biotechnology tools can be effectively used to diagnose and treat thallassemia. **[4]**

Q4) a) Explain Hormone replacement therapy with suitable example. **[6]**

b) Discuss the applications of Nanotechnology in disease diagnosis. **[4]**

Q5) Write short note on any two. **[10]**

a) Gene therapy trials in ADA deficiency.

b) Applications of Stem cells in tissue engineering.

c) Microarray in medical biotechnology.

✪ ✪ ✪