Total No. of Questions : 7]

SEAT No. :

PA-3378

[Total No. of Pages : 2

[5918]-11

M.Sc. (Biotechnology)

MBT- 101 : ADVANCED BIOLOGICAL CHEMISTRY

(2019 Pattern) (Semester - I) (CBCS)

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) ***Q.2 to Q.7 carry equal marks.***

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

a) Molten globule.

b) Allosteric site - define.

c) Steady state assumption - state.

d) Metabolome - define.

e) Draw the structure of isoprene.

f) Define maximum velocity.

Q2) a) Comment on protein motif and its importance in protein structure. **[7]**

b) Give a brief account on reciprocal plot. **[5]**

Q3) a) Describe any two factors affecting the enzymatic activity. **[7]**

b) Comment on the concept of metabolic flux analysis **[5]**

P.T.O.

Q4) a) Define metabolic engineering . Explain with a representative example. **[7]**

b) Explain the structure function relationship of a protein. **[5]**

Q5) a) Explain the qualitative and quantitative methods for the analysis of secondary metabolites. **[7]**

b) Comment on the use of enzyme as therapeutic and diagnostic agents. **[5]**

Q6) a) Comment on the types of Zenpenoids and their pharmacological action. **[7]**

b) Explain the term Multienzyme complexes. **[5]**

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

a) Protein engineering.

b) Glucose oxidase as biosensor.

c) Primary metabolites as precursors of secondary metabolites.

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Total No. of Questions : 7]

SEAT No. :

PA-3379

[Total No. of Pages : 2

[5918]-12

M.Sc.

BIOTECHNOLOGY

MBT- 102 : Cell & Molecular Biology

(2019 Pattern) (Semester - I) (CBCS)

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) ***Q.2 to Q.7 carry equal marks.***

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

a) Define Tm.

b) What are secondary messengers?

c) Explain C - value paradox.

d) Enlist inhibitors of replication.

e) What do you mean by cell differentiation?

f) Discuss the role of centromere.

Q2) a) Describe why are plasma membranes fluid - mosaic. **[7]**

b) Short note on mitochondrial genomes. **[5]**

Q3) a) Explain the mechanism of splicing. **[7]**

b) Justify the role of cytochrome - C in programmed cell death. **[5]**

P.T.O.

Q4) a) Discuss the various events in regulating cell cycle. **[7]**

b) Explain significance of mediator complex in gene activation mechanism. **[5]**

Q5) a) Give an account on positive & negative regulation of lac operon. **[7]**

b) Describe Na^+/K^+ ATPase system. **[5]**

Q6) a) Write a detailed note on adherent junctions. **[7]**

b) Discuss 'Nucleotide excision repair' mechanism. **[5]**

Q7) Write short notes on any <u>two</u> of the following: **[12]**

a) Self - splicing introns

b) Vesicular transport mechanism

c) Prophase - I of meiosis.

◆ ◆ ◆

Total No. Of Questions : 7]

SEAT No. :

PA-3380

[Total No. Of Pages : 2

[5918]-13
M.Sc. (Biotechnology)
MBT - 103 : Genetics and Immunology
(2019 Pattern) (CBCS) (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) ***Q.2 to Q.7. carry equal marks.***

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

a) What is heterosis?

b) Define genetic drift.

c) Enlist applications of genetic maps.

d) State roles of adjuvants in vaccine.

e) What is clonal selection theory?

f) Define antigen. State biological classes of antigens.

Q2) a) Describe the genetic linkage and recombination with suitable example. **[7]**

b) Discuss how exogenous antigens are processed and presented. **[5]**

Q3) a) Describe in detail proliferation and differentiation of B cells. **[7]**

b) Explain law of dominance and law of segregation with suitable example. **[5]**

P.T.O.

Q4) a) Discuss the genetics of Diabetes. **[7]**

b) Describe in detail structure and function of any one secondary lymphoid organ. **[5]**

Q5) a) State different classes of immunoglobulins along with their function. Describe in detail structure of IgM. **[7]**

b) In a sampled population the percentage of homozygous recessive genotype (aa) is 36%. Calculate the allelic and genotype frequencies. **[5]**

Q6) a) Explain physical mapping along with it's example. **[7]**

b) State principle and application of flow cytometry. **[5]**

Q7) **Write a short note on any <u>Two</u> of the following.** **[12]**

a) Hardy weinberg equilibrium

b) Population Bottleneck

c) Major Histocompatibility Complex.

Total No. of Questions : 5]

SEAT No. :

PA-3381

[Total No. of Pages : 2

[5918]-14

M.Sc. (Part - I)

BIOTECHNOLOGY

MBT- 105 : Environmental Biotechnology

(2019 Pattern) (Semester - I) (CBCS)

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) Enlist various sources of natural energy.

b) Define bioleaching.

c) What is GIS?

d) Write significance of ISO 14000 series.

e) Mention constraints of Air act 1981.

f) What are xenobiotic compounds?

Q2) a) Explain metrological factors affecting transport & difussion of environmental pollutants. **[6]**

b) Comment on future scenario of the global environment. **[4]**

Q3) a) What is solid waste management? Mention various constraints in the solid waste management. **[6]**

b) Mention different objectives of EIA. **[4]**

P.T.O.

Q4) a) Explain various strategies of removing organic & inorganic pollutants from sewage. **[6]**

b) With suitable example mention role of antipollution acts in improvement of environmental health. **[4]**

Q5) Write short notes on: **[10]**

a) Earth Summits.

b) Global Warming.

c) Biofertilizers.

◆ ◆ ◆

Total No. of Questions : 7]

SEAT No. : ____

PA-3382

[Total No. of Pages : 2

[5918]-15
M.Sc.
BIOTECHNOLOGY
MBT - 106 : Food Biotechnology
(2019 Pattern) (CBCS) (Semester - I)

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

Instructions to the candidates :

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

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

a) Define food intoxication.

b) Conjugated linoleic acid significance.

c) Define TQM.

d) Glucosamine.

e) Define antioxidants

f) Creatine.

Q2) a) Explain the use of nanoparticles for delivery of bioactive constituents. **[7]**

b) Describe staphylococcal poisoning in details. **[5]**

Q3) a) Explain with the help of flow chart 'citric acid fermentation'. **[7]**

b) Describe any two enzyme and its application in food processing. **[5]**

P.T.O.

Q4) a) Explain recent trends in food formulation, add a note on disaster afflicted and space food. **[7]**

b) Describe seven principles of 'MACCP' **[5]**

Q5) a) Explain the application of Natrigenomics in food industry. **[7]**

b) Describe probiotics, add a note on its beneficial effects. **[5]**

Q6) a) Explain role of pigments and sweeteners in food industry. **[7]**

b) Describe role of Biotechnology in food waste management. **[5]**

Q7) **Write short notes on any <u>Two</u> of the following.** **[12]**

a) Aflatoxins

b) Nanosensors in pesticide detection.

c) GMOs.

Total No. of Questions : 7]

SEAT No. :

PA-3383

[Total No. of Pages : 2

[5918]-21
M.Sc. - I
BIOTECHNOLOGY
MBT 201 : Genetic Engineering
(2019 CBCS Pattern) (Semester - II)

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

Instructions to the candidates:

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

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

a) Define Transformation.

b) What are phagemids?

c) Significance of Blue white screening.

d) What are linkers?

e) Role of alkaline phosphatase.

f) Enlist genetic elements in expression Vectors.

Q2) a) Comment on construction of microarrays with reference to genomic studies. **[7]**

b) Differentiate between insertion and replacement Vectors. **[5]**

Q3) a) Define gene therapy. Comment on Vivo strategy. **[7]**

b) Explain the syber green method with reference to quantitative PCR. **[5]**

Q4) a) Discuss the strategy of genomic library construction and comment on number of recombinant clones required to cover the entire human genome. **[7]**

b) Explain the use of RELP technique for mutation detection. **[5]**

P.T.O.

Q5) a) Discuss the components used for a typical PCR reaction. Add a note on temperature conditions. **[7]**

b) Explain the working principle of automated DNA requencing. **[5]**

Q6) a) Define genome editing. Comment on any one method with an appropriate example. **[7]**

b) Comment on manufacturing of edible Vaccines. **[5]**

Q7) Write a note on any Two of the following. **[12]**

a) CRISPR CAS

b) PCR based site specific mutagenesis

c) Chemical synthesis of oligonucleotides.

Total No. of Questions : 7]

SEAT No. :

PA-3384

[Total No. of Pages : 2

[5918]-22

M.Sc.-I
BIOTECHNOLOGY
MBT-202 : BACTERIOLOGY AND VIROLOGY
(2019 Pattern) (CBCS) (Semester-II)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Slove 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) Enlist any two examples of encapsulated bacteria.

b) What are extremophiles? State any two adoptions of extremophiles.

c) What are biosurfactants?

d) Describe in brief types of cell cultures used in cultivation of Viruses.

e) State any two examples of negative sense RNA viruses.

f) What is viropexis?

Q2) a) What are unculturable becteria? Describe in detail different strategies used for culture of unculturable bacteria. **[7]**

b) Describe any two viral diseases of animals. **[5]**

Q3) a) Give an account of nucleoside analogues in therapy of viral infections **[7]**

b) What are bacterial Pilli? Describe types and functions of bacterial pilli. **[5]**

Q4) a) Describe mycobacterial infection with respect to pathogeni city and laboratory diagnosis. **[7]**

b) Describe life cycle of lambda phage. **[5]**

P.T.O.

Q5) a) Discuss different mechanisms of emergence and re-emergence of viral diseases. **[7]**

b) Describe significance of biofilm formation in pathogenicity of bacterial infections. **[5]**

Q6) a) What is bioremediation? Explain with suitable example role of bacteria in bioremediation of xenobiotics. **[7]**

b) Describe ICTV system of classification of viruses with suitable example. **[5]**

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

a) Bacterial cell wall.

b) Serological diagns of viral infections.

c) Morphology of SARS virus.

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Total No. of Questions : 7]

SEAT No. :

PA-3385

[Total No. of Pages : 2

[5918]-23

M.Sc.-I
BIOTECHNOLOGY
MBT-203 : Plant Biotechnology
(2019 CBCS Pattern) (Semester-II)

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) Define micro propagation.

b) What is cryopreservation.

c) Define biotic stress with two examples.

d) What is selectable market?

e) Give ideal characters of molecular marker.

f) What is artificial seed?

Q2) a) What is invitro androgenesis? describe the technique for production of haploid & add a note on its application. **[7]**

b) What are plantibodies? Explain their advantages over we of animal system. **[5]**

Q3) a) With atleast one explanatory example justify crop productivity is increased by manipulating photosunthesis. **[7]**

b) What are cyorids? Write their application. **[5]**

Q4) a) What is QTL? Discuss QTL mapping techniques. **[7]**

b) Explain concept of gene pyramiding. **[5]**

P.T.O.

Q5) a) Discuss production & scale up, of bioactive secondary metabolites using plant biotechnology. **[7]**

b) What are reporter gene? How they are usefull in detecting transformants? **[5]**

Q6) a) Discuss Citing appropriate example use of genetic engineering for production of insect resistance plant. **[7]**

b) Give advantages & disadvantages of micropropagation. **[5]**

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

a) Marker free transgenic.

b) Agro infection.

c) Suspension culture.

Total No. of Questions : 7]

SEAT No. :

PA-3386

[Total No. of Pages : 2

[5918]-24

M.Sc. - I

BIOTECNOLOGY

MBT-205 : Clinical Research, Data Management and IPR

(2019 Pattern) (Semester-II)

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) What is preclinical trial.

b) Define ADR and SAE.

c) Enlist any four types fo study designs.

d) Define IP. Mention any two names of IPs.

e) State Biological diversity act 2002.

f) Give the criteria for patentability.

Q2) a) Describe the procedure of patent application in India. **[7]**

b) Write on recording and reporting of adverse events. **[5]**

Q3) a) Explain roles of investigator in conduct of clinical trials. **[7]**

b) Give an account on farmer's rights during the protction of plant varieties**[5]**.

Q4) a) What is copyright? Discuss the process for the registration of copyright in India. **[7]**

b) State composition and importance of IEC. **[5]**

P.T.O.

Q5) a) Elaborate on schedule Y of drug and cosmetic act. **[7]**

b) Comment on - TRIPS agreement. **[5]**

Q6) a) Describe in detail monitoring of clinical trials. **[7]**

b) Give different types of in fringement ant their remedies. **[5]**

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

a) CRF designing.

b) Commercialization of patent.

c) Global perspectives of IPs.

Total No. of Questions : 7]

SEAT No. :

PA-3387

[Total No. of Pages : 2

[5918]-25

M.Sc. - I

BIOTECHNOLOGY

MBT-206 : Medical Biotechnology

(2019 CBCS Pattern) (Semester-II)

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

Instructions to the candidates:

1) ***Q.No.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) Define antisense gene therapy.

b) What are attenuated vaccines.

c) Enlist protein markers used in disease diagnosis.

d) What is Gaucher's disease?

e) What are polygenic disorders. Give an example.

f) Define synthetic vectors with an example.

Q2) a) What is gene therapy? Describe the methodology involved in in-vivo gene therapy. **[7]**

b) Write a note on bioartificial organs. **[5]**

Q3) a) What are stem cells? Discuss their potential uses. **[7]**

b) Describe nucleic acid probes in disease diagnostics. **[5]**.

Q4) a) What are infections disorders? Explain any one in detail. **[7]**

b) Explain the use of enzyme markers in disease diagnosis. **[5]**

P.T.O.

Q5) a) What are biosensors? Explain how they are applied in clinical diagnosis. **[7]**

b) Write a note on tissue engineering and its applications in medical biotechnology. **[5]**

Q6) a) What is Alzhimer's Disease? How medical biotechnology tools can be effectively used to diagnose and treat Alzhimer disease? **[7]**

b) What is gene argmetation? Explain its importance in gene therapy. **[5]**

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

a) Hormone replacement in diabetes.

b) Tissue engineering.

c) Monoclonal antibodies in infections diseases.

Total No. of Questions : 7]

SEAT No. : ____

PA-3388

[Total No. of Pages : 2

[5918]-31

S.Y. M.Sc.

BITECHNOLOGY

MBT - 301 : Animal and Stem Cell Technology

(CBCS 2019 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) ***Question 2 to 7 carry equal marks.***

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

a) What is a role of CO_2 in animal cell culture?

b) Why less serum is required in continuous cell culture?

c) What kind of markers are used for characterization of normal cell cultures?

d) State important characteristics of stem cells.

e) Define pleuripotency with example.

f) Comment on senescence.

Q2) a) Describe any two types of cell cultures with neat and well labelled diagram. **[7]**

b) Write a note on carbonate-bicarbonate buffering system in tissure culture medium. **[5]**

Q3) a) Explain the process of establishment of primary cell culture with its flow chart. **[7]**

b) Differentiate between finite and infinite cell lines. **[5]**

Q4) a) Discuss the process of artificial insemination in detail with its significance. **[7]**

b) Describe the CRISPR-cas 9 system with respect to production of transgenic animals. **[5]**

P.T.O.

Q5) a) Explain the concept of stem cell niche with neural stem cells as an example. **[7]**

b) Describe in detail how a transgenic mouse model can be used to study neurodegenerative diseases. **[5]**

Q6) a) Write application of animal cell culture. **[7]**

b) Give a note on biosafety issues related to animal biotechnology **[5]**

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

a) Estrous synchronization.

b) Cell transformation

c) Types of organ transplants.

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Total No. of Questions : 7]

SEAT No. :

PA-3389

[Total No. of Pages : 2

[5918]-32

M.Sc. - II

BIOTECHNOLOGY

MBT-302 : Bioprocess Engineering

(CBCS 2019 Pattern) (Semester-III)

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

Instructions to the candidates:

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

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

a) Define Bioprocess engineering. Give components of Bioprocess.

b) Give importance of scale up.

c) Give concept of mass transfer.

d) Define bioseparation. Enlist methods of bioseparation.

e) State applications of exopolysaccharides.

f) Enlist common quality control tests.

Q2) a) Discuss kinetics of continuous fermentation process. **[7]**

b) Explain strain improvement by any one method. **[5]**

Q3) a) Explain the design of batch sterilization of media. **[7]**

b) Give an account on monitoring and control of pH. **[5]**

Q4) a) What is K_{La}? Discuss measurement and determination of K_{La} (any one method.) **[7]**

b) Discuss corelation of power number and Reynolds number with respect to power consumption during fermentation. **[5]**

P.T.O.

Q5) a) Discuss methods of product purification by chromatography. **[7]**

b) Give an account on P.I.D. control. **[5]**

Q6) a) Describe industrial production of 'Vitamin C'. **[7]**

b) Give role of quality assurance (QA) in Fermentation industry. **[5]**

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

a) Inoculum build up for bacterial culture.

b) Fed batch Fermentation.

c) Bubble driven bioreactor.

Total No. of Questions : 7]

SEAT No. : ____

PA-3390

[Total No. of Pages : 2

[5918]-33

M.Sc. - II
BIOTECHNOLOGY
MBT-303 : Bioinformatics and Biostatistics
(2019 CBCS Pattern) (Semester - III)

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) ***Q.2 to Q.7 carry equal marks.***

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

a) Define biological database.Give examples of protein databases.

b) Define 'Type - I' error.

c) What are scoring matrices. Give examples of scoring matrices.

d) What do you mean by 'Randomized Block Design'?

e) Write applications of multiple sequence alignment.

f) Calculate coefficient of kurtosis if $\mu_4 = 1.16$, $\mu_2 = 0.85$. Comment on your result.

Q2) a) Explain dynamic programming with needleman wunsch algorithm. **[7]**

b) Six enteries in music contest were rated by two Judges x and y as follows.

Rank by Judge x	5	6	4	3	2	1
Rank by Judge y	6	2	1	3	4	5

Compute spearman's rank correlation coefficient between x and y. **[5]**

P.T.O.

Q3) a) Explain 'simple linear regression'. Also write the procedure of testing of significance of slope and intercept when variance is known. **[7]**

b) Explain PDB file format. **[5]**

Q4) a) Explain homotogy modelling in detail. **[7]**

b) Dissolving times (in secs) of a drug in gastric juice are 42.7, 43.4, 44.6, 45.1, 46.8. Can we conclude that the population mean is 45 seconds? use t-test for mean. [Table value : 2.776] **[5]**

Q5) a) Describe the term 'Skewness'. Explain it's types and coefficient of skewness based on moments. **[7]**

b) Describe Ramchandran plot. **[5]**

Q6) a) Explain ligand based drug design method in detail. **[7]**

b) Prepare the analysis of variance (ANOVA) table for following data. **[5]**

Weights of balls (in gms)		
Machine I	Machin II	Machine III
2.0	1.8	3.0
2.2	2.2	2.8
1.7	2.0	3.2

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

a) Principles of randomization and local control in design of experiment.

b) HMM (Hidden Markov Model)

c) BLAST

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Total No. of Questions : 5]

SEAT No. :

PA-3391

[Total No. of Pages : 2

[5918]-34
M.Sc. - II
BIOTECHNOLOGY
MBT-305 : Nanobiotechnology
(2019 Pattern) (CBSC) (Semester - III)

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) Nanotechnology.

b) Nanoparticles.

c) Green synthesis.

d) Top down approach.

e) Enlist any two electrical properties of nanoparticles.

f) Buck minster fullerence.

Q2) a) Explain synthesis of nanoparticles using chemical vapor deposition. **[6]**

OR

Describe recent trends is Nanobiotechnology.

b) Give reasons, the uses of Nanotechnology in biosensors. **[4]**

P.T.O.

Q3) a) Explain the use of liposomes used in drug delivery vehicles. **[6]**

OR

Describe the logic used in biological synthesis of nanomaterial.

b) Write strategies used in characterization of nanoparticles using spectrophotometer. **[4]**

Q4) a) Explain different parameters that affect the size of Nanoparticles. **[6]**

OR

Describe 'Quantum dots' and give its application.

b) Explain Sol-Gel synthesis. **[4]**

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

a) SEM.

b) Nanoparticles in diagnostics.

c) X ray diffraction.

Total No. of Questions : 5]

SEAT No. :

PA-3392

[Total No. of Pages : 2

[5918]-35
M.Sc. - II
BIOTECHNOLOGY
MBT-306 : Agricultural Biotechnology
(CBSC 2019 Pattern) (Semester - III)

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) What is agribusiness?

b) Enlist two siderophose producing bacteria.

c) What are microbial Bio insecticides.

d) What are bioinoculants?

e) Define endosperm culture.

f) What are Microsatellites?

Q2) a) Enlist & explain growth hormone production by bacteria & give it's significance in agriculture. **[6]**

b) Mention 4 importance of Agriculture at national economy. **[4]**

Q3) a) Explain about recent advances in plant bar coding with it's 4 benefits & limitations. **[6]**

b) Comment on chloroplast manipulation. **[4]**

P.T.O.

Q4) a) With suitable example explain major diseases of plants & their biotechnological control methods. **[6]**

b) Explain 4 advantages of biotechnological methods over conventional methods of crop improvement. **[4]**

Q5) Write short notes on : **[10]**

a) Plant finger printing.

b) Bar coding Markers.

c) Biofertilizers.

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Total No. of Questions : 7]

SEAT No. : ____

PA-3393

[Total No. of Pages : 2

[5918]-41

S.Y. M.Sc.

BIOTECHNOLOGY

MBT-401 : Genomics and Proteomics

(2019 Pattern) (CBCS) (Semester - IV)

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

Instructions to the candidates:

1) ***Q. 1 is compulsory.***
2) ***Solve any 5 of questions from Q.2 to Q.7.***
3) ***Q.2 to Q.7 carry equal marks.***

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

a) Comparative genomics

b) EST

c) Metagenomics

d) Salting out

e) M13 phage

f) Enlist any two cell lysis method

Q2) a) Describe the goals of functional genomics. **[7]**

b) Explain MALDI has mode MS study easy. **[5]**

Q3) a) Explain proteomics in Biomarker discovery. **[7]**

b) Describe NGS platform in genome sequencing. **[5]**

Q4) a) Explain sangers method of DNA sequencing. **[7]**

b) Describe phage display technique. **[5]**

P.T.O.

Q5) a) Explain Yeast two hybrid system streamlines proteomics study. **[7]**

b) Write principle & scope of structural genomics. **[5]**

Q6) a) Explain role of pharmacogenomics in personalized medicine. **[7]**

b) Describe protein microarray. **[5]**

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

a) Toxigenomics

b) Serum proteomics

c) 2D.PAGE

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Total No. of Questions : 7]

SEAT No. :

PA-3394

[Total No. of Pages : 2

[5918]-42

M.Sc. (Semester - IV)

BIOTECHNOLOGY

MBT-402 : Advanced Bio-analytical Techniques

(2019 Pattern) (Choice Based Credit System)

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) Define Cryotomy.

b) State Lambert's-Beer's Law of spectroscopy.

c) Significance of Circular Dichroism (CD).

d) Principle of X-ray crystallography.

e) Define Micro arry system.

f) What do you mean by Isoelectric Focussing?

Q2) a) Discuss Principle, Working & Significance of Fluorescence In-situ Hybridization (FISH). **[7]**

b) Explain principle and significance of Infra-Red spectroscopy (IR). **[5]**

Q3) a) Explain construction and working of transmission electron Microscopy (TEM). **[7]**

b) Explain in detail affinity chromatography. **[5]**

P.T.O.

Q4) a) Explain principle, working & applications of High Performance Liquid Chromatography (HPLC). **[7]**

b) Discuss principle and working of nuclear magnetic resonance (NMR) spectroscopy. **[5]**

Q5) a) Discuss principle and working of fluorescence spectroscopy. Add a note on its applications. **[7]**

b) Explain in brief immunoprecipitation. **[5]**

Q6) a) Explain principle, working & applications of quantitative PCR (q-PCR). **[7]**

b) Discuss principle of Denaturing Gradient gel electrophoresis (DGGE). **[5]**

Q7) Write short note on any <u>two</u> of the following : **[12]**

a) Freeze-etch & freeze-Fracture method.

b) Stem Cell Markers.

c) Principle and Data processing tools of Next Generation Sequencing (NGS).

Total No. of Questions : 7]

SEAT No. :

PA-3395

[Total No. of Pages : 2

[5918]-43
M.Sc.
BIOTECHNOLOGY
MBT - 404 : Bio-Entrepreneurship & Startup Designing
(2019 Pattern) (Semester - IV) (CBCS)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any five questions from Q2 to Q7.***
3) ***Q2 to Q7 carry equal marks.***

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

a) Define Intrapreneurship.

b) What is financial feasibility?

c) Enlist different features of an Entrepreneur.

d) State any two points of Ethical Entrepreneurship.

e) Name the steps taken for Environmental scanning.

f) Distinguish between Vision and Mission.

Q2) a) Explain women Entrepreneurship. **[7]**

b) Describe startup policy framework. **[5]**

Q3) a) Describe porter's 5 force model with a case study. **[7]**

b) Explain SWOT analysis, add a note on its significance. **[5]**

Q4) a) Write role of society and family in the growth of Entrepreneur. **[7]**

b) Explain different types of entrepreneurs. **[5]**

P.T.O.

Q5) a) Describe sources of generating new ideas. **[7]**

b) Explain rural Entrepreneurship. **[5]**

Q6) a) Explain value chain analysis. **[7]**

b) Describe types of business risks. **[5]**

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

a) Market survey.

b) New venture strategies.

c) Pre-feasibility study.

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Total No. of Questions : 7]

SEAT No. :

PA-3396

[Total No. of Pages : 2

[5918]-44
M.Sc. - (Part-II)
BIOTECHNOLOGY
MBT-405 : PHARMACEUTICAL BIOTECHNOLOGY AND DRUG DESIGNING
(2019 Pattern) (CBCS) (Semester - IV)

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) What are 'Biosimilars'?

b) Define MDR and XDR.

c) State importance of pharmacodynamics.

d) What is structure based drug designing?

e) Give mode of action of cisplastin.

f) Define LD_{50}.

Q2) a) How do you determine and validate targets for drug discovery? **[7]**

b) What is high-through put screening? How does it help in drug discovery process. **[5]**

Q3) a) What is computer aided drug designing? Give a brief account on ligand based drug design. **[7]**

b) What are the analytical techniques used in carcinogenelcity and mutagenicity testing? **[5]**

P.T.O.

Q4) a) Give a brief account on regulatory authorities in drug approval. **[7]**

b) Comment on different mechanisms of drug resistance to anticancer agents. **[5]**

Q5) a) Explain the process of clinical development of new chemical entity. **[7]**

b) Justify role of Hematopoietic growth factor as biopharmaceutics. **[5]**

Q6) a) Explain physiochemical properties of ideal drug. **[7]**

b) Comment on ligand and protein preparation in molecular docking. **[5]**

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

a) Production of Arteminisin.

b) Drug metabolism.

c) Drug tolerance and intolerance.

Total No. of Questions : 7]

SEAT No. :

PA-3397

[Total No. of Pages : 2

[5918]-45

M.Sc. (Biotechnology)

MBT- 406 : RESEARCH METHODOLOGY AND SCIENTIFIC COMMUNICATION

(2019 Pattern) (Semester - IV) (CBCS)

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) ***Q.2 to Q.7 carry equal marks.***

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

a) What is citation index?

b) What is ithenticate?

c) Define journal impact factor.

d) What is difference between reductionist and holistic approach?

e) What is sigmastat?

f) Enlist methods of secondary data collection.

Q2) a) What is patent? Describe the process of patenting biotechnological products. **[7]**

b) Explain the use of statistical tools for biological data analysis. **[5]**

Q3) a) What are data fudging and plagiarism? Discuss the approaches for detecting them. **[7]**

b) Write a note on social implications of scientific research. **[5]**

P.T.O.

Q4) a) Explain in detail the research data management. **[7]**

b) Describe how experimental designing is key for impactful scientific research. **[5]**

Q5) a) Discuss the oral forms of scientific communications. **[7]**

b) What is problem identification? Explain its importance in scientific research. **[5]**

Q6) a) What is journal impact factor? Write a note on web of science based journal impact factor and how it is calculated. **[7]**

b) Write a note on animal expentation ethics. **[5]**

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

a) Key factors for synthesizing a research proposal.

b) Holistic approaches of scientific research.

c) Lab data books and their importance.

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Total No. of Questions : 7]

SEAT No. :

PA-3398

[Total No. of Pages : 2

[5918]-46

M.Sc. (Biotechnology)

MBT- 407 : QUALITY CONTROL, BIOSAFETY AND BIOETHICS

(2019 Pattern) (Semester - IV) (CBCS)

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) ***Q.2 to Q.7 carry equal marks.***

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

a) Write the purpose of containment.

b) What is GEAC stand for?

c) What are laboratory acquired infections?

d) State any two advantages of QC in pharma industry.

e) Write any two roles of animal ethical committee.

f) What is biopiaracy?

Q2) a) Describe with the help of diagram mechanism for implementation of guidelines. **[7]**

b) What is biological containment? **[5]**

Q3) a) Describe in detail rDNA biosafety guidelines. **[7]**

b) Why we need biosafety? **[5]**

P.T.O.

Q4) a) Describe in details biosafety in academic research. **[7]**

b) What are the eight elements of quality management? **[5]**

Q5) a) Explain in details what are the national ethical guidelines for biomedical and health research. **[7]**

b) What is the structure of bioethics committee? **[5]**

Q6) a) What is cGMP? Explain in details any 5 aspects of cGMP? **[7]**

b) Describe GMOs and LMOs guidelines in India. **[5]**

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

a) Human genome project.

b) Ethics related to authorships.

c) Controlling of quality variations.

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