Total No. of Questions :7]

SEAT No. :

P2629

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M.Sc.-I

BIOTECHNOLOGY

MBT 205 : Clinical Research, Data base Management and IPR

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

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

a) What is NDA? When it is field?

b) State the role of FDA.

c) What is phase IV of Clinical trial.

d) What are the Criterias of patentability?

e) What is geographical Indications? Give examples.

f) What are breeder's rights?

Q2) a) Justify significance of pre-clinical studies and clinical trails in the process of drug development. **[7]**

b) What are microbial patents? Elobarate on budapest treaty and its significance. **[5]**

Q3) a) What is copyright? Elobarate on copyright ownership and its transfer. **[7]**

b) What is informed consent. State its importance. **[5]**

P.T.O.

Q4) a) What is schedule 'Y'? State its role in regulation of clinical trial. **[7]**

b) What is infringement? Describe different remedies for copyright infringement. **[5]**

Q5) a) What is patent? discuss provisional and complete specifications in patent filing. **[7]**

b) Comment on query raising and its resolution in clinical trial data management. **[5]**

Q6) a) What is pharmacovigillence? Discuss international procedures of it. **[7]**

b) Comment on transfer of patents. **[5]**

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

a) Blinding and randomization in clinical trials.

b) Investigator's responsibilities.

c) Patent cooperation treaty.

● ● ●

Total No. of Questions : 7]

SEAT No. :

P-2621

[Total No. of Pages : 2

[6072]-111

M.Sc.

BIOTECHNOLOGY

MBT-101 : Advanced Biological Chemistry

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

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

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

a) Maximum velocity.

b) Isopentenyl pyrophosphate.

c) Protein Families.

d) ES complex.

e) Metabolic Flux.

f) Effect of pH on enzyme activity.

Q2) a) Explain with an appropriate example protein-protein interactions. **[7]**

b) Discuss the shikimate pathway for synthesis of secondary metabolites. **[5]**

Q3) a) Comment on the assumptions used for the derivation of Michaelis-Menten equation. **[7]**

b) Explain the importance of integration of metabolism for the functioning of an organism. **[5]**

P.T.O.

Q4) a) With the representative example explain the process of metabolic engineering. **[7]**

b) Explain Diagnostics and therapeutic use of enzymes. **[5]**

Q5) a) Give the classification of terpenoids and the major pathway responsible for its synthesis. **[7]**

b) Comment on the protein folding and the genetic diseases associated with it. **[5]**

Q6) a) Discuss competitive inhibition of enzyme. **[7]**

b) Give the significance of double reciprocal plot to measure the Km & Vmax of an enzyme. **[5]**

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

a) Pharmacological properties of flavonoids.

b) Therapeutic proteins.

c) Molten globule

□□□

Total No. of Questions : 7]

SEAT No. :

P2622

[Total No. of Pages : 2

[6072]-112

F.Y.M.Sc. (Biotechnology)

MBT -102 : CELL & MOLECULAR BIOLOGY

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

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

Instructions to the candidates:

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

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

a) State the importance of cholesterol present in membrane.

b) What are secondary messangers.

c) State the role of primase in replication process.

d) Describe Go stage.

e) What are ribozymes.

f) Enlist different inhibitors of prokaryotic transcription.

Q2) a) Describe Na^+–k^+ ATpase in detail. **[7]**

b) Comment on Tight junctions. **[5]**

Q3) a) Write a detailed note on signal transduction mediated by GPCR. **[7]**

b) What is vescicular transport? **[5]**

Q4) a) 'Justify the role of Telomerase in replicating ends of chromosomes. **[7]**

b) Describe Extra cellular matrix. **[5]**

P.T.O.

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

b) Explain the role of CDK & cyclins in cell cycle regulation. **[5]**

Q6) a) Write a note on different types of lipids present in plasma membrane. **[7]**

b) Describe Base excision repair system. **[5]**

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

a) Mitochondrial DNA.

b) Nucleosome.

c) Neurotransmitters.

Total No. of Questions : 7]

SEAT No. :

P-2623

[Total No. of Pages : 2

[6072]-113

M.Sc. (Part - I)

BIOTECHNOLOGY

MBT-103 : Genetics and Immunology

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

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

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

a) Define back cross and test cross.

b) What is adaptive landscape?

c) What is linkage disequilibrium?

d) Define :

i) Epitope ii) PAMP

e) What is precipitation reaction? State any two techniques based on it.

f) What are CDRS?

Q2) a) What is clinical genetics? Explain genetics of Hypertension in detail. **[7]**

b) What is phagocytosis? Explain its process with labelled diagram. **[5]**

Q3) a) Give an account on haermatopoiesis. Explain structure and function of each cell. **[7]**

b) Explain the concept of genetic linkage and describe the process of linkage mapping. **[5]**

Q4) a) Explain Hardy-Weinberg Principle and describe the factors that can affect Hardy-Weinberg equilibrium. **[7]**

b) Give a brief account on immunofluorescence microscopy. **[5]**

P.T.O.

Q5) a) What are immunoglobulins? State its classes, and their functions. Describe with labelled diagram structure of IgG. **[7]**

b) Describe the concept of inbreeding and inbreeding depression with example. **[5]**

Q6) a) What is epistasis? Explain dominant and recessive epistasis in detail. **[7]**

b) Compare and contrast active and passive immunization. **[5]**

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

a) Molecular marker and its significance.

b) Complement activation.

c) Monoclonal antibodies.

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Total No. of Questions : 5]

SEAT No. :

P-2624

[Total No. of Pages : 2

[6072]-114

F.Y. M.Sc.

BIOTECHNOLOGY

MBT - 105 : Environmental Biotechnology

(2019 Pattern) (CBCS) (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) ***Question 2 to 5 carry equal marks.***

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

a) Define bioleaching.

b) Mention constraints of Air act 1981.

c) What is Ozone hole.

d) Enlist names of biological agents in pollution control.

e) Mention significance of antipollution act.

f) Write any 2 limitations of Bioremediation.

Q2) a) Comment on International Environmental Laws & Policies. **[6]**

b) Write a note on Environmental Impact Assessment. **[4]**

Q3) a) Explain types of Remote sensing with their applications. **[6]**

b) Explain xenobiotic degradation in detail. **[4]**

P.T.O.

Q4) a) Write detail account on Activated sludge process. **[6]**

b) Write a note on impact of various pollutants on Environment. **[4]**

Q5) Write short notes on Any Two of the following : **[10]**

a) Bioaugmentation

b) Sea level rise

c) Important objectives of Environment Protection Act 1986

▽▽▽▽

Total No. of Questions : 7]

SEAT No. :

P-2625

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[6072]-115

F.Y. M.Sc. (Biotechnology)

MBT - 106 : FOOD BIOTECHNOLOGY

(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) ***Questions 2 to 5 carry equal marks.***

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

a) Define food borne intaxication Enlist the agents responsible for food borne intorication.

b) What are genetically modified microorganisms.

c) Give applications of nutrigenomics.

d) Explain probiotics with 2 examples.

e) What are functional foods.

f) Write Role of quality control in food industry.

Q2) a) Describe the process of protease production & its applications in food processing. **[7]**

b) Explain how nanosensors are used in detection of pathogens. **[5]**

Q3) a) Explain National and Enternational food laws. **[7]**

b) Describe health benefits of creatine. **[5]**

P.T.O.

Q4) a) Define nutraceuticals. Write health benefits and side effects of conjugated Linoleic acid. **[7]**

b) Write principles of TQM. **[5]**

Q5) a) Describe mechanism of action of probiotics. Write disadvantages of probiotics. **[7]**

b) Write applications of Biotechnology in development of value added products. **[5]**

Q6) a) What is food borne infection? Explain in detail organisms involved in food borne infection. **[7]**

b) Explain food formulation for drought and disaster affected area. **[5]**

Q7) Short notes (any 2) **[2×6=12]**

a) Mycotoxin.

b) Food safety Authorities.

c) Radical sequenging activity of antioxidant.

Total No. of Questions : 7]

SEAT No. :

P2626

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M.Sc.-I

BIOTECHNOLOGY

MBT- 201 : Genetic Engineering

(2019 Pattern) (CBCS) (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 Q.7 carry equal marks.***

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

a) Biopharming.

b) Multiple cloning site.

c) Dideoxynucleotide and its significance.

d) Radioactive probes.

e) Alkaline phosphatase.

f) Transfection.

Q2) a) Summarize the enzymes used in successful generation of an recomfinant DNA. **[7]**

b) Comment on the use of phagemids as cloning vectors. **[5]**

Q3) a) Explain any one chemistry used in the study of gene expression profile by quantitative PCR. **[7]**

b) Give a comparative between replacement vectors and insertional vectors. **[5]**

Q4) a) Discuss the CRISPR-CAS technology for gene editing. **[7]**

b) Explain the PCR fased method for detection of mutation in a sample. **[5]**

P.T.O.

Q5) a) With a representative example discuss the expression of industrially important biotherapeutics. **[7]**

b) Define genetic diseases. Explain methods for detection and diagnosis. **[5]**

Q6) a) Discuss the direct methods of gene transfer in plant cells. **[7]**

b) Explain the method for chemical synthesis of oligonuclestides. **[5]**

Q7) Write short notes on (any two) **[12]**

a) Electrophoretic mobility shift assay.

b) Application of gene silencing.

c) shuttle vectors.

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Total No. of Questions : 7]

SEAT No. :

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F.Y. M.Sc.

BIOTECHNOLOGY

MBT-202 : Bacteriology and Virology

(2019 Pattern) (Semester - II) (CBCS)

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) Define phylogeny.

b) Define Horizontal gene transfer.

c) What is L form of bacteria?

d) What is PFU/ml

e) State the mechanism of action of acyclovir.

f) Enlist the different types of poultry virsus.

Q2) a) Give ultra detail structure of bacterial Flagella with respect to **[7]**

i) Arrengment ii) Types of bacteria

b) Describe the use of in vivo models in virology studies. **[5]**

Q3) a) Describe fatly acid profile analysis used in taxanomy. **[7]**

b) Discuss importance and limitations of ICTV systems for classification of virsus. **[5]**

Q4) a) Explain genome organization and life cycle of M13 bacteriophage. **[7]**

b) What is bioluminescence? Explain with suitable example. **[5]**

P.T.O.

Q5) a) Write structure, functions and significance of sidero phase. **[7]**

b) Describe any two viral diseases of plans and state its economic importance. **[5]**

Q6) a) Discuss molecular methods for the diagnosis of viral diseases, state its importance. **[7]**

b) Explain molecular adoptations in halophiles. **[5]**

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

a) Biofertilizers.

b) Antiviral agents.

c) Structure and pathogenesis of influenza virus.

Total No. of Questions : 7]

SEAT No. :

P2628

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F.Y.M.Sc.
BIOTECHNOLOGY
MBT-203 : Plant Biotechnology
(2019 Pattern) (CBCS) (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 stage 2 in micropropagation?

b) What is QTL?

c) Give two examples of Cryoprotectant.

d) Define selectable marker.

e) What is invitro androgenesis?

f) Define somatic hybridization.

Q2) a) What is protoplast? Explain different methods of protoplast isolation & comment on cybridization. **[7]**

b) Explain application & disadvantages of cryopreservation. **[5]**

Q3) a) What are transgenic plants? Discuss selection & regeneration of transgenic plants. **[7]**

b) Enlist various biotic stress & explain any one in detail. **[5]**

Q4) a) What is MABC? Explain procedure to perform MABC. **[7]**

b) How synthetic biology is used for production of bioactive secondary metabolities? **[5]**

P.T.O.

Q5) a) What is organogenesis? Discuss in detail factors affecting it. **[7]**

b) Discuss marker assisted gene pyramiding. **[5]**

Q6) a) How stress tolerant plant variety is produced? Explain with one example for biotic & abiotic stress. **[7]**

b) What are advantages of micropropagation over conventional methods. **[5]**

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

a) Molecular farming for antibody & therapeutic protein.

b) Suspension culture.

c) Methods of cryopreservation.

Total No. of Questions :7]

SEAT No. :

P2630

[Total No. of Pages : 2

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F.Y. M.Sc.

BIOTECHNOLOGY

MBT-206 : MEDICAL BIOTECHNOLOGY

(2019 Pattern) (CBCS) (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) Attempt any five of the following: **[10]**

a) What is bottom up method in nanotechnology?

b) Name two chromosomal disorders.

c) What are DNA vaccines?

d) Give two uses of stem cell's in medical biotechnology.

e) Enlist the defects in single gene in case of sickle cell anaemia.

f) Name any two hormonal disorders.

Q2) a) With a suitable example describe microarray technology in disease diagnosis. **[7]**

b) Describe infection disorders **[5]**

Q3) a) Discuss enzyme therapy with the help of examples. **[7]**

b) Give a brief Account of genetic diseases with example. **[5]**

P.T.O.

Q4) a) Explain HIV its diagnosis and gene therapy for its treatment. **[7]**

b) Discuss polygene diseases. **[5]**

Q5) a) Give an account of PCR and nucleic acid probes in disease diagnosis. **[7]**

b) Give uses of embryonic stem cells in tharapeutics. **[5]**

Q6) a) How would you diagnose infections diseases using monoclonal antibodies. **[7]**

b) Discuss bioartificial Organs. **[5]**

Q7) Write short note on any two **[12]**

a) Biosensors.

b) Nanotechnology in diagnostics.

c) Thala ssemia.

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Total No. of Questions : 7]

SEAT No. :

P-2631

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M.Sc.

BIOTECHNOLOGY

MBT-301 : Animal and Stem Cell Technology

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

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

a) What is split ratio comment on its importance?

b) Write about use of CO_2 incubator in animal tissue culture lab.

c) What are knock in animals?

d) Enlist two important properties of pleuripotent stem cells.

e) Define histotypic cultures. Mention applications in ATC.

f) Explain the concept of cnyptic contamination.

Q2) a) What is artificial insemination? Describe any one method of semen collection. **[7]**

b) Differentiate between finite & infinite cell lines? **[5]**

Q3) a) Describe embryo transfer technology in details. **[7]**

b) Explain the concept of stem cell niche with one suitable example. **[5]**

Q4) a) What are transgenic animals? Explain how are transgenic animals suitable in studies of neurodegenerative disorders. **[7]**

b) Write a note on tissue engineering. **[5]**

P.T.O.

Q5) a) Define primary cell culture. Explain establishment of any one primary culture in flow chart form. **[7]**

b) What are bioartificial organs? Mention their applications. **[5]**

Q6) a) Elaborate different methods for establishment of organ culture. Also add a note on applications of them. **[7]**

b) Write rationale of animal tissue culture media formulation. **[5]**

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

a) Applications of animal cell cultures.

b) Gene silencing.

c) Biochemical characterization of cells.

□□□

Total No. of Questions : 7]

SEAT No. :

P-2632

[Total No. of Pages : 2

[6072]-312

S.Y. M.Sc. (Biotechnology)

MBT-302 : BIOPROCESS ENGINEERING

(2019 Pattern) (Semester - III) (Credit System)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Attempt any FIVE questions for Q2 to Q7.***
3) ***Questions 2 to 7 carry equal marks.***

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

a) What do you mean by specific growth rate?

b) Define Thermal Death Temperature.

c) What is Phase?

d) Define brewing?

e) Explain volumetric mass transfer coefficient.

Q2) a) Discuss the kinetics of product formation in chemostat. **[7]**

b) Explain sterilization of exhaust air. **[5]**

Q3) a) What is Newton law of viscous flow? Explain various types of non-newtonian fluid. **[7]**

b) Comment on aqueous two phase extraction for down stream processing. **[5]**

Q4) a) Explain industrial production and recovery of any one exopolysaccharide. **[7]**

b) What are the regulation on use and distribution of biotechnological product. **[4]**

P.T.O.

Q5) a) Discuss the inoculum development for yeast and mycelial processes. **[7]**

b) Explain in brief various carbon sources for media requirement in fermentation. **[5]**

Q6) a) How del factor is calculated during heating and cooling by using graphical integration method? **[7]**

b) Discuss measurement and control of dissolved oxygen in fermentation processes. **[5]**

Q7) Write short note on any TWO of following. **[12]**

a) Energy balance for fermentation.

b) Two film theory

c) Theory of depth filter

Total No. of Questions : 7]

SEAT No. :

P-2633

[Total No. of Pages : 3

[6072]-313

M.Sc.

BIOTECHNOLOGY

MBT - 303 : Bioinformatics & Biostatistics

(2019 Pattern) (CBCS) (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 : Lineage.

b) Define : Type I error.

c) List structural databases.

d) Define : Alternative hypothesis.

e) List any two block-based alignment programs.

f) What do you mean by 'completely randomized design'?

Q2) a) What is sequence alignment? Give full account of pairwise sequence alignment. **[7]**

b) The scores obtained by 5 candidates in drawing (X) and in music (Y) are given below : **[5]**

Codidate	A	B	C	D	E
Scores in drawing (X)	24	29	19	14	30
Scores in music (Y)	37	35	16	26	23

Compute Spearman's rank correlation between X and Y.

P.T.O.

Q3) a) Explain the term 'Correlation'. Write down it's types. **[7]**

b) Explain 'Pharmacophore Classes'. **[5]**

Q4) a) What is biological database? Explain its classification with example. Write importance of database in biology. **[7]**

b) The following table shows the results of an experiment performed to analyse the effect of vaccination on laboratory animals against a particular disease :

	Infected	Uninfected
Vaccinated	5	431
Not - Vaccinated	9	239

Examine the effect of vaccination in controlling the suspectibility of animals to disease. [Table value : 3.841]. **[5]**

Q5) a) Explain the term 'Skewness'. Write its types. Write formula for coefficient of skewness based on moments. **[7]**

b) Define the term phylogenetic tree. How are these trees constructed using multiple sequence alignment data : **[5]**

Q6) a) Discuss the importance of cheminformatics in drug discovery. Describe various tools and techniques used in chemoinformatics along with their applications. **[7]**

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

Weights of grains

(in kgs)

Variety I	Variety II	Variety III
2.0	1.8	3.0
2.2	2.2	2.8
1.7	2.0	3.2

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

a) HMM

b) Pharmachophore modelling

c) Principles of randomization & replication in design of experiment.

▽▽▽▽

Total No. of Questions : 5]

SEAT No. :

P-2634

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M.Sc. - II

BIOTECHNOLOGY

MBT-305 : Nanobiotechnology

(2019 Pattern) (CBCS) (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) ***Question 2 to 5 carry equal marks.***

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

a) Chemical vapor deposition.

b) Metal oxide nanoparticles.

c) Co-precipitation.

d) Nanometer.

e) Bottom up approach.

f) Polyvalent nanoparticles.

Q2) a) Define nanoparticles. Add a note on sources and the methods used for biological synthesis. **[6]**

b) Comment on applications of Nanobiotechnology in the field of water remediation and purification. **[4]**

Q3) a) Describe the use of electron microscope for imaging of nanoparticles. **[6]**

b) Explain the use of nanoparticles in diagnostics. **[4]**

P.T.O.

Q4) a) Comment on the chemical precipitation and hydrothermal method for synthesis of nanoparticles. **[6]**

b) Explain the structural properties of nanoparticles. **[4]**

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

a) Microelectrical systems (MEMs)

b) Nanoparticle-Protein interactions

c) Characterization of NP by spectroscopy

□□□

Total No. of Questions : 5]

SEAT No. :

P-2635

[Total No. of Pages : 2

[6072]-315

M.Sc. - II

BIOTECHNOLOGY

MBT - 306 : Agriculture Biotechnology

(2019 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.2 to Q.5.***
3) ***Question 2 to 5 carry equal marks.***

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

a) Endosperm.

b) Bio insecticides.

c) Flavr savr tomato.

d) Growth hormones.

e) Artificial seeds.

f) Cyanofacterio in agriculture.

Q2) a) With an representative example explain the production of seedless plant varieties. **[6]**

b) Comment on development and formulation of phosphate solubilizing bioinoculants. **[4]**

P.T.O.

Q3) a) Discuss on major pest of horticultural crops and their control by biotechnological methods. **[6]**

b) Give the importance of Agriculture at National Economy. **[4]**

Q4) a) Discuss the strategy for chloroplast manipulations for production of therapeutic antibodies. **[6]**

b) Comment on use of CRISPR based technology and its application in plants. **[4]**

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

a) Barcoding markers.

b) Opportunities in Agriculture biotechnology.

c) Nitrogen fixing bioinoculants.

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Total No. of Questions : 7]

SEAT No. :

P2636

[Total No. of Pages : 2

[6072]-411

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

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

a) What is genomics? How does it differ from genetics.

b) What techniques used in functional proteomics.

c) Define transcriptomics

d) What is IEF?

e) Give any two applications of comparative genomics.

f) What is the difference between MALDI & ESI?

Q2) a) Describe the process of whole genome sequencing. including the methods used, assembly & analysis. **[7]**

b) Explain how protein structure is analyse? Explain X-ray crystallography method for protein structure analysis. **[5]**

Q3) a) Explain yeast two Hybrid system along with its applications. **[7]**

b) What is pharmacogenomics? How does it help in personalized medicine. **[5]**

Q4) a) Discuss the concept of metagenomics and its significance in studying microbial communities. **[7]**

b) Describe peptide mass finger printing. **[5]**

P.T.O.

Q5) a) Give an account on phage display. **[7]**

b) Describe toxicogenomics and its applications. **[5]**

Q6) a) Explain the concept of DNA microarray including their preparation, working & analysis. **[7]**

b) Give an account on LC-MS. **[5]**

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

a) SAGE

b) Protein microarrays

c) Functional genomics

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Total No. of Questions : 7]

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S.Y. M.Sc.

BIOTECHNOLOGY

MBT402: Advanced Bioanalytical Techniques

(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 : **[5 × 2 = 10]**

a) Principle of Sandwitch ELISA.

b) Isoelectric focussing (IEF).

c) Applications of FISH.

d) Monochromators.

e) Cryotomy.

f) Bragg's equation.

Q2) a) Give the principle of TEM and its working to determine the surface structure of object. **[7]**

b) Discuss Radio Immuno Assay (RIA) technique. Add a note on its applications. **[5]**

P.T.O.

Q3) a) Give the principle and working of NMR Technique. **[7]**

b) Explain RNA Micro array system. **[5]**

Q4) a) Discuss the principle and applications of High Performance Liquid Chromatography (HPLC). **[7]**

b) Describe NGS data procession tools. **[5]**

Q5) a) Explain in detail Denaturing Gradient Gel Electrophoresis (DGGE) Technique. **[7]**

b) Enlist the types of Affinity chromatography. Add a note on its applications. **[5]**

Q6) a) Discuss the principle and working of flow cytometry. **[7]**

b) Give the principle and applications of mass spectroscopy. **[5]**

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

a) Freeze-Fracture method for electron microscopy.

b) Surface plasmon resonance.

c) Immuno precipitation.

Total No. of Questions : 7]

SEAT No. :

P2638

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S.Y.M.Sc.

BIOTECHNOLOGY

MBT-404 : Bio-Entrepreneurship & Startup 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 does Liberalization mean?

b) Define Social entrepreneurship.

c) Define Scalable Startup.

d) Define Globalization.

e) State what is B2B and B2C.

f) Write long form of SWOT & SWOC.

Q2) a) Describe the status of technology in India. **[7]**

b) Azim Premji-Wipro a Case study entrepreneur. **[5]**

Q3) a) Describe how economic factors namely : Capital, labour, raw materials, markets and infrastructure impact emergence of entrepreneurship. **[7]**

b) Explain the execution of Business plan. **[5]**

Q4) a) Explain the role of entrepreneur in elimination of poverty. **[7]**

b) Describe innovation entrepreneurship. **[5]**

P.T.O.

Q5) a) Discuss the types of entrepreneurs. **[7]**

b) Explain what are five basic questions that one should as for evaluating the opportunity. **[5]**

Q6) a) Explain how the New Economic Policy of 1991 was a huge turning point for entrepreneurs. **[7]**

b) Explain in detail value chain analysis. **[5]**

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

a) Business incubation centre.

b) Optimal use of Resources.

c) Government schemes to promote entrepreneur.

Total No. of Questions :7]

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P2639

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M.Sc. -II

BIOTECHNOLOGY

MBT-405 : Pharmaceutical Biotechnology & Drug Designing

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

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

Instructions to the candidates:

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

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

a) What is CADD?

b) Define pharmacokinetics.

c) What is IND? state its significance.

d) What are bio pharmacenticals? State any two examples.

e) What are Pharmacological patents?

f) What is MDR? state any one example.

Q2) a) Elaborate on the process of drug discovery. **[7]**

b) Elaborate on drug potency assarys & its significance. **[5]**

Q3) a) What are antibiotics? Explain antibiotic resistance mechanisms with suitable examples. **[7]**

b) What are preclinical studies? Explain any two in-vivo models used in preclinical studies. **[5]**

P.T.O.

Q4) a) What is high throughput screening? Describe in detail about virtual HTS. **[7]**

b) Explain with suitable examples the downstream processing of biopharmaceutical production. **[5]**

Q5) a) What is pharmacophore? Discuss in detail about pharmacophore modelling. **[7]**

b) What are clinical trials? Justify its significance in drug development. **[5]**

Q6) a) Discuss drug regulation in India. **[7]**

b) What is docking? Explain any two docking softwares. **[5]**

Q7) Write short note on any two **[12]**

a) Indian pharmacopeia.

b) ADMET

c) Drug tolerance & intolerance.

Total No. of Questions : 7]

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P-2640

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M.Sc.

BIOTECHNOLOGY

MBT-406 : Research Methodology and Scientific Communications

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

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

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

a) What is H Index?

b) What is deductive resoning?

c) Write names of two Literature Style.

d) Enlist any two statistical tools used in research of Biotechnology.

e) What is turnitin tool?

f) What is Google Scholar? What is its use in research?

Q2) a) Discuss various research philosophies. **[7]**

b) What is data fudging? Write ways to prevent it. **[5]**

Q3) a) Explain how ethics in scientific research is important. **[7]**

b) Discuss various mathematical models used in scientific data analysis. **[5]**

Q4) a) Discuss the similarities and differences between deductive and inductive reasoning with examples. **[7]**

b) Discuss the social impact of Research. **[5]**

P.T.O.

Q5) a) Explain the methods used in primary data collection. **[7]**

b) Explain how 'Results and Discussions' is critical in report writing. **[5]**

Q6) a) Discuss in details different types of Research Reports. **[7]**

b) Discuss various statistical software used in research data analysis. **[5]**

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

a) What do you mean by Impact factor? How it is calculated? Write a note on its importance.

b) Explain how to make on effective oral presentation.

c) What is Patent? Write a note on Patenting of Biotech inventions and Product.

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Total No. of Questions : 7]

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P2641

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S.Y.M.S.c. (Biotechnology)

MBT-407 : QUALITY CONTROL, BIOSAFETY AND BIOETHICS

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

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) Answer any five from the following: **[10]**

a) Define validation state give any two advantages of validation state.

b) What are the two main elements of quality management?

c) State any two ethical limits for animal use.

d) Discuss levels of biosafety.

e) What is bio piracy?

f) What is PPE?

Q2) a) Explain in detail four types of process validation. **[7]**

b) Discuss radiation hazard and its control. **[5]**

Q3) a) Describe containment control in BSL4 Lab. **[7]**

b) What is the sequence of qualification of equipment. **[5]**

Q4) a) Describe roles of industrial bisafety committee. **[7]**

b) Describe class II biosafety cabinate. **[5]**

P.T.O.

Q5) a) Write down animal ethics committee and its role. **[7]**

b) Describe four classes of fire. **[5]**

Q6) a) Discuss classification of infective micro organisms by risk groups. **[7]**

b) Discuss details points to be considered white designing premises as per CGMP. **[5]**

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

a) Ethical issues related to animal cloning.

b) Total quality management.

c) Environmental relase issues of GMO.