Total No. of Questions : 7]

SEAT No. : ____

PC3948

[Total No. of Pages : 2

[6345]-101
First Year 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 5 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 meant by Pre-steady state in enzyme catalyzed reaction?

b) What is Motif in Protein structure?

c) Define Metabolism.

d) What is an Isoprene unit?

e) Define Active site of enzyme.

f) What are chaperons?

Q2) a) Write a detail account on secondary structure of protein. **[7]**

b) Discuss enzymes on biosensors. **[5]**

Q3) a) Give types of phenotics and comment on their pharmacological properties. **[7]**

b) Explain with an suitable example hormonal regulation of enzymes. **[5]**

Q4) a) Explain metabolic engineering with a representative example of polyketide synthesis. **[7]**

b) Enlist different methods for extraction of secondary metabolites and explain anyone in detail. **[5]**

P.T.O.

Q5) a) Derive Michaelis-Menten (MM) equation for single substrate enzyme catalyzed reaction. **[7]**

b) Discuss about integration of metabolic pathways. **[5]**

Q6) a) Explain with suitable example methods adopted for protein engineering. **[7]**

b) Write a note on protein- DNA interaction. **[5]**

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

a) Metabolic flux analysis.

b) Eadie-Hofster plot for enzyme catalyzed reaction.

c) Diagnostic and therapeutic application of enzymes.

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Total No. of Questions : 7]

SEAT No. : ____

PC3949

[Total No. of Pages : 2

[6345]-102

M.Sc.-I

BIOTECHNOLOGY

MBT 102 : Cell & Molecular Biology

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

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

a) Enlist functions of calcitonin hormone.

b) Why caspases are so called? Give one example.

c) Write the checkpoint of G_1 to S phase.

d) Name any four part translational modification.

e) Mention sensitivity of RNA pol. to α-amyntin and Rifamin.

f) Define SINES and LINES.

Q2) a) Explain treadmilling of actin filaments. **[7]**

b) Describe Na^+/K^+ ATPase with a suitable diagram. **[5]**

Q3) a) Describe Base excision repair and nucleotide excision repair. **[7]**

b) Explain photoreactivation mechanism. **[5]**

P.T.O.

Q4) a) Distinguish benign and malignant tumor, add a note on what triggers the tumorogenisis. **[7]**

b) Explain the pathway that leads to apoptosis. **[5]**

Q5) a) Explain prokaryotic replication in detail. **[7]**

b) Describe post transcriptional modifications. **[5]**

Q6) a) Explain molecular mechanism of release of neurotransmitter at synapses with the help of SNARE proteins. **[7]**

b) Illustrate RTKase signaling pathway. **[5]**

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

a) Gene silencing.

b) Rho independent termination.

c) Thyroid hormones.

Total No. of Questions : 7]

SEAT No. :

PC3950

[Total No. of Pages : 2

[6345]-103
M.Sc. - I
BIOTECHNOLOGY
MBT-103: Genetics and Immunology
(2019 Pattern) (Semester - I)

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

Instructions to the candidates:

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

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

a) State the law of independent assortment.

b) What is inbreeding depression?

c) Define back cross.

d) Enlist any two examples of PRRs.

e) What is sIgA and state its function.

f) Give any two examples of cytokines secreted by Th 1 cells.

Q2) a) Describe the molecular marker and their applications in genetic mapping. **[7]**

b) What are cytokines? Explain its importance in immune induction. **[5]**

Q3) a) Explain any complement activation pathway involved in innate immunity. **[7]**

b) Explain sex linkage and its associated genetic disorders. **[5]**

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

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

P.T.O.

Q5) a) Describe subunit and conjugate vaccine with suitable example. State their significance. **[7]**

b) In population of 240 individuals dominant allele (A) frequency is 0.7 and recessive allele (a) is 0.3. Determine the number of heterozygous individuals. **[5]**

Q6) a) Explain epistasis. Discuss dominant and recessive epistasis with example. **[7]**

b) What is antibody engineering? Comment on chimeric antibodies. **[5]**

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

a) Arabidopsis as model organism for genetics.

b) Linkage and recombination.

c) Western blotting.

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Total No. of Questions : 5]

SEAT No. : ____

PC3951

[Total No. of Pages : 2

[6345]-104
M.Sc. - I (Biotechnology)
MBT-105 : ENVIRONMENTAL BIOTECHNOLOGY
(2019 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 conventional energy?

b) Define Biomining

c) What is remote sensing?

d) Mention significance of ecostandards

e) Write limitations of the water Act 1974

f) What is bioremediation?

Q2) a) Justify biomaterials as substitute for non degradable materials. **[6]**

b) Comment on environmental priorities of India. **[4]**

P.T.O.

Q3) a) How do the three categories of municipal solid waste management (compost, recycling & landfill) differs **[6]**

b) Enlist & explain different steps involved in EIA process. **[4]**

Q4) a) Biological waste water treatment methods are superior over physical & chemical methods. Justify **[6]**

b) Write objectives of environmental laws & policies **[4]**

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

a) Rio conference

b) Phytoremediation

c) Bioleaching

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Total No. of Questions : 7]

SEAT No. :

PC3952

[Total No. of Pages : 2

[6345]-105
M.Sc.-I (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 question from Q.2 to Q.7.***
3) ***Q.2 to Q.7 carry equal marks.***

Q1) Solve any 5 of the following. **[10]**

a) Write health benefits of 'curcumin'.

b) Give any two significance of carnitine

c) Define antioxidants.

d) Define QA and QC.

e) E.coli 0157 H7.

f) Name any four bacteria that generally contaminate fruits & vegetables.

Q2) a) Explain salmonellosis in detail **[7]**

b) Describe panary fermentation, add a note on its application **[5]**

Q3) a) With example, write the purpose, significance of nutraceuticals **[7]**

b) Explain the production of Ascorbic acid by fermentation. **[5]**

P.T.O.

Q4) a) Describe the role of FSSAI in food adulteration & misbranding. **[7]**

b) Explain prebiotics and probiotic giving examples. **[5]**

Q5) a) Explain Nutrigenomics and its role in food biotechnology. **[7]**

b) Write an essay on food safety and adverse effects of functional food. **[5]**

Q6) a) Explain nanoencapsulation, add a note on its application. **[7]**

b) Describe the role of Enzymes in food processing. **[5]**

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

a) Beer production

b) Mycotoxins

c) Food waste management

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Total No. of Questions : 7]

SEAT No. :

PC3953

[Total No. of Pages :2

[6345]-201

M.Sc. - I

BIOTECHNOLOGY

MBT-201 : Genetic Engineering

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

Q1) Answer the following (any five): **[10]**

a) Importance of colony hybridization.

b) Use of alkaline phosphatase in genetic engineering.

c) Give two examples of synthetic promoters.

d) What is ORI site?

e) Significance of TA cloning.

f) Structure and use of ddNTP.

Q2) Answer the following:

a) Explain any one method for quantitative (real time) PCR. **[7]**

b) Discuss the method for chemical synthesis of oligonucleotides. **[5]**

Q3) Answer the following:

a) Discuss the genetic elements of a typical expression vector. **[7]**

b) Explain any two methods for foreign DNA insertion in animal cells. **[5]**

Q4) Answer the following:

a) Explain the method for cDNA synthesis. **[7]**

b) Comment on genetic disorders and its diagnosis with a representative examples. **[5]**

P.T.O.

Q5) Answer the following:

a) Describe the use of DNA markers in the study of plants. **[7]**

b) Explain the conditional knockout method for successful directional insertion of gene. **[5]**

Q6) Answer the following:

a) Why RNA sequencing is considered superior than microarray? **[7]**

b) Explain any one method for mutation detection. **[5]**

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

a) Restriction digestion

b) Gene therapy

c) Pichia vector system

Total No. of Questions : 7]

SEAT No. : ____

PC3954

[Total No. of Pages : 2

[6345]-202
M.Sc. -I (Biotechnology)
MBT-202: BACTERIOLOGY AND VIROLOGY
(2019 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) ***Q.2 to Q.7 carry equal marks.***

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

a) What is numerical taxonomy?

b) Give any two examples of cell inclusions.

c) What is bioluminescence? Give its application in Biotechnology.

d) What are Prions? Name any two diseases caused by them.

e) 'HIV is a retrovirus'. Justify.

f) Give importance of viral diseases in poultry.

Q2) a) Compare & Contrast cell wall of eubacteria and archaea. **[7]**

b) Elaborate rules for classification and nomenclature of Viruses as per ICTV. **[5]**

Q3) a) Give an account of therapeutic antiviral agents. **[7]**

b) Give significance of fatty acid profile in bacterial taxonomy. **[5]**

Q4) a) Discuss 'Agro bacterium as a Valuable tool in the field of biotechnology'. **[7]**

b) Elaborate use of electron microscopy in the detection of viruses. **[5]**

P.T.O.

Q5) a) Discuss antigenic characters & transmission of SARS and H1N1viruses. **[7]**

b) Write significance of 165 rRNA in bacterial identification. **[5]**

Q6) a) Give an account of Pathogenecity of Mycobacterium. **[7]**

b) Describe any two diagnostic tests for quantitative estimation of Viruses. **[5]**

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

a) Microbial Fuel Cell

b) Ultrastructure of bacterial Flagella

c) M13 Phage

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Total No. of Questions : 7]

SEAT No. : [ ]

PC3955

[Total No. of Pages : 2

[6345]-203
First Year M.Sc.
BIOTECHNOLOGY
MBT - 203 : Plant Biotechnology
(2019 Pattern) (Semester - II) (Credits - 4)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any 5 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 are artificial seeds?

b) Explain the term-somatic hybridisation.

c) What are cointegrate vectors?

d) Enlist the various biotic stresses of plants.

e) What is organogenesis with respect to plant tissue culture.

f) What is meant by hardening of in Vitro raised plants?

Q2) a) Explain the use of transgenics in the improvement of plants for abiotic stress tolerance. **[7]**

b) Explain the gene transfer method-particle bom bardment. **[5]**

Q3) a) Give a detailed account of the process of generating and rogenic haploids and give the application of this technique. **[7]**

b) Give an account of the various additives that can be supplemented to a plant tissue culture medium and explain their role. **[5]**

P.T.O.

Q4) a) Describe in detail QTL mapping techniques and its importance in plant breeding. **[7]**

b) Explain the methods of cryopreservation and add a note on the applications. **[5]**

Q5) a) Explain the role of transgenics in increase in productivity by manipulation of photosynthesis in plants. **[7]**

b) Explain the mechanism of T-DNA transfer to plants. **[5]**

Q6) a) Explain how synthetic biology can be used for the production of bio active compounds with examples. **[7]**

b) What is Marker assisted back crossing? Explain procedure. **[5]**

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

a) Molecular farming of therapeutic proteins.

b) Commercial application of micropropagation.

c) Role of reporter genes and markers in plant vectors.

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Total No. of Questions : 7]

SEAT No. : ____

PC3956

[Total No. of Pages : 2

[6345]-204

M.Sc. - I

BIOTECHNOLOGY

MBT - 205 : Clinical Research, Data Base Management and IPR

(2019 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) Give rational to protect IP.

b) What are vulnerable subjects?

c) Differentiate between licensee and assignee.

d) Define 'Randomization' in clinical trials.

e) Explain with suitable example meaning of 'True and first inventor'.

f) Enlist any four essential documents required before the conduct of clinical trial.

Q2) a) Explain in detail TRIPS agreement. **[7]**

b) Discuss in detail phases of clinical trial. **[5]**

Q3) a) Give an account of responsibilities of sponsor in clinical trial. **[7]**

b) Decribe the contents of complete specifications and it's importance in grant of patent. **[5]**

P.T.O.

Q4) a) Explain procedure for registration of copyright. **[7]**

b) Define SAE. Discuss in detail responsibilities of Investigator in reporting of SAE. **[5]**

Q5) a) What are international procedures for pharmacovigilance. **[7]**

b) Comment on non - patentable inventions under Indian patent Act. 1970. **[5]**

Q6) a) Discuss query raising and resolution in clinical data management. **[7]**

b) Describe significance of registration of plant varieties and it's benifits with suitable example. **[5]**

Q7) Write short notes on any 2. **[12]**

a) IRB

b) ICH

c) Budapest Treaty

Total No. of Questions : 7]

SEAT No. :

PC3957

[Total No. of Pages : 2

[6345]-205

First Year M.Sc.

BIOTECHNOLOGY

MBT - 206 : Medical Biotechnology

(2019 Pattern) (CBCS) (Semester - II) (4 Credits)

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

Instructions to the candidates:

1) ***Question No. 1 is compulsory.***
2) ***Attempt any 5 questions of remaining Q2 to Q7.***
3) ***Q2 to Q7 carries equal marks.***

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

a) Illustrate the chromosome structural abnormality associated with Pallister Killian syndrome.

b) Draw a flowchart of diagnosis used in Brunner syndrome using monoamine oxidase.

c) Enlist any four vectors used in gene therapy.

d) Distinguish between adult and embryonic stem cells.

e) A vaccine is a sheep in wolf clothing, justify.

f) Write the names of Physical components of Biosensor.

Q2) a) Explain in detail Thalassemia; add a note how it can be diagnosed? **[7]**

b) With a flow chart, explain diagnosis of newly emerged n CoV coronavirus.**[5]**

Q3) You have been supplied a normal and cancer tissue of a patient, using PCR; how will you detect the genes gone wrong? **[12]**

P.T.O.

Q4) a) Describe the potential used of nanotechnology in alleviating chronic diseases. **[7]**

b) Explain any one commercial diagnostic test which employs enzyme technology. **[5]**

Q5) a) Classify, giving examples single gene and polygenic disorders. **[7]**

b) Explain: 2D and 3D hepatic tissue engineering a potential cure for hepatic ailments. **[5]**

Q6) a) Compare and contrast ex-vivo and in- vivo gene therapy. **[7]**

b) Describe the construction, principle and working of a biosensor. **[5]**

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

a) Alzheimer

b) Microarray

c) Gene agumentation.

Total No. of Questions : 7]

SEAT No. : ____

PC3958

[Total No. of Pages : 2

[6345]-301
M.Sc. -II
BIOTECHNOLOGY
MBT-301: Animal and Stem Cell Technology
(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) ***Q.2 to Q.7 carry equal marks.***

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

a) Define cell senescence.

b) What are knock in animal?

c) Define cell synchronization.

d) What are cryoprotectants? Give examples.

e) Define totipotent stem cell with example.

f) State any two functions of cell repositories.

Q2) a) Explain in detail "Embryo Transfer Technology". **[7]**

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

Q3) a) Explain in detail cryopreservation of animal cell. **[7]**

b) Comment on applications of animal cell line in Pharmaceutical protein production. **[5]**

Q4) a) Define Suspension culture. Describe criteria for subculturing of suspension culture. **[7]**

b) Write a note on advantages of monolayer culture over organ culture. **[5]**

P.T.O.

Q5) a) Write a note induced pluripotent stem cell and its applications. **[7]**

b) Explain in detail production of monoclonal antibody. **[5]**

Q6) a) Elaborate on cell cycle regulation in stem cells. **[7]**

b) Write a note on advantages and limitations of serum free media. **[5]**

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

a) RNA interference technology.

b) Concept of knock out in animals.

c) Animal cloning.

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Total No. of Questions : 7]

SEAT No. : ____

PC3959

[Total No. of Pages : 2

[6345]-302

S.Y. M.Sc.

BIOTECHNOLOGY

MBT 302 : Bioprocess Engineering

(2019 Pattern) (Semester - III)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Attempt 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 dual fermentation? Give example.

b) Write importance of scale down process in bioprocess.

c) What are growth linked product? Give example.

d) What are Newtonian & non-Newtonian fluids?

e) Give role of inhibitors in fermentation media with example.

f) State any two roles of quality assurance department in fermentation industry.

Q2) a) Describe large scale production of Glutamic acid. **[7]**

b) Discuss importance of standard operating procedures in fermentation industry. **[5]**

Q3) a) With neat labeled diagram describe principle and working of counter - current method of liquid - liquid extraction. **[7]**

b) Explain biotransformation of steroid. **[5]**

P.T.O.

Q4) a) What is kLa? Explain any two methods of determination of kLa. **[7]**

b) Describe process of inoculum development. **[5]**

Q5) a) With suitable example discuss use of auxotrophic mutant for overproduction of economically important product. **[7]**

b) Briefly describe role of computer in measurement and control of bioprocess parameter. **[5]**

Q6) a) What is screening? Discuss various methods of primary screening for isolation of industrially important microbes. **[7]**

b) Enlist various quality control test conducted in fermented industry. Explain LAL test in detail. **[5]**

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

a) Plackett - Burman design of media optimization.

b) Plate and Frame filter.

c) Two film theory.

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Total No. of Questions : 7]

SEAT No. :

PC3960

[Total No. of Pages : 3

[6345]-303

S.Y.M.Sc.

BIOTECHNOLOGY

MBT 303 : Bioinformatics & Biostatistics

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

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

a) Enlist any two literature database.

b) What is level of significance in hypothesis testing?

c) What are scoring matrices?

d) Explain the term 'treatment' in the design of experiment.

e) Name any two pose prediction strategies in docking.

f) Write down the formula for co-efficient of Kurtosis based on moments.

Q2) a) What is multiple sequence alignment? Explain its applications in detail. **[7]**

b) Assume blood-glucose level in a population are normally distributed with mean 85 mg/dL and standard deviation 24 mg/dL. Suppose the abnormal range were defined to the glucose levels outside of 2 standard deviations of the mean. What percentage of individuals would be now called 'abnormal'? Compute the lower bound and upper bound values for the blood glucose level. **[5]**

P.T.O.

Q3) a) Perform chi-square test to infer whether School-A and School-B has any effect on the average marks obtained by students. Prepare the contingency table for expected value. **[7]**

[Critical value : 5.991 at 95% c.I.]

Observed value				
	Math	Science	English	Total
School - A	12	16	21	49
School - B	20	11	20	51
Total	32	27	41	100

b) Explain Needle man & Wunsch algorithm of pairwise sequence alignment. **[5]**

Q4) a) Explain the term 'Skewness'. Write its types. Write formula for co-efficient of skewness based on moments. **[7]**

b) Explain structure based drug designing in detail. **[5]**

Q5) a) Calculate a t-test for the following data of the sleeping duration with and without exercise. **[7]**

Sleeping hours (hr)	
With exercise (x_1)	Without exercise (x_2)
4	3
5	8
7	6
6	4
9	7

b) What is Homology modelling? Explain its applications in tertiary structure prediction. **[5]**

Q6) a) Explain the principles of randomization and replication in design of experiments. **[7]**

b) Explain molecular file formats. **[5]**

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

a) Types of probability based sampling

b) HMM

c) Protein structure databases

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Total No. of Questions : 5]

SEAT No. : ____

PC3961

[Total No. of Pages : 2

[6345]-304
S.Y.M.Sc.
BIOTECHNOLOGY
MBT - 305 : Nanobiotechnology
(2019 Pattern) (Semester - III) (CBCS)

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

Instructions to the candidates:

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

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

a) What are Biosensors?

b) What is the approach used for synthesis of nanotechnology?

c) State scope of nanoparticles in diagnostics.

d) Enlist different types of nanoparticles as per size.

e) Define NTA.

f) What are Nanocomposites?

Q2) a) Explain in detail principle, working of x-ray diffraction method used for characterization of nanoparticles. **[6]**

b) Give uses of nanoparticles for detecting anti -viral activity. **[4]**

Q3) a) Comment on nanobots as medicine to cross the blood-brain barrier **[6]**

b) Write the significance of Anisotropic and Magnetic particles. **[4]**

P.T.O.

Q4) a) Comment on Microemulsion synthesis method for nanoparticle synthesis. **[6]**

b) Explain peptide and DNA coupled Nanoparticle. **[4]**

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

a) Nanoparticles in plant growth.

b) Antibactrial effect of silver Nanoparticles.

c) NEMS based on Nanomaterials.

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Total No. of Questions : 5]

SEAT No. :

PC3962

[Total No. of Pages : 2

[6345]-305
M.Sc. - II
BIOTECHNOLOGY
MBT - 306 : Agricultural 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 question from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***

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

a) What is endosperm

b) What is somaclonal variants?

c) What are siderophores?

d) What are bioinsecticides

e) Explain bioinoculants

Q2) a) Explain the term virus indexing & briefly discuss the methodology involved in it. **[6]**

b) Comment on improvement of crop quality in agriculture. **[4]**

Q3) a) Which bioreactors are used in plant production, explain with example. **[6]**

b) Explain the methodology used to carry out RFLP **[4]**

P.T.O.

Q4) a) Explain the production method of sudless plants varieties with example. **[6]**

b) Comment on CRISPR based technology. **[4]**

Q5) Write short notes on: (any 2) **[10]**

a) Virus free plants.

b) Major pests & disease of horticulture crops.

c) Applications of agriculture biotechnology.

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Total No. of Questions : 7]

SEAT No. : ____

PC3963

[Total No. of Pages :2

[6345]-401

S.Y.M.Sc.

BIOTECHNOLOGY

MBT-401 : Genomics & Proteomics

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

a) Write the goal of structural genomics.

b) Define pharmacogenomics & enlist its applications.

c) What are SNP's? Give their significance.

d) What are components of mass spectrometry?

e) What are the goals of functional genomics?

f) What is Iso Electric Focussing (IEF)? Which reductant commonly used in IEF?

Q2) a) Explain the concept of DNA sequencing including the different sequencing methods used in genomics. **[7]**

b) Explain NMR. **[5]**

Q3) a) Describe MALDI-TDF with its advantages and disadvantages. **[7]**

b) Explain goals, methods and applications of structural genomics. **[5]**

Q4) a) Discuss the concept of toxicogenomics and its significance in studying the effect of toxic substances on living organisms. **[7]**

b) What is SILAC (stable isotopelabeling by Amino acid in cell culture)? Write advantages of SILAC. **[5]**

P.T.O.

Q5) a) Describe construction principle and working of Electron Spray Ionization (ESI). **[7]**

b) Explain the difference between RNA-sequencing and Microarray approaches. **[5]**

Q6) a) Discuss the significance of genomics in basic research including the study of genefunction regulation and evolution. **[7]**

b) Give an account on 2D PAGE. **[5]**

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

a) Comparative genomics.

b) Applications of proteomics in drug discovery.

c) EST.

Total No. of Questions : 7]

SEAT No. : ____

PC3964

[Total No. of Pages : 2

[6345]-402
M.Sc. - II
BIOTECHNOLOGY
MBT-402: Advanced Bioanalytical Techniques
(2019 CBCS Pattern) (Semester - IV)

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) Principle of IR.

b) Isoelectric point.

c) GISH.

d) Retention time.

e) DGGE.

f) Electromagnets.

Q2) a) Give the principle of scanning Electron Microscopy. Add a note on staining and Visualization of Cells using SEM. **[7]**

b) Discuss the working of UV-visible spectro-photometer to quantify the concentration of unknown sample. **[5]**

Q3) a) Comment on designing of an DNA microarray and give its applications. **[7]**

b) Elaborate on the principle and working of flow cytometry. **[5]**

Q4) a) Discuss the working principle of HPLC with a representative diagram. **[7]**

b) Explain the principle and use of confocal Microscopy in study of cells. **[5]**

P.T.O.

Q5) a) NGS has resulted in huge amount of database. Justify, how is the data processed and managed? **[7]**

b) Explain the process of Molecular structure determination using X-ray crystallography. **[5]**

Q6) a) Discuss in situ localization technique by GISH. **[7]**

b) Explain the applications of GLC. **[5]**

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

a) Freeze - Fracture methods for EM.

b) Capillary electrophoresis.

c) Detection of antigen in living cells.

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Total No. of Questions : 7]

SEAT No. : ____

PC3965

[Total No. of Pages : 2

[6345]-403
S.Y.M.Sc.
BIOTECHNOLOGY
MBT - 404 : Bio-entrepreneurship & Start up Designing
(2019 Pattern) (CBCS) (Semester - IV)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any 5 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) Enlist the qualities of good entrepreneur.

b) Define ethical entrepreneurship.

c) Define business plan.

d) Define corporate venturing.

e) State the source of new ideas.

f) Define 'Start up'.

Q2) a) Explain SWOT analysis, add a note on competitive strategies. **[7]**

b) Entrepreneur-a problem solver, justify the statement. **[5]**

Q3) a) Explain factors affecting in the emergence of entrepreneur. **[7]**

b) Describe methods used for generation of new ideas. **[5]**

P.T.O.

Q4) a) Discuss in detail 'Market feasibility study. **[7]**

b) Explain barriers in entrepreneurship. **[5]**

Q5) a) Discuss the challenges encountered in new venture. **[7]**

b) Explain in detail entrepreneurial culture. **[5]**

Q6) a) Entrepreneur and its role in economic development. **[7]**

b) Explain in detail business incubation centre. **[5]**

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

a) Value chain analysis.

b) Government scheme to promote entrepreneur.

c) Women entrepreneur.

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Total No. of Questions : 7]

SEAT No. : ____

PC3966

[Total No. of Pages : 2

[6345]-404

M.Sc. - II

BIOTECHNOLOGY

MBT - 405 : Pharmaceutical Biotechnology and Drug Designing

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

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

a) Define

i) API

ii) Biosimilars

b) Enlist any two softwares used in molecular docking

c) What is drug allergy?

d) What is FDA? State its role

e) Explain in brief pharmacodynamics

f) What is upstream processing?

Q2) a) Explain different approaches used for target identification and validation. **[7]**

b) Compare and contrast conventional and modern drug development process. **[5]**

Q3) a) Enlist types of anti - cancer drugs. Explain mechanism of action of any two anticancer drugs. **[7]**

b) Elaborate on different phases of clinical trials. **[5]**

P.T.O.

Q4) a) What is molecular docking? Discuss different types and principle with suitable examples. **[7]**

b) What are biotherapeutics? Explain the role of haematopoietic growth factors and coagulation factors in therapeutics. **[5]**

Q5) a) What is molecular modeling? Give an account on molecular modeling of proteins. **[7]**

b) Comment on drug tolerance and intolerance state it's effect on drug action. **[5]**

Q6) a) Define drug. Elaborate on physicochemical properties of drugs. **[7]**

b) Explain new drug approval system in Europe. **[5]**

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

a) Anti - inflammatory drugs

b) Drug toxicity testing

c) Indian drug regulations

Total No. of Questions : 7]

SEAT No. : ____

PC-3967

[Total No. of Pages : 2

[6345]-405

M.Sc.

BIOTECHNOLOGY

MBT406: Research Methodology and Scientific Communications

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

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

Instructions to the candidates:

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

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

a) Define JIF.

b) What is h-g Index?

c) Explain 'i-thenticate'.

d) What is power analysis?

e) Write names of two Bibliography style's software.

f) Write any four types of research reports.

Q2) a) Discuss laws governing the human experimentation ethics. **[7]**

b) Elaborate on guidelines for report writing. **[5]**

Q3) a) What is ANOVA? Discuss its use in scientific data analysis. **[7]**

b) Write a note on patenting of Biotechnological inventions and product. **[5]**

P.T.O.

Q4) a) Compare & contract between primary and secondary data collection with suitable examples. **[7]**

b) Discuss important points for effective oral presentation. **[5]**

Q5) a) Elaborate on holistic approaches in scientific research. **[7]**

b) Write a note on wildlife ethics in research. **[5]**

Q6) a) What is plagiarism? Write a note on its detection and prevention. **[7]**

b) Explain Experimental design and its significance. **[5]**

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

a) Write important factors for developing a research proposal.

b) Explain significance of Lab book and add a note on data tabulation.

c) What is Citation Index? Explain any one in detail.

Total No. of Questions : 7]

SEAT No. : ____

PC3968

[Total No. of Pages : 2

[6345]-406
M.Sc. - II
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.No. 2 to Q.No. 7.***
3) ***Q.2 to Q.7 carry equal marks.***

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

a) State any four advantages of ac in pharma industry.

b) Explain in brief two main types of clinical studies.

c) State the differente between ethics and bioethics.

d) Discuss any two misconducts in publication ethics.

e) Define biohazard.

f) Enlist fire preventive methods.

Q2) a) Explain in detail the differences in roles of quality control and quality assuarance. **[7]**

b) Explain GMO and LMO guidlines of India. **[5]**

Q3) a) Describe containment controls in BSL3 laboratory. **[7]**

b) State any five ways of controlling quality variations. **[5]**

P.T.O.

Q4) a) Explain in detail what is ethical decision. **[7]**

b) What is blue cross in India? **[5]**

Q5) a) Discuss mis conducts of publication ethics. **[7]**

b) What is occupational exposure limit (OEL) **[5]**

Q6) a) Discuss in detail about sources of quality variations. **[7]**

b) Explain legal and socio economic impact of biotechnology. **[5]**

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

a) Master formula records

b) Bio piaracy

c) Risk assessment

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