Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐ Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. (BT) (Sem-3)
ANIMAL TISSUE CULTURE
Subject Code : MBT-311
M.Code : 76733
Date of Examination : 24-05-2023

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

a) Warm trypsinization

b) Cell synchronization

c) Membrane filtration

d) In-situ hybridization

e) Anchorage dependent cells

f) Cell banking

g) Viability measurement

h) HAT selection

i) Cell line immortalization

j) Serum free media

SECTION-B

2. What are the various requirements to set-up a primary culture?

3. Write down about role of serum in animal tissue culture media.

4. How would you sterilize media in animal tissue culture?

5. Discuss about role of enzymes in cell separation.

6. Write a note on cell line designation.

7. What is flow cytometry? Give principle and applications.

8. Explain various applications of monoclonal antibodies.

SECTION-C

9. Enlist some industrial products of animal cell culture. Also add a note on continuous culture of animal cell.

10. Give an account of cryopreservation of cell lines.

11. What are the components of animal tissue culture media? Give detail.

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Total No. of Pages : 02

Total No. of Questions : 11

M.Sc (Biotechnology) (Sem-3)

IPR, GOOD LAB PRACTICES AND BIOETHICS

Subject Code : MBT-304

M.Code : 76731

Date of Examination : 02-01-23

Time : 3 Hrs. **Max. Marks : 70**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Write briefly :**

   a. What is Tangible and Intangible property?

   b. What is Non-obviousness and its importance?

   c. What is Utility Patent?

   d. What is Patent search?

   e. What are GMOs?

   f. What is TKDL?

   g. How many safety levels exist?

   h. Mention the paradigms of Bioethics.

   i. Why is chemical inventory required in a laboratory?

   j. Difference between bioethics and biopiracy.

SECTION-B

2. Discuss the need of IPR and its management.

3. What is knowledge management database of IPR? Mention the various databases for patent search.

4. Discuss the concepts of folklore and traditional knowledge?

5. Why is maintenance of lab record book necessary? How is radiation safety maintained in the lab?

6. What is the international standards of bioethics and discuss the ethical issues of patenting?

7. What are the condition and procedures of registration?

8. What are the various levels of contamination and how can they be eradicated?

SECTION-C

9. Discuss in detail the TRIPS agreement and the amendments made in Indian Patent Law after India became the member of TRIPS.

10. Discuss in detail the GLPs in a Biotechnology Laboratory including handling of glassware, chemicals and biological material.

11. Discuss the bioethical issues arising out of Neem and Haldi cases.

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Total No. of Pages : 02

tions : 11

M.Sc (Biotechnology) (Sem-3)

GOOD LAB PRACTICES AND BIOETHICS

Subject Code : MBT-304

M.Code : 76731

Date of Examination : 02-01-23

Max. Marks : 70

TO CANDIDATES :

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SECTION-A

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What is Patent search?

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Total No. of Questions : 11

M.Sc (BT) (Sem.-3)
GENETIC ENGINEERING
Subject Code : MBT301
M.Code : 76728
Date of Examination: 12-12-2022

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :
1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :

a. Representative diagram of M13mp vector.

b. What are Linkers and their uses?

c. What is a Biolistic Gun?

d. Write salient features of primers used for PCR.

e. What are characteristics of Golden Rice?

f. What is His-Tag and its utility in protein purification?

g. What are thermostable polymerase?

h. Explain the term Gene Therapy.

i. Methodology of Southern Blotting.

j. What is Phage display?

2. Describe the activity and applications of following tools of genetic engineering :

a) Alkaline phosphatase

b) Polynucleotidyl Kinase.

3. Discuss the utility of Restriction Enzymes as tools in genetic engineering.

4. Describe Plasmid Vectors for cloning in *E.coli*.

5. Briefly describe two methods of transforming yeast cells.

6. Write preparation of radioactively labelled probes for hybridization.

7. What are the risk factors involved in working with recombinant microbes.

8. Describe two animal virus derived vectors.

SECTION-C

9. *Describe the construction of Genomic library. How can gene of interest be isolated from such a library?*

10. *Describe the technique of PCR. What are various types of the PCR methodologies and their uses in genetic engineering?*

11. a) *What are the strategies adopted to maximize gene expression in a genetic engineering protocol?*

b) *Write the principle and applications of gene silencing using siRNA.*

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Total No. of Questions : 11

Total No. of Pages : 02

M.Sc. (Biotechnology) (2018 Batch) (Sem.-3)

BIOSTATISTICS

Subject Code : MBT-302

M.Code : 76729

Date of Examination : 14-12-22

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

a) Define biostatistics.

b) Define mode with example.

c) What do you mean by degrees of freedom?

d) Define precision

e) A book contains 100 pages. If you open book randomly, what is the probability that you will get page number 90?

f) Define distribution

g) Give example for non-parametric tests

h) Define rank correlation

i) Define variance

j) Write the formulae for Karl Pearson coefficient of correlation.

SECTION-B

2. Write a note on Correlation.

3. What do you mean by Normal distribution?

4. The number of defects per unit in sample of 330 units of manufactured product was found as follows :

No of Defects	0	1	2	3	4
No of Units	214	92	20	3	1

Fit a poision distribution to the data (Given $e^{-0.439} = 0.6447$)

5. Calculate Mean, Median and Mode by taking your own data.

6. Explain *t-Test* importance in *biostatistics*. Write the various formulae for standard deviation used in *t-Test*.

7. In an anti malarial campaign particular city, quinine was given to some people. Discuss the usefulness of quinine checking malaria by using chi square test

Observed:	20	220	792	2216
Expected:	60	180	752	2256

(Table value is 3.84)

8. Write a note on graphical presentation.

SECTION-C

9. Discuss in detail Chi square test and randomised block design

10. Perform one way Analysis of variance for the given following data $F_{0.05}(2, 6)$ is 5.14.

A	B	C
5	4	3
6	5	7
7	3	5

11. Write a note on any two : a) Design of experiments b) Probability c) Regression.

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Total No. of Questions: 11

M.Sc. (BT) (Sem. – 3)

ANIMAL TISSUE CULTURE

Subject Code: MBT 311

M Code: 76733

Date of Examination: 16-12-2022

Time: 3 Hrs. **Max. Marks: 70**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Give a brief account of the following:

a) Organ culture

b) What are the advantages of cell culture over use of animals?

c) How to identify the contamination with mycoplasma?

d) Suspension culture

e) Which properties of glass make it a suitable material for substratum or vessel material?

f) Enlist the physical factors that need to be controlled for culture.

g) In hybridoma technology the how the cloning is carried out to get the desired clones?

h) Explant

i) Dedifferentiation

j) Collagenase treatment

SECTION-B

2. Define the terms: Primary cell culture, Seeding , Feeding, Plating efficiency, Rich medium, Cloning of cells.

3. How to make serum free medium so that it can replace serum?

4. Describe the layout of the tissue culture lab.

5. Give the various cell separation techniques.

6. In situ hybridization technique and significance.

7. Give an account of flow cytometer.

8. What are cell banks and how to transport a cell line from cell bank?

SECTION-C

9. Which methods are used to check the viability and growth of cells?

10. How to characterize a cell line?

11. Describe the role of cell culture in raising medical products.

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Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. (BT) (Sem.-3)

CLINICAL RESEARCH

Subject Code : MBT-313

M.Code : 76735

Date of Examination : 21-12-22

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Q1. Write briefly :

a) Define phase IV clinical trials.

b) Define Clinical Practice.

c) Define Intellectual Property Rights.

d) Name major ethical issues in conduct of clinical trials.

e) Enlist various phases of clinical trials and their significance.

f) Define Placebo. How does it act?

g) Define Investigator's Brochure.

h) Define protocol and protocol deviations

i) Briefly describe the composition of IEC

j) Define Good Clinical Practice.

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SECTION-B

2. Describe the objectives and significance of various phases of clinical trials.
3. Differentiate between clinical research and clinical practice.
4. Describe the composition and functions of IRB.
5. Briefly describe the CDSCO guidelines for good clinical practice
6. Briefly describe the methods for post marketing surveillance.
7. Briefly describe the design of clinical trial protocol.
8. Briefly describe the history of clinical research.

SECTION-C

9. Describe in detail the national perspective of clinical trials in India.
10. Write short note on the following:
    a) Clinical Trial Market
    b) Career in Clinical Research
11. Briefly describe the structure of ISH and principles of ICH GCP.

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Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. (BT) (Sem.-3)

CLINICAL RESEARCH

Subject Code : MBT-313

M.Code : 76735

Date of Examination : 21-12-22

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.**
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Total No. of Questions : 11

M.Sc (Biotechnology) (2018 Batch) (Sem.-3)

BIOSTATISTICS

Subject Code : MBT-302

M.Code : 76729

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

a) Define Level of significance and Null hypothesis.

b) What are characteristics of normal probability curve?

c) What do you understand by test for proportion?

d) Write down advantages of randomized block design.

e) Calculate the standard deviation of the following data :

X	2	3	4	5	6
Y	1	5	8	4	2

f) What are Judgemental and Quota sampling?

g) From a large field of corn, 714 ears were collected in a random fashion. Each ear was measured to the nearest centimetre. Construct a histogram based on the data shown below :

Class Interval	24-25	22-23	20-21	18-19	16-17	14-15	12-13	10-11
F	11	45	80	190	220	100	60	8

h) A certain disease has a mortality rate of 75%. Two patients suffering from the disease are selected at random. What is the probability that at least one of them will recover?

i) What are sampling and non-sampling errors?

j) Differentiate between correlation and regression analysis.

SECTION-B

2. Explain the method of least square to obtain the line of regression of Y on X.

3. a) A flower of genotype Bb is self-fertilized and produces 100 seeds. What is the probability that at least 60 of the seeds are of genotype Bb?

   b) Contrast binomial and poisson distribution.

4. Calculate median and mode from the data given below :

Marks below	10	20	30	40	50	60	70	80
No. of students	11	24	45	54	76	87	128	200

5. An antimalarial drug was given to 1500 men, and 15 individuals showed an anaphylactic reaction. Of 1400 women given the same drug, 40 individuals has a similar reaction. Analyse these data to determine whether an association exists between sex and an allergic reaction to the drug.

6. Write a note on completely randomized design.

7. The mean weight of 98 students as calculated from a frequency distribution is found to be 50 kg. It was later found that the frequency of class interval 30-40 was wrongly taken as 8 instead of 10. Calculate the correct mean.

8. An investigator tests a drug which he has reason to believe will increase haemoglobin content in grams/100 ml. The haemoglobin content of eight subjects is measured before and after administration of the drug. Analyse the following data in terms of the effectiveness of the drug :

Subject	Before	After
1	10	12
2	9	11
3	11	13
4	12	14
5	8	9
6	7	10
7	12	12
8	10	14

(in beats per min) in human females ranging from one to fifteen years. Analyse the data in terms of following :

a) Compute the regression coefficient

b) Test the regression coefficient the statistical significance

c) Compute the upper and lower 95-percent confidence limits for the heart rate expected in a randomly selected ten years old female child.

Recording number	Age	Heart rate
1	1	111
2	2	108
3	3	108
4	4	102
5	5	99
6	6	92
7	7	93
8	8	88
9	9	90
10	10	90
11	11	88
12	12	86
13	13	84
14	14	83
15	15	83

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M.Sc (BT)(2018 Batch) (Sem.-3)

GENETIC ENGINEERING

Subject Code : MBT301

M.Code : 76728

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Write briefly :**

   a) Adaptors

   b) Immunoprecipitation

   c) Phagemids

   d) SV-40 based vectors

   e) Ti vectors

   f) Phage display

   g) Jumping libraries

   h) Real time PCR

   i) Si RNA Technology

   j) Automated DNA sequencing

SECTION-B

2. Give a detailed description of enzymes used in DNA manipulation.
3. Explain principle, methodology and applications of Southern Blotting.
4. Draw a labeled diagram showing salient features of pUC 19 and Baculovirus vectors.
5. What are intein-based vectors? Explain their features and methods of cloning in an intein based vector.
6. Give detailed description of yeast two hybrid system and its applications.
7. Explain in detail the methods of cloning PCR products.
8. Write down basic principle and methodology of PCR. Compare multiplex and nested PCR.

SECTION-C

9. a) Preparation of DNA and RNA probes

   b) Methods to reduce formation of inclusion bodies in the recombinant cells

10. a) Methods of constructing genomic DNA library

    b) Isolation and purification of mRNA from eukaryotic cells.

11. a) Transfection techniques for plants and animals

    b) Gene Knockouts: principle and applications.

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Total No. of Questions : 09

M.Sc.(BT) (2016 to 2017) (Sem.–3)

RECOMBINANT BIOTECHNOLOGY

Subject Code : MSBT-205

M.Code : 15020

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write brief note on the following :**

   a) Expression Vectors

   b) Transfection

   c) Fusion proteins

   d) Cosmids

   e) Nick translation

   f) Northern Blotting

   g) In- Situ hybridization

   h) Transgenic animals

   i) cDNA library

   j) Human Genome Project

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SECTION-B

2. Write a note on Restriction Endonucleases.

3. What are Molecular Probes? How are they applied?

4. Write a note on Plasmid vectors.

5. Discuss the technique of DNA Fingerprinting.

6. List factors affecting expression of cloned genes.

SECTION-C

7. Discuss the applications of rDNA technology in medicine.

8. Elaborate steps in cDNA synthesis and library construction.

9. Write about ex vivo and in vivo gene therapy.

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Total No. of Questions : 11

M.Sc. (BT)Elective (2018 Batch) (Sem.-3)

FOOD BIOTECHNOLOGY

Subject Code : MBT 312

M.Code : 76734

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

   (a) Biogums

   (b) Bioflavours

   (c) Biocolours

   (d) Protein engineering

   (e) Peptide antibiotics

   (f) Nutraccuticals

   (g) Transporter gene polymorphism

   (h) Gene-diet interactions

   (i) Complex foods

   (j) β-Galactosidase

SECTION-B

2. What are food additives? Describe the applications of citric, fumaric and malic acid in food.

3. Describe the methods and limitations of protein engineering.

4. Describe the applications of protein engineering with special reference to β-galactosidase.

5. Describe the scope and future perspectives of nutraceuticals.

6. What are functional foods? Discuss their classification with suitable examples.

7. What are nutrigenomics? Highlight their scope and importance to human health and industry.

8. What is food biotechnology? Give a brief account of various food ingredients.

SECTION-C

9. Describe nutrigenomics approaches to unravelling effects of complex foods.

10. What is functional food science? Discuss the impact of food technology on functional food development.

11. What is a biosensor? Describe its principle, types and applications in food processing.

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M.Sc. (BT) Elective (2018 Batch) (Sem.-3)

ANIMAL TISSUE CULTURE

Subject Code : MBT-311

M.Code : 76733

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. **Write briefly :**

   a) How can microbial contamination in tissue culture be assessed?

   b) What is trypsinization?

   c) Describe the advantages of tissue culture.

   d) What are important aspects in culturing cells?

   e) What are primary and secondary cultures?

   f) How is cell viability determined?

   g) Which bioreactors are used for culturing animal cells?

   h) What are stem cells?

   i) Name bioproducts obtained from animal cell culture.

   j) What is cryopreservation?

SECTION-B

2. What are isozymes? Describe their role in diagnostics.
3. What are the different procedures used for sterilization of culture media and equipment?
4. What is stem cell preservation? How are cell lines preserved? Explain.
5. Describe the risk assessment and safety aspects of cell culture.
6. Write a note on hybridoma technology.
7. What is cytotoxicity? How is cytotoxicity assayed?
8. What are monolayer and suspension cultures? How are primary cultures established?

SECTION-C

9. Describe the set up of an animal tissue culture lab.
10. Give a detailed account on media constituents for culturing animal cells.
11. Describe the principle and applications of *in situ* hybridization.

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M.Sc (Biotechnology) (2018 Batch) (Sem3)

IPR, GOOD LAB PRACTICES AND BIOETHICS

Subject Code : MBT-304

M.Code : 76731

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write briefly :**

   a. Basic principles for claiming 'inventorship' in patent

   b. Importance of novelty search before patent filing

   c. Name offline (four) and online (four) patent databases.

   d. Basic biosafety concerns to handle GMOs

   e. Biosafety risk groups and Biosafety levels.

   f. Cartagena protocol on biosafety

   g. Significance of professional ethics in academia and research in present knowledge era

   h. Define physical and biological containment.

   i. Traditional knowledge and its types

   j. Basic learning from 'Haldi' and 'Basmati' case.

DEC-2019

SECTION-B

2. What are provisional and complete specifications in patent application? Enlist some advantages of filing patent with provisional specifications.

3. Describe the minimum standards laid down under TRIPs agreement for protection of various IPRs.

4. Discuss the concept of folklore and traditional knowledge with examples.

5. Describe basic principles of Good Laboratory Practices and their importance.

6. Explain and differentiate the terms 'Risk assessment' and 'Risk management' with examples.

7. Discuss in detail about ethical issues involved in biotechnology research.

8. How authorship is decided in publications related to particular research work? Discuss with the help of related basic ethical principles.

SECTION-C

9. What do you mean by IP, IPRs and IP management? Describe various modes to protect different type of IP in India.

10. Write a detailed note on TKDL describing its purpose, structure and possible risks.

11. What do you understand by term 'Bioethics'? Discuss its basic principles. What types of ethical issues are involved in patenting of biological inventions?

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Total No. of Pages : 02

Total No. of Questions : 09

M.Sc.(BT) (2016 to 2017) (Sem.–3)

FERMENTATION TECHNOLOGY

Subject Code : MSBT-203

M.Code : 15019

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1) Answer briefly/True/False :

a) Define Scale-Up and scale- down.

b) Define Solid and submerged fermentation.

c) Define Enzyme. Give two examples of enzyme.

d) What do you mean by high fructose corn syrup?

e) What is algal biofuel?

f) What is the significance of hydrogen production?

g) What is the role of food starters?

h) Write four applications of lipase enzyme.

i) What are probiotic and prebiotics foods?

j) Antibiotics are generally secondary metabolites. (True / False)

SECTION-B

2) Briefly discuss important components of a fermentation medium

3) How is anaerobic fermentation process is employed for the manufacture of beer?

4) Explain the production of xanthan.

5) Explain the production and application of vinegar.

6) Write a note on fermentation economics.

SECTION-C

7) Describe the manufacture of penicillin in detail. Further, how is it recovered to pure form?

8) Explain the microbial production of amino acids with one example.

9) What do you mean by 'single cell protein'? Indicate advantages and disadvantages of single cell protein when it is used as food source?

DEC-2019

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

Roll No. [ ]

Total No. of Pages : 02

Total No. of Questions : 11

M.Sc (Biotechnology) (2018 Batch) (Sem.-3)

GENOMICS AND PROTEOMICS

Subject Code : MBT-303

M.Code : 76730

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SEVEN questions carrying SIX marks each and students have to attempt any FIVE questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1) **Write briefly :**

(a) Genomics

(b) Genome databases

(c) Functional genomics

(d) TILLING

(e) SNPs

(f) Protein digestion techniques

(g) Proteome

(h) Tandem mass spectrometry

(i) Applications of Proteomics

(j) Protein-protein interactions

SECTION-B

2) Compare genetic organization of prokaryotes and eukaryotes.

3) Give methods and applications of sequence comparison.

4) Explain principle, method and applications of SAGE.

5) Discuss in detail the strategies and applications of SNP determination.

6) Explain theory, technique and applications of 2D-IEF.

7) Give a detailed description of tools and techniques used in proteome analysis.

8) Outline features, techniques and applications of peptide sequencing.

SECTION-C

9) Write down detailed notes on :

(a) Genome evolution

(b) ESTs

10) Give a detailed description of strategies and methods of comparative genomics.

11) Write down detailed notes on :

(a) Peptide sequence analysis

(b) Analysis of protein modification

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.