Total No. of Questions : 7]

SEAT No. : ____

PA-3264

[Total No. of Pages : 2

[5913]-11

M.Sc. - I

MICROBIOLOGY

MBCT 111 (MB-501) : Microbial Systematics

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

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any five questions from Q. 2 to Q. 7.***
3) ***Question 2 to 7 carry equal marks.***
4) ***Figures to the right side indicate full marks.***
5) ***Draw neat labelled diagram wherever necessary.***
6) ***Use of Scientific calculator is allowed.***
7) ***Assume suitable data if necessary.***

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

a) What is Microbial Diversity?

b) Define unculturable Bacteria.

c) What is RFLP and Give its Applications.

d) Define Selfish genes.

e) Enlist and explain any one structural characteristics of phenetic classification of Bacteria.

f) Define inclusive fitness.

Q2) Attempt the following:

a) What is coevolution? Describe coevolution with respect to host parasite evolution. **[7]**

b) Describe Measures and Indices of Diversity. **[5]**

Q3) Attempt the following:

a) Explain the strategies for cultivating the unculturable bacteria by culture dependent methods. **[7]**

b) Justify 16S rRNA is the most widely accepted molecular chronometer in bacterial taxanomy. **[5]**

P.T.O.

Q4) Attempt the following:

a) What is phylogenetic tree? Give steps involved in constructing phylogenetic tree using suitable example. **[7]**

b) From the given data calculate the Shannon diversity index for the river water sample Total number of colonies are 184×10^7. **[5]**

Sr.No.	Type of Colonies	Number of Colonies
1	Pinpoint Colonies	60
2	Pigmented Colonies	71
3	Colonies larger than 1 mm	83

Q5) Attempt the following:

a) Describe in detail Lamarckism and Darwinism theory of evolution. **[7]**

b) Explain the importance of protein profiling in bacterial taxanomy. **[5]**

Q6) Attempt the following:

a) Explain in detail polyphasic approach in taxanomy. **[7]**

b) Describe species concept in Prokaryotes and Eukaryotes. **[5]**

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

a) VBNC

b) Species Divergence

c) Reciprocal Altrusim

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Total No. of Questions : 7]

SEAT No. :

PA-3265

[Total No. of Pages : 3

[5913]-12

M.Sc. - I

MICROBIOLOGY

MBCT-112 : Quantitative Biology

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

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 Q.7 carry equal marks.***
4) ***Figures to the right side indicate full marks.***
5) ***Draw neat labeled diagrams wherever necessary.***
6) ***Use of scientific calculators, logarithmic and statistical tables is allowed.***

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

a) Give any four advantages of sampling over census method.

b) What are SRSWR and SRSWOR?

c) Represent the following data by means of frequency polygon.

Sr.No.	Age	No.of Students
1	10-12	15
2	12-14	17
3	14-16	8
4	16-18	20
5	18-20	12

d) Calculate the median from the following data: 3, 5, 12, 9, 8, 21, 14, 16, 25.

e) Define : Inference.

f) Explain Central limit theorem.

Q2) Attempt the following.

a) The time required for bacteria to duplicate was recorded before and after mutation therapy. Observations were carried out on 15 different strains of bacteria. Apply t-test and find out whether the mutation therapy have effect on generation time. **[7]**

Before treatment generation time	After treatment generation time
19, 22, 17, 19, 15, 25, 24, 22, 28, 23, 19, 25, 24, 23, 18	18, 14, 23, 25, 17, 16, 15, 21, 15, 12, 22, 18, 19, 24, 20

b) Write a note on : Type-I and Type-II errors. **[5]**

P.T.O.

Q3) Attempt the following.

a) A ratio of male to female birth in universe is constant. In a village it was found that, children born were 52 female and 48 male. Is this difference due to chance? **[7]**

b) Explain parametric and nonparametric test. **[5]**

Q4) Attempt the following.

a) In a factory no. of accidents in three shifts over a half year period is given below, can we conclude that all shifts are equally dangerous?

Morning	Afternoon	Night
12	14	19

[7]

b) What is the probability that a queen, king and Joker are drawn in the same order from pack of 52 cards without replacement? **[5]**

Q5) Attempt the following.

a) From the data given below find out whether the means of three samples differ significantly or not by ANOVA.

Sample One	Sample Two	SampleThree
20	19	13
10	13	12
17	17	10
17	12	15
16	09	05

[7]

b) When 10 coins are tossed, find the probability of exactly six heads. **[5]**

Q6) Attempt the following.

a) In an experiment of pea breeding following frequency of the seeds in F2 generation were obtained. With the help of chi square determined whether the obtained ratio match with Mendel's dihybrid ratio. **[7]**

Round yellow : 315

Wrinkled yellow : 101

Round green : 108

Wrinkled green : 32

b) From a pack of 52 cards, one card is drawn at random. What is the probability of getting King or Queen? **[5]**

Q7) Attempt any two of the following. **[12]**

a) A sample of Barley was sown in 7 plots. In each plot following yield in quintal were obtained. Analyze the data and find out whether there is significant difference in mean yield.

Sample A	Sample B	SampleC
8	7	6
10	7	8
6	8	10
7	9	6
9	8	4
-	5	5
-	-	7

b) The probability that evening college students will graduate is 0.6. Find the probability that out of 5 students

i) None graduate

ii) One graduate

iii) At least one graduate

c) An average five cars arrive at toll booth every min. Assume it is Poisson distribution, what is the probability that exactly 0, 1, 2, 3 and 4 cars arrive in one min.

Total No. of Questions : 7]

SEAT No. : ____

PA-3266

[Total No. of Pages : 2

[5913]-13

M.Sc. - I

MICROBIOLOGY

MB - 503 - MBCT - 113 : Biochemistry and Metabolism

(2019 Pattern) (Credit System) (Revised) (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) ***Q.2 to Q.7 carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Figures to the right side indicates full marks.***
6) ***Use of logarithmic tables and scientific calculators is allowed.***

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

a) The linear order of aminoacid in a protein, which constitute its primary structure is maintained by which bond? Which atoms are involved in bond formation?

b) What are the conditions to elute protein from affinity chromatography matrix.

c) The Hox-genes in drosophila codes for which 2 complexes?

d) What is root apical meristem?

e) A double membrane encloses which two organelles.

f) Write advantages of Hot-Start PCR.

Q2) Attempt the following. **[12]**

a) With a suitable example describe quarternary structure of protein. **[7]**

b) You have a mixture of protein with the following molecular weight

Protein 1 Mr - 12,000

Protein 2 Mr - 62,000

Protein 3 Mr - 28,000

Protein 4 Mr - 9,000

Other factors aside, what order of emergence would you expect from there proteins which run on the Sephadex G-50 gel exclusion column. **[5]**

P.T.O.

Q3) Attempt the following. **[12]**

a) Explain Maxam and Gilbert method of sequencing DNA. **[7]**

b) Apeptide has the sequence **[5]**

Glue - His - Trp - Ser - Gly - leu -Arg - Pro - Gly

Using data given below predict the charge

on the peptide at pH - 3, 8 and 11

	Pk_a	Pk_R
Terminal α - COOH group	3.1	-
Terminal α - NH_2 group	8	-
Histidine	-	6
Arginine	-	12.5
Glutamic acid	-	4.1

Q4) Attempt the following. **[12]**

a) Explain anterior - posterior axis development in drosophila. **[7]**

b) Explain the phases in cell cycle. **[5]**

Q5) Attempt the following. **[12]**

a) Describe Microtubule structure and functions. **[7]**

b) Justify : Conserve nature of development. **[5]**

Q6) Attempt the following. **[12]**

a) Derive Henderson - Hasselbach equation and explain its role in buffer formulation. **[7]**

b) Write short note on RT - PCR and gives its applications. **[5]**

Q7) Attempt any two of the following. **[12]**

a) Explain structure and functions of golgi apparatus. **[6]**

b) Write short note on apoptosis. **[6]**

c) Describe the organization of root and shoot meristem. **[6]**

✪ ✪ ✪

Total No. of Questions : 5]

SEAT No. : ____

PA-3267

[Total No. of Pages : 2

[5913]-14
M.Sc. - I
MICROBIOLOGY
MBET-115 (MBTE - 11) : Fungal Systematics and Extremophiles
(2019 Pattern) (CBCS) (Semester - I) (Credit System) (Revised)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions No. 2 to 5 carry equal marks.***
4) ***Figures to the right side indicate full marks.***
5) ***Draw neat labelled diagram wherever necessary.***

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

a) Draw structure of any one fruiting body observed in fungi.

b) Give two examples of Psychrophiles.

c) Enlist two examples of fungi belonging to basidiomycetes.

d) Enlist two cellular adaptive mechanism observed in acidophiles.

e) Enlist four characteristics of fungi.

f) Enlist two applications of Ascomycetes.

Q2) Attempt the following :

a) Write a note on Enrichment & isolation of methanogens. **[6]**

b) Write a note on life cycle of Zygomycetes. **[4]**

P.T.O.

Q3) Attempt the following :

a) Write a note on application of thermophiles. **[6]**

b) Explain ascus formation with the help of diagram. **[4]**

Q4) Attempt the following :

a) Write a note on adaptations, that help psychrophiles, survive at low temperature. **[6]**

b) Explain general characteristics observed in basidiomycota. **[4]**

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

a) Diagramatically represent sexual reproduction in Ascomycetes.

b) Write a note on application of Halophiles.

c) Enlist general characteristics of chytridiomycetes.

Total No. of Questions : 5]

SEAT No. :

PA-3268

[Total No. of Pages : 2

[5913]-15
M.Sc. - I
MICROBIOLOGY
MBET-116, MBTE - 12 : Experimental Design and Quantitative Approaches for Biologists
(2019 Pattern) (Semester - I) (Credit System) (Revised)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Figures to the right side indicate full marks.***
5) ***Draw neat Labelled diagram wherever necessary.***

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

a) What are the basic measurements in epidemiology for mortality and morbidity.

b) Compare stochastic and deterministic models.

c) Define SIR model.

d) Explain the simulation of bacterial growth.

e) What is survey methodology.

f) Enlist different sampling methods.

Q2) Attempt the following :

a) Describe the cyclic processes of model construction. **[6]**

b) Write a short note on clinical trials. **[4]**

P.T.O.

Q3) Attempt the following :

a) Give significance of graphs and tables in presentation of experimental data. **[6]**

b) Explain models based on Hardy-Weinberg equation. **[4]**

Q4) Attempt the following :

a) Discuss the use of plackett Burman design in Microbiology with example. **[6]**

b) How clinical trials are conducted using statistics? **[4]**

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

a) DOE in Agriculture.

b) Fractional factorial design.

c) Concurrent study designs.

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Total No. of Questions : 5]

SEAT No. :

PA-3269

[Total No. of Pages : 2

[5913]-16
M.Sc. - I
MICROBIOLOGY
MBET-117 (MBTE 13) : Microbial Communication, Membrane Transport and Signal Transduction
(2019 Pattern) (Semester - I) (Credit System) (Revised)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Draw neat Labelled diagram wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables and scientific calculators is allowed.***
7) ***Assume suitable data if necessary.***

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

a) What is an auto inducer?

b) What is culmination?

c) Define passive diffusion.

d) What is the role of pst B cells in Dictyostelium?

e) Give reaction for CAMP synthesis in Dictyostelium.

f) What is a biofilm?

Q2) Attempt the following :

a) Describe the molecular mechanism of quorum sensing in Gram negative bacteria. **[6]**

b) Explain the mechanism of chemo taxis in bacteria. **[4]**

P.T.O.

Q3) Attempt the following :

a) Explain S-motility and A-motility and comment on its significance in lifecycle of myxobacteria. **[6]**

b) Justify that 'during quorum sensing bacteria exploit various moleculs as signal. **[4]**

Q4) Attempt the following :

a) Explain with the help of suitable example what are gated ion channels **[6]**

b) What is the electrochemical potential difference when the intracellular $[Ca^{2+}]$ = l μM and the extracellular $[Ca^{2+}]$ = 1mM?
Assume $\Delta\psi$ = –100 mV (inside negative) and T = 25°C.
R = 8.3145 $J.K^{-1}. mol^{-1}$, F = 96,485 $J.V^{-1}, mol^{-1}$. **[4]**

Q5) Attempt any two : **[10]**

a) Describe the architecture of biological membrane.

b) What are liposomes? Give their applications.

c) What are ionophores? Describe any one in detail.

Total No. of Questions : 7]

SEAT No. :

PA-3270

[Total No. of Pages : 2

[5913]-21

M.Sc. (Microbiology)

MBCT - 121 : INSTRUMENTATION AND MOLECULAR BIOPHYSICS

(2019 Pattern) (Semester - II) (Credit System) (Revised)

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.***
4) ***Figures to the right side indicate full marks***
5) ***Draw neat labelled diagrams wherever necessary.***
6) ***Use of scientific calculator is allowed.***
7) ***Assume suitable data, if necessary.***

Q1) Attempt any five : **[10]**

a) Explain column efficiency.

b) Enlist detectors far HPLC.

c) Define chemical shift in NMR spectroscopy.

d) What is bravis lattice?

e) What are radioactive isotopes?

f) What is quenching?

Q2) Attempt the following:

a) Explain instrumentation, working & application of HPLC. **[7]**

b) Explain partition coefficient and resolution of column chromatography. **[5]**

P.T.O.

Q3) Attempt the following:

a) Describe different mass analysers and ionization of molecules in mass spectrometry. **[7]**

b) The absorbance A of 5×10^{-4} M solution of amino acid tyrosine at wavelength of 280nm is 0.75. The path length of the cuvette is 1 cm. What is molar absorption coefficient ε? **[5]**

Q4) Attempt the following:

a) Explain the basis principle of NMR and working of NMR instrument with suitable diagram. **[7]**

b) Explain direct lattice & reciprocal lattice. **[5]**

Q5) Attempt the following:

a) Explain measurement of radioactivity using scintillation counters. **[7]**

b) With a suitable example explain the pluse chase experiment. **[5]**

Q6) Attempt the following:

a) Explain working of MALDI - TOF. **[7]**

b) Describe the principle of isoelectric focusing. **[5]**

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

a) SDS - PAGE.

b) Signal to noise ratio.

c) Eward sphere.

◆ ◆ ◆

Total No. of Questions : 7]

SEAT No. :

PA-3271

[Total No. of Pages : 2

[5913]-22

M.Sc. (Microbiology)

MBCT - 122 (MB - 602) : MOLECULAR BIOLOGY

(2019 Pattern) (Semester - II) (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.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Figures to the right indicate full marks***
6) ***Assume suitable data, if necessary.***
7) ***Use of scientific calculator is allowed.***

Q1) Attempt any five : **[10]**

a) Comment on use of T4 DNA polymerase.

b) Write applications of genome project.

c) Give applications of knock out mice.

d) Explain construction of T_i based vector.

e) What is spliceosome?

f) What is gene annotation?

Q2) a) Enlist various methods used for designing probes and explain any two of them in detail. **[7]**

b) Explain about the vectors derived from pichia and its applications. **[5]**

Q3) a) Justify : 'RNA interference technique can be used in gene silencing: **[7]**

b) Explain the use of micro RNA in cancer diagnosis. **[5]**

P.T.O.

Q4) a) What are the salient features of human genome project. **[7]**

b) What are expression vectors? Explain use of expression vectors with suitable examples. **[5]**

Q5) a) Comment on use of immunoassay. **[7]**

b) As a part of under graduate project, a student was attempting to construct a restriction map of the plasmid pVC 23 using restriction enzymes Eco RI and Bam HI, after carrying out both single and double enzyme digest reactions, following fragments were obtained. **[5]**

Enzyme(s)	Fragment length obtained
Eco RI	20 kb
Bam HI	11 kb, 6 kb, 3 kb
Eco RI + Bam HI	8 kb, 6 kb, 3 kb(2)

From the information construct a restriction map of pVC 23.

Q6) a) Write a note on restriction endonucleases and their applications in molecular biology. **[7]**

b) Describe RNA splicing. **[5]**

Q7) Attempt the following: [Any 2] **[12]**

a) Give protocol for preparing gene library.

b) Write a note on - genome project of drosophila.

c) Comment on : RNA signatures of antibiotic resistance.

◆ ◆ ◆

Total No. of Questions : 7]

SEAT No. :

PA-3272

[Total No. of Pages : 3

[5913]-23
M.Sc. - I
MICROBIOLOGY
MBCT 123 : Enzymology, Bioenergetics and Metabolism
(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) ***Q. 2 to Q. 7 carry equal marks.***
4) ***Figures to the right side indicate full marks.***
5) ***Draw neat labelled diagrams wherever necessary.***
6) ***Use of scientific calculator is allowed.***
7) ***Assume suitable data if necessary.***

Q1) Attempt any Five : **[10]**

a) What are sugar epimers?

b) Enlist different methods used for purification of an enzyme.

c) Define Gibb's free energy.

d) Define K_{cat}.

e) Write down two examples of saturated fatty acids with structures.

f) State third law of thermodynamics.

Q2) Attempt the following :

a) Describe in detail the role of TCA cycle in generating biosynthetic intermediates. **[7]**

b) Explain with the help of suitable example the construction of an enzyme purification chart. **[5]**

P.T.O.

Q3) Attempt the following :

a) Explain concept of an allosteric enzymes with suitable example. **[7]**

b) Calculate ΔG for hydrolysis of ATP at pH7 & 25°C under steady state conditions (such as might exist in a living cell) in which the concentrations of ATP, ADP & Pi are maintained at 10^{-5}M, 10^{-4}M & 10^{-3}M respectively. **[5]**

(Given $\Delta G^{10} = -7700$ call mole)

Q4) Attempt the following :

a) What are coupled reactions? Discuss the significance of high energy compounds in such reactions. **[7]**

b) Draw secondary plots for uncompetitive inhibition & comment on calculation of Ki. **[5]**

Q5) Attempt the following :

a) Phosphoglucomutase is crucial for glycogen breakdown as well as glycogen synthesis. Explain the role of this enzyme in each of the two processes. **[7]**

b) A marine microorganism contains an enzymes that hydrolyzes glucose 6 sulfate. The assay is based on rate of glucose formation. The enzyme is a cell free extract has kinetic constants of $K_m = 6.7 \times 10^{-4}$M & Vmax = 300nmols/lit^{-1}/min^{-1}. Galactose 6 PO_4 is a competitive inhibitor (I). At 10^{-5} galactose-6-sulphate & 2×10^{-5}M glucose-6-sulfate, υ was 1.5nmole $\times$ lit^{-1}/min^{-1}. Calculate K_i for galactose-6-sulfate. **[5]**

Q6) Attempt the following :

a) Comment on entropy. **[7]**

b) What relationship exist in Km & S in enzyme catalysed reaction proceeds at 75% Vmax. **[5]**

Q7) Attempt any two of the following : **[12]**

a) Write short note on phospholipids.

b) Outline pathway of biosynthesis of sterols.

c) Write short note on Atkinson's energy charge.

□□□

Total No. of Questions : 5]

SEAT No. :

PA-3273

[Total No. of Pages : 2

[5913]-24
M.Sc.-I
MICROBIOLOGY
MBCT-125 : (MBTE 21) : Bioinformatics and Bionanotechnology
(2019 Pattern) (CBCS) (Semester - II) (Revised)

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

Instructions to the candidates:

1) ***Q.No. 1 is compulsory.***
2) ***Solve any three questions from Q.No. 2 to Q.No. 5.***
3) ***Question No. 2 to 5 carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***

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

a) What is homology modeling?

b) What is a magnetosome?

c) Mention any two sequence databases.

d) Define nanoparticle.

e) What is FASTA?

f) Give Principle of SEM.

Q2) Attempt the following :

a) Explain sequence alignment in reference to local and global alignment. **[6]**

b) Comment on OMIM database. **[4]**

Q3) Attempt the following :

a) Discuss the role of plants in the nanoparticle synthesis. **[6]**

b) Justify for nanoparticles “there is plenty of room at the bottom.” **[4]**

P.T.O.

Q4) Attempt the following :

a) What is PDB? Explain how it is different from OMIM database. **[6]**

b) Comment on the use of magnetotatic bacteria in the synthesis of nanoparticles. **[4]**

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

a) Zeta Potential

b) Rasmol

c) TEM

□□□

Total No. of Questions : 5]

SEAT No. :

PA-3274

[Total No. of Pages : 2

[5913]-25

M.Sc. - I

MICROBIOLOGY

MBET - 126 (MBTE 22) : Molecular Biology Tools and Applications

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

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Figures to the right side indicate full marks.***

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

a) What are Monoclonal antibodies?

b) What are secondary Metabolites?

c) Enlist methods used to study protein - DNA interactions.

d) Write applications of Microarray technique.

e) What are three types of biopolymers?

f) What are cDNA arrays?

Q2) Attempt the following:

a) Explain synthesis of ascorbic acid. **[6]**

b) Give an account on super shift assay. **[4]**

Q3) Attempt the following:

a) Write an account on hybridoma technology. **[6]**

b) What are three potential applications of CRISPR? **[4]**

P.T.O.

Q4) Attempt the following:

a) Explain filter binding assay with example. **[6]**

b) Write an account on un-conventional microbial systems for production of high quality protein drugs. **[4]**

Q5) Attempt any two of the followings: **[10]**

a) Give applications of phage display technique.

b) Elaborate microarray technique.

c) Explain protein interaction with example.

◆ ◆ ◆

Total No. of Questions : 5]

SEAT No. :

PA-3275

[Total No. of Pages : 2

[5913]-26
M.Sc. (Part - I)
MICROBIOLOGY
MBET - 127 : Nitrogen Metabolism, Respiration and Photosynthesis
(2019 Pattern) (CBCS) (Semester - II)

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

Instructions to the candidates :

1) ***Q. 1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q. 5.***
3) ***Q.2 to Q.5 carries equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Figures to the right side indicate full marks.***
6) ***Use of logarithmic tables and scientific calculator is allowed.***

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

a) Write down net reaction of biological N_2 reduction.

b) Enlist component involved in bacterial cyclic electron flow of photosynthesis.

c) Name the substrates used for the reactions carried out by Rubisco.

d) If radioactively labelled water $H_2{}^{18}O$ is provided to plant, where does the label appear.

e) What is IMP? What are the products formed from IMP.

f) What is full form of PRPP?

Q2) Attempt the following.

a) Describe photophosphorylation in purple Sulphur bacteria. Compare it with photosystem II in plants. **[6]**

b) Enlist the properties of nitrogenase enzyme. **[4]**

P.T.O.

Q3) Attempt the following.

a) Explain CAM pathway and give its significance. **[6]**

b) Write short note on Oxygen Evolving Complex (OEC). **[4]**

Q4) Attempt the following.

a) Differentiate between C_3 and C_4 plants. **[6]**

b) Justify, "enzymes involved in nitrogen metabolism like glutamine synthetase and nitrogenase can be regulated by covalent modification". **[4]**

Q5) Attempt any two of following. **[10]**

a) What is photorespiration? What is its cause and why is it believed to be wasteful?

b) Describe biosynthesis of pyruvate family of amino acids.

c) Write note on regulation of Calvin cycle.

▽▽▽▽

Total No. of Questions : 7]

SEAT No. : ____

PA-3276

[Total No. of Pages : 2

[5913]-31

Second Year M.Sc.

MICROBIOLOGY

MBCT 231 : Immunology

(Core Compusory Theory Paper)

(2015 Pattern) (Semester-III)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any five questions from Q. 2 to Q. 7.***
3) ***Question 2 to 7 carry equal marks.***
4) ***Draw neat diagrams wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables/scientific calculator is allowed.***
7) ***Assume suitable data if necessary.***

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

a) What are Toll like receptors?

b) What is sthe role of PAMPs in innate immune response.

c) What is SCID mice?

d) What is negative selection?

e) Write principle of Elispot assay.

f) What is Hodgkin's disease?

Q2) Attempt the following.

a) Describe IL-2 pathway of signal tansduction. **[7]**

b) Justify-TCR-CD3 complex is required for activation mechanism. **[5]**

Q3) Attempt the following.

a) Explain Network theory of antigen antibody complex formation. **[7]**

b) How biological response modifiers can be used for cancer therapy. **[5]**

P.T.O.

Q4) Attempt the following.

a) What are transgenic animals? How they are used in immunological research? **[7]**

b) Explain the methods used for funcitonal assay of macrophages. **[5]**

Q5) Attempt the following.

a) Comment on the escape mechanisms of tumour from host defense system. **[7]**

b) Describe different types of tumours of lymphoid system. **[5]**

Q6) Attempt the following.

a) How animal models are used in the study of atoimmunity and AIDS. **[7]**

b) Explain cytokine mediated cross regulation of T cells. **[5]**

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

a) RAS/MAP kinase pathway.

b) Regulation of classical pathway of complement activation.

c) Structure and functions of B cell receptor.

Total No. of Questions : 7]

SEAT No. : ____

PA-3277

[Total No. of Pages : 2

[5913]-32

M.Sc.-II
MICROBIOLOGY
MBCT-232 : MOLECULAR BIOLOGY
(2019 Pattern) (Semester-III) (Credit System)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Slove any five questions from Q.2 to Q.7.***
3) ***Questions 2 to 7 carry equal marks.***
4) ***Draw neat diagrams wherever necessary.***
5) ***Figure to the right indicate full marks.***
6) ***use of logarithics tables? scientific calculator is allowed.***
7) ***Assume suitable data of necessary.***

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

a) Name any two techniques used for protein characterization.

b) Mention any two applications of transgenic animals.

c) Give two examples of amino acids with non-polar, aliphatic 'R' groups.

d) Give two examples of eukaryotic expression vectors.

e) What is gene-aging? Give one example.

f) What is SNP? Give one example.

Q2) Attempt the following:

a) " Telomere length can be an indicate of an individual's biological age" justify. **[7]**

b) What is longevity? Mention the biological factors effecting tongevity. **[5]**

Q3) Attempt the following.

a) The first five nucleotide pairs of a particular gene are present in following sequence,

A T G C A

T A C G T

↑

How many distinct homo alleles of the above gene are there that differ from the above sequence by a single nucleotide substitution occuring at position 5 (nucleotide pair No. 5 as indicated by arrow.) **[7]**

b) " Humans can be an example of alternative gene expression" explain. **[5]**

P.T.O.

Q4) Attempt the following:

a) What is the relation between genetic trade off and evolution? **[7]**

b) " Small non-coding RNA regulate the epigenetics" explain. **[5]**

Q5) Attempt the following.

a) Sometimes the strategy for the expression of a target protein in a host organism involves synthesizing the protein as a part of fusion protein. What are the advantages of this approach? **[7]**

b) Give two examples of each.

i) Amino acids with positively charged R group.

ii) Amno acids with negatively charged R group. **[5]**

Q6) Attempt the following.

a) Which of the following pairs of DNA sequences could qualify as the terminal repeats. of a bacterial IS element? Explain why.

i) 5'–GAATCCGCA'–3' and 5'–ACGCCTAAG'–3'

ii) 5'–GAATCCGCA–3' and 5'–CTTAGGCGT–3'

iii) 5'–GAATCCGCA–3' and 5'–TGCGGATTC–3' **[7]**

b) What are the differences between replicative and non-replicative transposition? **[5]**

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

a) Composite transposons.

b) Advantages and disadvantages of geritically modified organisms.

c) What is gene-argumentation? Add a note on its significance.

● ● ●

Total No. of Questions : 7]

SEAT No. : [ ]

PA-3278

[Total No. of Pages : 2

[5913]-33

M.Sc. - II
MICROBIOLOGY
MBCT-233 : Clinical Microbiology
(2019 Pattern) (Semester - III) (Credit System)

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.***
4) ***Draw neat labelled diagram wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use to logarithmic tables/scientific calculator is allowed.***
7) ***Assume suitable data if necessary.***

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

a) What is biofilm formation?

b) What are exotoxins? Give two examples.

c) Write two characters of antigenically variable component of endotoxin.

d) Enlist the morphological forms of Giardia lamblia.

e) Enlist various methods for HIV detection.

f) Draw neat labelled diagram of ahon's complex.

Q2) Attempt the following.

a) Describe in detail the disease prediction model of covid 19. **[7]**

b) Describe immunoprecipitation and enzyme immunoassay techniques used in in-vitro detection of bacterial toxins. **[5]**

Q3) Attempt the following.

a) Describe antimicrobial resistance mechanisms developed by Acinetobacter baumanii. **[7]**

b) Describe characteristic features and cultural characteristics of etiological agent of tuberculosis. **[5]**

P.T.O.

Q4) Attempt the following.

a) Discuss in detail adherence and colonization mechanism in bacterial pathogenesis. **[7]**

b) Describe clinical manifestations of infection with dermatophyte fungus Trichophyton Mentagrophytes. **[5]**

Q5) Attempt the following.

a) Write a note on treatment used for HIV-AIDS. Describe preventive measures for it. **[7]**

b) Suggest treatment and precautionary measures for H1N1 swine flu. **[5]**

Q6) Attempt the following.

a) Describe morphology and detailed life cycle of Ascaris lumbricoides. **[7]**

b) Describe pathophysiology of Ebola virus infection. **[5]**

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

a) Hair perforation test for dermatophytic fungi.

b) Rapid antigen test and RT - PCR test for detection of Influenza A.

c) Structure of HIV particle.

Total No. of Questions : 5]

SEAT No. : ____

PA-3279

[Total No. of Pages : 2

[5913]-34
M.Sc.
MICROBIOLOGY
MBET-235 : Cell Culture Techniques
(2019 Pattern) (Semester - III) (Credit System)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Draw neat Labelled diagram wherever necessary.***
5) ***Figures to the right side indicate full marks.***
6) ***Use of logarithmic tables and scientific caluclators is allowed.***
7) ***Assume suitable data if necessary.***

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

a) What are primary cultures?

b) How does pH affect the cell growth in animal cell culture?

c) What are cell lines?

d) What is the role of growth factors in the culture medium used for growing animal cell cultures?

e) What is the importance of trypsinisation of cells?

f) What are secondary cell cultures?

Q2) Attempt the following :

a) Explain the different ingredients used in the preparation of media for animal cell culture. **[6]**

b) What are the differences between anchorage independent and anchorage dependent cell cultures. **[4]**

P.T.O.

Q3) Attempt the following :

a) What are the characteristic features of transformed cells. **[6]**

b) What are the applications of lymphoid cell lines. Explain with examples. **[4]**

Q4) Attempt the following :

a) Explain the steps in preparation of an established cell line. **[6]**

b) What is the significance of immunomodulators in immunological studies. **[4]**

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

a) Suspension cell cultures.

b) Hybrid lymphoid cell lines.

c) Role of serum in medium for animal cell culture.

x x x

Total No. of Questions : 5]

SEAT No. : ____

PA-3280

[Total No. of Pages : 2

[5913]-35
M.Sc. - II
MICROBIOLOGY
MBET 236 : Bioremediation & Biomass Utilization
(2019 Pattern) (Semester - III) (Credit System)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Draw neat Labelled diagram wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables and scientific calculators is allowed.***
7) ***Assume suitable data if necessary.***

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

a) Give any two examples of plasmids used for creation of super bug.

b) What do you mean by in-situ bioremediation.

c) Draw structure of napthalene.

d) Give two examples of cellulose degrading micro organisms.

e) What is the advantage of using biomass as fuel source?

f) Give two examples of micro organisms used for industrial alcohol production.

Q2) Attempt following :

a) Explain the isolation and manipulation of eukaryotic cellulose genes. **[6]**

b) Explain the important methods involved in microbial degration of Xenobiotics. **[4]**

P.T.O.

Q3) Attempt following :

a) Explain genetic engineering of 2 mobilis for utilization of different carbon sources for production of ethanol. **[6]**

b) Describe silage production & it's advantages. **[4]**

Q4) Attempt following :

a) Explain modulation of yeast transcription for improvization of alcohol production. **[6]**

b) Explain Napthalene biodegradation pathway. **[4]**

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

a) Advantages of bioremediation.

b) Degradation of lignin.

c) Development of Xenobiotic degrading bacteria by using suitable example.

x x x

Total No. of Questions : 5]

SEAT No. :

PA-3281

[Total No. of Pages : 2

[5913]-36
M.Sc. - II
MICROBIOLOGY
MBET 237 : Microbial Virus Technology
(2019 Pattern) (Semester - III) (Credit System) (Revised)

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Draw neat Labelled diagrams wherever necessary.***
5) ***Figures to the right side indicate full marks.***
6) ***Use of logarithmic tables and scientific calculators is allowed.***
7) ***Assume suitable data if necessary.***

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

a) Define lytic cycle.

b) Enlist two examples of algal Viruses.

c) What is EoP.

d) Define latent period in one step growth curve.

e) What are mycoviruses.

f) Enlist different methods for isolation of Bacteriophages from sewage treatment plant.

Q2) Attempt the following :

a) Describe the different methods for isolation of bacteriophages from river sample. **[6]**

b) Enlist different characterization techniques for mycoviruses & Explain one in detail. **[4]**

P.T.O.

Q3) Attempt the following :

a) Explain one step growth curve of bacteriophage in details. **[6]**

b) Explain in detail genetic basis of lysogenic cycle of bacteriophage. **[4]**

Q4) Attempt the following :

a) Write in detail about occurrence & taxonomy of mycroviruses. **[6]**

b) Describe phage lysin therapy in detail. **[4]**

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

a) Mycroviruses.

b) Bacteriophages as biocontrol agent in Poultry.

c) Phage typing.

x x x

Total No. of Questions : 7]

SEAT No. : ____

PA-3282

[Total No. of Pages : 2

[5913] - 41

S.Y. M.Sc.

MICROBIOLOGY

MBCT 241 : Pharmaceutical Microbiology

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

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

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Q.2 to Q.7 carry equal marks.***
4) ***Draw neat labelled diagram wherever necessary.***
5) ***Figures to the right indicates full marks.***
6) ***Use of logarithmic tables and scientific calculator is allowed.***
7) ***Assume suitable data if necessary.***

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

a) What is the objective of drug Metabolism?

b) What is the advantage to design a drug with a very rapid rate of Metabolism?

c) Briefly explain two examples of non-renal mode of excretion of drugs.

d) Explain the term Hits.

e) Explain briefly effective dose - 50 (ED_{50}) of a compound.

f) Give two examples of lead compounds derived from plant sources.

P.T.O.

Q2) Attempt the following :

a) Explain different Methodologies in rational drug discovery, explain any one in detail. **[7]**

b) What is the importance of GMP in pharmaceutical industry. **[5]**

Q3) Attempt the following :

a) Describe in brief the purpose and procedures for acute toxicity studies. **[7]**

b) Justify-Blood-brain barrier must be considered when designing drugs to target the brain. **[5]**

Q4) Attempt the following :

a) Compare between structure-based and ligand-based drug design approach. **[7]**

b) What is drug absorption? Explain the first-pass effect in detail. **[5]**

Q5) Attempt the following :

a) Explain drug biotransformation reactions. **[7]**

b) Compare objectives and outcomes of Phase I and Phase II clinical trials. **[5]**

Q6) Attempt the following :

a) Explain with examples classification of drugs based on therapeutic classes. **[7]**

b) Distinguish between parenteral and enteral routes of drug administration. **[5]**

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

a) Objectives and guidelines of CLSI.

b) Molecular docking in drug design.

c) High throughput screening.

Total No. of Questions : 7]

SEAT No. :

PA-3283

[Total No. of Pages : 2

[5913]-42

M.Sc. (Microbiology)

MBCT-242 : MICROBIAL TECHNOLOGY

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

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any five questions from Q.2 to Q.7.***
3) ***Questions 2 to 7 carry equal marks.***
4) ***Draw neat diagrams wherever necessary.***
5) ***Figures to the right side indicate full marks.***
6) ***Use of logarithmic tables / scientific calculator is allowed.***
7) ***Assume suitable data if necessary.***

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

a) Draw Rushton turbine impeller.

b) What are Newtonian fluids?

c) Define biosensor and enlist their different types.

d) Define downstream processing.

e) What is aeration number?

f) Define IPR.

Q2) a) Explain the design and working of airlift bioreactor. **[7]**

b) Describe the various flow patterns in a bioreactor. **[5]**

Q3) a) Describe the solid state fermentation process for Chitinase enzyme. **[7]**

b) Explain the concept of ISO certification. **[5]**

P.T.O.

Q4) a) How fungi can be used as a biocontrol agent? **[7]**

b) In a mechanically agitated and aerated bioreactor saturated Do concentration is 100m M/L/H while the current Do concentration value is 10m M/L/H. What will be the impact on overall OTR at present? **[5]**

Q5) a) What are impellers and what are their roles in stirred tank reactors. **[7]**

b) Justify "In continuous culture specific growth rate is controlled by dilution rate. **[5]**

Q6) a) Explain the effect of broth rheology on oxygen transfer. **[7]**

b) What are the validation protocols in quality control? **[5]**

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

a) Describe the flow chart for Rifamycin production?

b) What are the effects of impeller blade number on kLa?

c) Describe any production using immobilization technique.

Total No. of Questions : 5]

SEAT No. :

PA-3284

[Total No. of Pages : 2

[5913]-43

M.Sc. (Microbiology)

MBET - 244 : QUALITY ASSURANCE AND VALIDATION IN PHARMACEUTICAL INDUSTRY AND DEVELOPMENT OF ANTI INFECTIVES

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

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

Instructions to the candidates:

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Q.2 to Q.5 carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Figures to the right side indicate full marks***
6) ***Use of logarithmic tables and scientific calculators is allowed.***
7) ***Assume suitable data, if necessary.***

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

a) What is GMP?

b) Define MIC.

c) What is the importance of teratogenicity testing?

d) What is the importance of determining MBC?

e) Give two examples of anti-viral agents.

f) What is the principle of disc diffusion method.

Q2) Attempt the following:

a) Enlist and explain good laboratory practices (GLP) in pharmaceutical industry. **[6]**

b) Explain the objectives of ISO certification related to quality assurance. **[4]**

P.T.O.

Q3) Attempt the following:

a) How sterility testing of pharmaceutical products is performed. Explain. **[6]**

b) Explain Ames test. Give its importance. **[4]**

Q4) Attempt the following:

a) Describe the Kirby Bauer method for susceptibility testing of antibacterial agent. **[6]**

b) What steps are taken to assure safety in microbiology laboratory. **[4]**

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

a) Rabbit pyrogen test.

b) Susceptibility testing for anti-fungal agents.

c) Carcinogenicity testing.

◆ ◆ ◆

Total No. of Questions : 5]

SEAT No. :

PA-3285

[Total No. of Pages : 2

[5913]-44
M.Sc.
MICROBIOLOGY
MBET-245 : ADVANCES IN MICROBIAL TECHNOLOGY
(2019 Pattern) (Semester - IV) (Credits system)

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) ***Draw neat diagrams wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables/scientific calculator is allowed.***
6) ***Assume suitable data if necessary.***
7) ***Q.2 to Q.5 carry equal marks.***

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

a) What do you mean by non-growth associated products?

b) Write expression for mixed growth associated product formation.

c) Define biomass yield.

d) Write growth expression of Monod's model.

e) What is meant by limiting substrak concentration?

f) Which cells produce insulin?

Q2) Attempt following.

a) Describe structured model of growth & product formation. **[6]**

b) Describe production of HIV subunit vaccine. **[4]**

Q3) Attempt following.

a) What are the effects of cell morphology on product yield? **[6]**

b) What are challenges in HIV vaccine production? **[4]**

P.T.O.

Q4) Attempt following.

a) Explain production of endonucleases with suitable example. **[6]**

b) Explain downstream processing of monoclonal antibody production. **[4]**

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

a) Advantages of animal cell culture for biopharmacentical product production.

b) Effect of pellet formation on aeration.

c) Large scale production of monoclonal antibodies using immobilized cell system.

Total No. Of Questions : 5]

SEAT No. :

PA-3286

[Total No. Of Pages : 2

[5913]-45

M.Sc. (Microbiology)

MBET-246 - Industrial Waste Water Treatment & Industrial Production Of Vaccine

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

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

Instructions to the candidates :

1) ***Q. No.1 is compulsory.***
2) ***Solve any Three questions from Q.2 to Q.5.***
3) ***Q - 2 to Q - 5 carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Figures to the right side indicate full marks.***
6) ***Use of logarithmic tables and scientific calculators is allowed.***
7) ***Assume suitable data if necessary.***

Q1) **Solve <u>any Five</u> of the following**: **[5]**

a) Define - Hydraulic retention time.

b) Write two examples of first generation vaccines.

c) What is the role of excipients in vaccine production?

d) What is the role of grit chamber in waste water treatment?

e) Give two examples of Preservatives used in vaccine production.

f) What will be the sludge volume index (SVI) if 100ml of sludge collected in 30minutes on drying weight 800mg?

Q2) **Attempt the following:**

a) Describe primary, secondary & tertiary treatment of waste water & explain one in detail. **[6]**

b) How is colour removed from the effluent of paper industry. **[4]**

P.T.O.

Q3) **Attempt the following:**

a) Explain the role of adjuvants in vaccine production & explain the concept of anti - idiotype vaccines. **[6]**

b) Justify - modern vaccines are more applicable than conventional vaccines. **[4]**

Q4) **Attempt the following:**

a) Comment on recombinant vaccines in detail. **[6]**

b) The aeration tank influent BOD is 145mg/L, and the aeration tank influent flow rate is 1.6MG-D. What is the F/M ratio if the MLVSS is 2300mg/L & the aeration tank volume is 1.8MG? **[4]**

Q5) **Write a notes on <u>any Two</u>** : **[10]**

a) Characteristics & treatment methods of effluent of dairy industry.

b) Chemical methods of disinfection in waste water treatment.

c) Role of vaccines in prophylaxis of various diseases.

Total No. of Questions : 5]

SEAT No. :

PA-3287

[Total No. of Pages : 2

[5913]-46
M.Sc. (MICROBIOLOGY)
MBET-247 : Bioethics, Biosafety, Quality Control and Quality Assurance
(2019 Pattern) (Semester - IV) (Credit System)

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

Instructions to the candidates :

1) ***Q.1 is compulsory.***
2) ***Solve any three questions from Q.2 to Q.5.***
3) ***Questions 2 to 5 carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logarithmic tables and scientific calculators is allowed.***
7) ***Assume suitable data if necessary.***

Q1) **Solve <u>any Five</u> of the following** : **[5]**

a) Define good manufacturing practices (GMP).

b) Give any two examples of pathogens belonging to biorisk group 2.

c) What do you mean by the term non-maleficence?

d) Define validation.

e) Which international standard (ISO) gives guidelines related to GMP and GLP?

f) Which regulatory body in India is involved in formulating standards for manufactured goods?

Q2) **Attempt the following:**

a) Describe in brief the roles of the following regulatory bodies:
i) GEAC ii) NABL **[6]**

P.T.O.

b) A 25 years old healthy male dies in a fatal road traffic accident; he has previously authorised his organ donations. There are three eligible patients requiring organ donation as below:

Case 1: 10 years old male with multi-organ failure and brain death.

Case 2: 75 years old female with extreme dementia and end-stage renal failure.

Case 3: 35 years young entrepreneur with acute renal failure.

Based on ethics, which patient will be the most likely recepient of the organ from the dead person. **[4]**

Q3) **Attempt the following:**

a) Explain the ethical principle of veracity with a suitable example. **[6]**

b) Justify: Quality of raw materials Affects the quality of finished products. **[4]**

Q4) **Attempt the following:**

a) Discuss the role of Quality assurance in the preparation of SOPs. **[6]**

b) Give the significance of biosafety with respect to misuse of genetically modified organisms. **[4]**

Q5) **Write short notes on <u>any Two</u> of the following** : **[10]**

a) Role of CPCB in air Quality Monitoring.

b) Laboratory designations using biosafety levels and biocontainment practices.

c) Salient provisions of the Biodiversity Act 2002 (India).

Total No. of Questions : 8]

SEAT No. :

PA-3536

[Total No. of Pages : 2

[5913]-51

M.Sc. (Part - II)

MICROBIOLOGY

MB - 802 : MOLECULAR BIOLOGY - II

(2013 Pattern) (Semester - IV) (Credit System) (70402)

Time : 3 Hours] ***[Max. Marks : 50***

Instructions to the candidates:

1) ***Attempt any three questions from Q.1 to Q.4.***
2) ***Attempt any two questions from Q.5 to Q.8.***
3) ***All questions carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Use of log tables scientific calculators is allowed.***
6) ***Assume suitable data, if necessary.***
7) ***Figures to the right side indicate full marks.***

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

a) Explain the principle of Maxam - Gilbert method of gene sequencing.

b) What are SNPs? How are they related to diseases?

c) Explain gene imprinting.

Q2) Attempt any two of the following: **[10]**

a) Give a flow chart of making cDNA library.

b) What are expression vectors? Explain any one use of expression vector. in gene technology.

c) What is electroporation? Explain its protocol in gene transfer to host.

Q3) Attempt any two of the following: **[10]**

a) Explain the role of RDT in the synthesis of ascorbic acid.

b) Give a protocol for making 'gum' using R.D.T.

c) How RDT is used in the production of novel antibiotic. Explain with a suitable example.

P.T.O.

Q4) Attempt any two of the following: **[10]**

a) Explain with suitable example, the mechanism involved in forming many proteins from one gene.

b) Explain protocol of screening of genomic library by DNA hybridization method.

c) Describe any one unconventional bacterial system for production of high quality protein drug.

Q5) Attempt any two of the following: **[10]**

a) What are the advantages of using transgenic plants?

b) What are the applications of genetically engineered microorganisms in medicine?

c) Comment on ethical and social issues related to use of GEMOs.

Q6) Attempt any two of the following: **[10]**

a) What is silage? How is silage produced using microbes.

b) Justify: multiple plasmids are required in the degradation of xenobiotic compounds.

c) Give a flow chart for the production of alcohol from starch using GEMO.

Q7) Attempt any two of the following: **[10]**

a) Give the protocol of gene annotation.

b) State the findings of yeast genome project.

c) Comment on: Drosophila genome project.

Q8) Attempt any two of the following: **[10]**

a) Comment on: gene therapy.

b) What is bioremediation? State the necessity of engineered microbes in bioremediation.

c) What are the applications of HGP?

◆ ◆ ◆