Total No. of Questions : 8]

SEAT No. :

P2939

[Total No. of Pages : 2

[5534]-101
M.Sc. - I
MICROBIOLOGY
MB-501 : Microbial Diversity and Taxonomy
(2013 Pattern) (Semester - I)

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

Instructions to the candidates:

1) ***Attempt any five questions.***
2) ***Attempt any 3 questions from Q.1 to Q.4.***
3) ***Attempt any 2 questions from Q.5 to Q.8.***
4) ***Figures to the right indicate full marks.***
5) ***Draw neat diagrams wherever necessary.***
6) ***All questions carry equal marks.***
7) ***Use of the logarithmic electronic pocket calculator is allowed.***
8) ***Assume suitable data, if necessary.***

Q1) Attempt any two of the following :

a) Write a note on molecular clock. **[5]**

b) What is species in eukaryotes? **[5]**

c) Elaborate concept of Speciation in sexual organisms. **[5]**

Q2) Attempt any two of the following :

a) Following data is obtained from soil sample. Find out the Simpson index. **[5]**

Sr.No.	Types of colories	No. of colories
01	Mucoid	34
02	Pigmented	58
03	Convex	45

b) Write a note on measurement of microbial diversity. **[5]**

c) Comment on expanse of microbial diversity. **[5]**

P.T.O.

Q3) Attempt any two of following :

a) Write note on 5-Kingdom classification system. **[5]**

b) Comment on phenetic approach in determinative bacteriology. **[5]**

c) Write note on phylogenic approach in systematic bacteriology. **[5]**

Q4) Attempt any two of the following :

a) Discuss the concept of evolutionary r and k selection. **[5]**

b) Give the significance of Shannon diversity index. **[5]**

c) Write note on polyphasic approach in bacterial taxonamy. **[5]**

Q5) Attempt any two of the following :

a) Describe the salient features of Basidiomycetes. **[5]**

b) Justify : "Morphological characterization is adequate for fungal classification upto class level". **[5]**

c) Give outline of classification of fungi. **[5]**

Q6) Attempt any two of the following :

a) Elaborate the concept of 'unculturable' bacterial diversity. **[5]**

b) Write note on strategies for culture of 'unculturable' bacteria. **[5]**

c) Write note on metagenome analysis. **[5]**

Q7) Attempt any two of the following :

a) Explain concept of neutral evolution with example. **[5]**

b) Give significance of stability of diversity. **[5]**

c) Explain evolution of rates of mutations. **[5]**

Q8) Attempt any two of the following :

a) Justify : "Gel concentration regulates the mobility of test molecule during electrophoresis". **[5]**

b) Write note on whole genome shotgun sequencing. **[5]**

c) Explain challenges in gene sequencing. **[5]**

Total No. of Questions :8]

SEAT No. :

P2940

[Total No. of Pages : 4

[5534]-102
M.Sc. (I)
MICROBIOLOGY
MB:502-Quantitative Biology
(2013 Pattern) (Semester-I)(Credit System)

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

Instructions to the candidates:

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

Q1) Attempt any two of the following.

a) The following data relate to original phosphorus and estimated plant availabe phosphorus (PPM) in 10 different soils at 25°C. Obtain the correlation coefficient between organic phosphorus and plant available phosphorus. Comment on it. **[5]**

Organic Phosphorus	52	23	19	34	24	65	44	31	29	58
Plant available Phosphorus	64	60	71	54	77	81	93	93	51	76

b) The number of pods per plant of a pulse are given below. Calculate the pearson's coefficient of skewness. **[5]**

Number of pods	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Number of pods	6	12	22	48	56	32	18	6

P.T.O.

c) Obtain mean, mode and median for the below data, 4, 9, 11, 12, 17, 5, 8, 12, 14. **[5]**

Q2) Attempt any two of the following.

a) The oxygen consumption of fishes before and after exposure to dichlorvos were recorded and the following data sets were obtained. State whether such exposure had any significant effect on the oxygen consumption using paired t-test. Use 5% level of significance. **[5]**

Fish Number	1	2	3	4	5	6	7	8	9	10
O_2Consumption before exposure	5.0	4.8	4.9	4.8	5.2	5.1	5.0	5.2	4.7	4.9
O2 Consumption after exposure	4.9	4.7	4.8	4.8	4.9	4.9	4.8	5.0	4.6	4.8

b) Write short note on, one and two tailed test. **[5]**

c) A drug is administered to 10 anemic patients and increments in their hemoglobin level is as follows, 6 3 -2 4 -3 4 6 0 0 2 is it reasonable to conclude that drug increases the hemoglobin level? Apply 5% level of significance . **[5]**

Q3) Attempt any two of the following.

a) In an experiment on cattle immunization for tuberculosis, following results were obtained. Test whether immunizaton protects the cattle against tuberculosis. **[5]**

	Affected	Not affected
Immunized	12	26
Not immunized	16	06

b) From the given data related to the weight of boys, test whether the group 1 is identical to group 2. **[5]**

Group 1	19	18	21	17	20	21	19	
Group 2	25	22	24	20	23	24	23	22

(Critical value of U, at 5% LOS = 10)

c) Grain yield of paddy field from 2 tillers is, **[5]**

Tiller 1 : 2.75, 2.35, 2.66, 2.90, 2.68, 2.95, 2.83, 3, 2.45, 2.45, 2.

Tiller 2 : 2.36, 2.09, 2.66, 2.55, 2.72, 2.60, 2.44, 2.74, 2.15, 2.20, 1.09.

Apply wilcoxan sign test at 5% LOS, level of significance.

Q4) Attempt any two of the following.

a) Calculate arithmatic and Geometric mean for below data, **[5]**

4, 5, 5, 6, 7, 8

b) Random sample of 10 boys had below IQ score. **[5]**

70, 120, 110, 101, 88, 83, 95, 98, 107, 100.

Does this data support the assumption that.

c) A cross is made between guinea pigs with black male and grey females off-springs obtained were so black and 70 grey. Calculate the chi square and intepret the result. **[5]**

	Black	Grey
Observed Frequency	50	70
Expected Frequency	60	60

Q5) Attempt any two of following.

a) From the following frequency distribution of weight of 50 students, draw less ogive curve. **[5]**

Weight in kg	35-40	40-45	45-50	50-55	55-60	60-65
No.of students	5	12	15	10	8	3

b) Explain stratified random sampling with example. **[5]**

c) Draw histogram for the below data : **[5]**

Classes	Frequency
0-10	4
10-20	10
20-30	24
30-40	17
40-60	10
60-70	3

Q6) Attempt any two of the following.

a) Person A and B appeared for an interview for 2 vacancies, Probability of selection of A is $\frac{1}{3}$ and B is $\frac{4}{5}$ respectively. **[5]**

Find the probability that,

i) A and B both are selected

ii) Only A is selected

b) A bag contains 5 white and 3 black balls. Two balls are drawn at random one after the other without replacement. Find the probability that both balls are white. **[5]**

c) A population of bacteria has 80% antibiotic producers. If 5 bacteria are selected at random, what is the probability that 3 of them are antibiotic, producer? **[5]**

Q7) Attempt any two of the following.

a) Four different drugs have been developed for the cure of a certain disease. The drugs were tried on patients of 3 different age groups. The number of cases of recovery from disease per 100 patients is, **[5]**

Age group	Drug			
	A	B	C	D
G1	24	20	24	17
G2	20	25	30	9
G3	13	28	31	13

perform ANOVA and interpret resulty 3

b) Explain concept of factorial design. **[5]**

c) What are the basic measurements in epidemiology for mortality and morbidity? **[5]**

Q8) Attempt any two of the following.

a) What is hardy weinberg principle? Give its significance with example. **[5]**

b) Explain in brief exponential growth model. **[5]**

c) Explain deterministic Vs stochastic model. **[5]**

Total No. of Questions :8]

SEAT No. :

P2941

[Total No. of Pages :2

[5534]-103
M.Sc. II
MICROBIOLOGY
MB-503: Cell Organisation and Biochemistry
(2013 Pattern) (Semester - I)

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

Instructions to the candidates:

1) ***Q1 to Q3 are compulsory (core - credits)***
2) ***Attempt at least two from Q.4 to Q.8(Non-core)***
3) ***All questions carry equal marks.***
4) ***Draw neat labelled diagram wherever necessary.***
5) ***Use of logarithmic tables and scientific calculator is allowed.***
6) ***Assume suitable data if necessary.***
7) ***Figures to the right indicate full marks.***

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

a) Explain the "z" form of DNA.

b) What is peptide linkage? Explain partial double bond nature of peptide linkage.

c) In what order will the Following aminoacid elute from a Dowex –50 Column at pH3.2 alanine (pI=6.02), arginine (pI=10.76), glutamic acid (pI=3.2), serine (pI=5.68) and tryptophan (pI=5.88)?

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

a) Write short Note on :- Apoptosis

b) Explain the role of signal Recognition particle in transfer of protein to the E.R. membrane.

c) Describe the inter mediate filaments structure and functions.

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

a) Write short note on :- organizers in drosophila.

b) Explain the process of commitment during developmental process.

c) Explain the gastrulation process in drosophila.

P.T.O.

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

a) Explain quorum sensing in Gram Negative Bacteria.

b) Explain applications of Biofilm in pathogenises.

c) Explain molecular mechanism of quorum sensing in Myxobacteria.

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

a) Explain charge transfer complex in molecules.

b) Explain addition reaction with examples.

c) Explain metal-ion catalysis of enzyme.

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

a) Explain Anomers and Epimers of Glucose.

b) Describe the classification and Nomenclature of fattyacid

c) Justify:-Membrane lipids comprise phospholipids.

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

a) Draw structure of Riboflavin and explain its biochemical mechanism in metabolism.

b) Describe structure and functions of vitamin K.

c) Explain biochemical role of copper and molybdenum in enzymic reactions.

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

a) Explain structure and function of male sex Hormone. .

b) Justify:- Pituitarygland is the master gland.

c) Write short note on: Hormones of pancreas.

Total No. of Questions :8]

SEAT No. :

P2942

[Total No. of Pages : 2

[5534]-201
M. Sc. - I
MICROBIOLOGY
MB - 601 : Instrumentation & Molecular Biophysics
(2013 Pattern) (Semester - II) (Credit System)

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

Instructions to the candidates:

1) ***Attempt any three questions from 1 to 4 (core credits).***
2) ***Attempt any two questions from 5 to 8 (non-core credit).***
3) ***All questions carry equal marks.***
4) ***Draw neat labelled daigrams wherever necessary.***
5) ***Figures to the right indicates full marks.***
6) ***Use of log tables/graph papers/scientific calculators is allowed.***
7) ***Assume suitable data if necessary.***

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

a) Explain significance of van deemter equation in chromatography.

b) Explain any two applications of affinity chromatography.

c) A macromolecule with $\bar{V}$ partial specific volume is 0.74 $cm^{3/g}$ is redimented in water at 20ºC S is 14.2×10^{-13}, D is 5.82×10^{-6}, R is 8.3100×10^{7} calculate its mole cular weight.

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

a) Enlist different methods of ionization in Mass Spectroscopy and explain any one method in detail.

b) Diagrammatically represent circular dichroism Instrument and Explain any 2 applications of C.D.

c) Write short note on : FRET (Fluorescence Resonance Energy Transfer)

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

a) Explain Direct Lattice and Reciprocal Lattice seen in x-ray crystallography

b) Explain Chemical Shift and Intensity with respect to NMR

c) Comment on : NOESY

P.T.O.

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

a) Explain electron density map obtained in x-ray crystallography.

b) Justify : Isoelectric foccusing is used in purification of amphoteric molecules like proteins

c) Enlist detectors used in HPLC and Explain the working of any two detectors.

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

a) With suitable examle explain tertiary structure of protein.

b) Explain secondary structures of proteins.

c) Write short note on : Ramchandran plot.

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

a) Comment on : OMIM database

b) Explain steps involved in BLAST

c) Explain Homology modelling for protein structure prediction.

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

a) Explain characteristics of Nano particles

b) What are Biogenic Nano particles? Explain synthesis of Nanoparticles by using any one micro organism.

c) Explain the significance of SEM in Nanobiotechnology

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

a) Explain partial double bond nature of peptide bond.

b) Explain pair wise sequence alignment

c) Explain Zeta Analysis to Characterize Nanoparticles.

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Total No. of Questions : 8]

SEAT No. :

P2943

[Total No. of Pages : 2

[5534]-202
M.Sc. - I
MICROBIOLOGY
MB-602 : Virology
(2013 Pattern) (Semester - II) (Credit System)

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

Instructions to the candidates:

1) ***Attempt any three questions from 1 to 4. (Core credits)***
2) ***Attempt any two questions from 5 to 8. (Non - core credits)***
3) ***All questions carry equal marks.***
4) ***Draw neat diagrams wherever necessary.***
5) ***Figures to the right indicate full marks.***

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

a) Write short note on Prions.

b) Describe the structure of non-enveloped viruses with any one example.

c) Explain genome packaging in replication of viruses.

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

a) Describe the hemagglutination test for viral diagnosis.

b) Explain pock counting method of viral quantification.

c) Briefly describe the secondary cell culture method for cultivation of viruses.

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

a) Discuss classification of viruses based on type of disease.

b) Explain the progression of ICTV classification system over a time period.

c) State the ICTV principles of nomenclature of viruses.

P.T.O.

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

a) Describe various symmetries of viral capsid.

b) Write short note on hemagglutination inhibition test.

c) Give current status of ICTV classification.

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

a) Describe morphology and genome organization of T odd phages.

b) Explain life cycle of Phi X 174 phage.

c) Elaborate phage therapy of bacterial diseases with suitable example.

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

a) Explain the DNA vaccines as viral therapeutics.

b) Elaborate the concept of anti-idiotype vaccines.

c) Describe the mechanism of resistance of anti-HIV agents.

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

a) Explain control measures and eradication of small pox disease.

b) Write short note on pathophysiology of mad cow disease.

c) 'HIV is an oncogenic virus'; Justify.

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

a) Explain the histological and cytological changes in virus infected plants.

b) Describe the antigen-based methods for detection of plant viruses.

c) Explain the transmission of plant viruses through vectors.

Total No. of Questions : 8]

SEAT No. :

P2944

[Total No. of Pages : 2

[5534]-203
M.Sc. - I
MICROBIOLOGY
MB 603 : Microbial Metabolism
(2013 Pattern) (Semester - II) (Credit System)

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

Instructions to the candidates:

1) ***Q. 1 to Q. 3 are compulsory.***
2) ***Attempt at least two from Q .4 to Q. 8.***
3) ***All questions carry equal marks.***
4) ***Draw neat-labelled diagrams wherever necessary.***
5) ***Use of logarithmic tables and scientific calculators are allowed .***
6) ***Assume suitable data, if necessary.***
7) ***Figures to the night indicate full marks.***

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

a) Derive MM equation for competitive inhibition of enzyme.

b) Explain the KNF model of allosteric enzyme.

c) Enlist the parameters used for preparing purification chart. Give the significance of each parameter.

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

a) Explain the concept of free energy and entropy.

b) The adenylote pool in a culture of lymphosarcoma cells was found to consist of 10^{-3} M ATP, 3×10^{-4} M ADP, & 10^{-4} M AMP. Calculate the "energy charge" of the cells.

c) Write a note on high energy compounds.

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

a) Draw neat labelled diagram of mitochondrial ATPase.

b) Enlist the inhibitors and uncouplers of ETC and write its significance.

c) Describe the energy generation pathway in methanogens.

P.T.O.

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

a) Write a note an Ionophores.

b) What are model membranes? Write its significance.

c) Schematically represent architecture of biological membrane.

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

a) Describe the reactions involved in assimilation of ammonium ions.

b) Outline the pathway of histidine biosynthesis.

c) Describe the mechanisms adapted by various organisms to prevent oxidative damage to nitrogenase complex.

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

a) Describe the CO_2 fixation as occuring in CAM plants.

b) Diagramatically illustrate 'z-scheme' as occuring in photosynthetic organisms.

c) Write a note on photorespiration.

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

a) Write a note on regulation of Calvin cycle.

b) Describe the steps involved in synthesis of peptidoglycan.

c) Illustrate the process of transport of solute across chloroplast membrane.

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

a) What are signal molecules? Explain giving suitable examples.

b) Explain schematically biosynthesis of cardiolipin.

c) Discuss the role of eicosanoids as signal molecules.

■ ■ ■

Total No. of Questions : 8]

SEAT No. :

P2945

[Total No. of Pages : 2

[5534]-301
M.Sc. - II
MICROBIOLOGY
MB-701 : Immunology
(2013 Pattern) (Semester - III) (Credit System)

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

Instructions to the candidates:

1) ***Attempt any three questions from 1 to 4 (core credits).***
2) ***Attempt any two questions from 5 to 8 (Non core credits).***
3) ***All questions carry equal marks.***
4) ***Draw neat labelled diagrams wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of the logarithmic tables & scientific calculators is allowed.***

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

a) Explain the structure of B-cell receptor.

b) Describe the role of adhesion molecules in immune activation.

c) Describe JAK / STAT signal transduction pathway.

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

a) Explain the mechanisms of tolerance induction by giving experimental evidences.

b) Diagrammatically explain regulation of classical complement pathway.

c) Explain the role of Antigen in regulation of immune response.

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

a) What are primary cell cultures and cell lines?

b) Describe ELISPOT assay and give its application.

c) Describe the use of animal models in studying AIDS.

P.T.O.

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

a) Describe the role of Toll like receptors in innate immunity.

b) Describe Idiotypic network theory and its experimental evidence.

c) Describe functional assays for phagocytes.

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

a) Describe escape mechanisms of tumors from host defense.

b) Differentiate between tumor specific antigens and tumor associated antigens.

c) Describe tumor vaccine therapy with examples.

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

a) Describe the pathophysiology in Salmonella infections.

b) How does the host immune system respond to HIV infections.

c) Describe the immunotherapeutic approaches to bacterial infections.

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

a) What are complement deficiencies and how are they diagnosed?

b) Explain the mechanisms of symptoms development in Myasthenia gravis.

c) Describe immunotherapeutic approaches to systemic Lupus Erythomatosus (SLE).

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

a) Describe the evolution of cellular immune defenses in invertebrates.

b) Explain the complexity of immune cells in different species of vertebrates.

c) Describe the diversity of humoral immunity components in different species of vertebrates.

Total No. of Questions :8]

SEAT No. :

P2946

[Total No. of Pages : 2

[5534]-302
M.Sc.
MICROBIOLOGY
MB:702-Molecular Biology-I
(2013 Pattern) (Semester-III)(Credit System)

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

Instructions to the candidates:

1) ***Attempt any three questions from 1 to 4 (core credits)***
2) ***Attempt any two questions from 5 to 8 (Non-core credits)***
3) ***All questions carry equal marks.***
4) ***Draw neat, labelled diagrams wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of logtables/scientific calculator is allowed.***
7) ***Assume suitable data if necessary.***

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

a) Explain-Epitope tagging as a tool in molecular biology.

b) Give applications of phage display technique with examples.

c) What is RFLP? Give its significance in diagrosis

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

a) Explain the mechanism of repression of lac operon.

b) Explain regulation of 'ara' operon.

c) How is attenuation detteated in tr'p operon?

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

a) How is m RNA protected in eukaryotes after its synthesis?

b) Diagrammatically illustrate t RNA splicing.

c) Explain the role of RNA interference in gene silencing.

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

a) Explain filtter binding assay.

b) Explain sigma factor switching in T_7 infection.

c) Explain design of probes and give applications of probes.

P.T.O.

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

a) Diagrammatically illustrate mu transposition.

b) Elaborate Ty elements in yeast.

c) Give structural details of retrotransposon.

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

a) Explain metabolomics with suitable examples.

b) Explain any one method used in analysis of protein structure.

c) Explain iso electric focussing and give its importance in characterization of proteins.

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

a) Give applications of PCR with suitable example.

b) Explain real time PCR technique.

c) Explian nested PCR technique.

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

a) Give structural details of composite transposon.

b) Explain MALDI.

c) What is DNA micro array technique? Give its applications.

Total No. of Questions :8]

SEAT No. :

P2947

[Total No. of Pages :2

[5534]-303
M.Sc.
MICROBIOLOGY
MB-703: Industrial Waste Water Treatment
(2013 Pattern) (Semester - III)

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

Instructions to the candidates:

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

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

a) Enlist different methods for measurement of organic matter content waste water. Explain any one in brief.

b) State principle and explain protocol of COD estimation of industrial waste water.

c) Give significance of indicator organisms in characterizing waste water.

Q2) Attempt any two: **[10]**

a) Describe in brief various types of screening devices used in pretreatment of industrial waste.

b) Describe how flow equalization is achieved in waste water treatment.

c) Describe the various floatation techniques.

Q3) Attempt any two: **[10]**

a) Explain with the help of diagram working of activated sludge treatment plant.

b) Give characteristics of an ideal disinfectant used in wastewater treatment.

c) Justify adsorption is an important tertiary treatment process.

P.T.O.

Q4) Attempt any two: **[10]**

a) Schematically represent the layout of typical industrial waste water treatment plant.

b) Describe various methods used for sedimentation of waste water.

c) Enlist various anaerobic processes of waste water treatment. Describe any one in brief.

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

a) Diagrammatically explain layout of ETP for dairy industry.

b) How is colour removed from the effluent of paper industry?

c) Comment on secondary treatment of effluent from food processing industry.

Q6) Attempt any two: **[10]**

a) What is EIA? Explain the significance of EIA.

b) Explain the strategy used to determine most significant impacts.

c) Justify "Baseline characterization is important step in EIA"?

Q7) Attempt any two: **[10]**

a) Briefly explain different methods of fouling control in MBRS.

b) Explain working of RBC with the help of suitable diagram.

c) Explain the working of MBBR.

Q8) Answer any two: **[10]**

a) Give characteristics of effluent of dye industry.

b) Describe advantages and disadvantages of SAFF.

c) Write a note on phases of EIA studies.

Total No. of Questions :8]

SEAT No. :

P2948

[Total No. of Pages : 2

[5534]-401
M. Sc. - II
MICROBIOLOGY
MB - 801 : Pharmaceutical and Medical Microbiology
(2013 Pattern) (Semester - IV) (Credit System)

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 diagram wherever necessary.***
5) ***Figures to the right indicate full marks.***

Q1) Attempt any two. **[10]**

a) Describe various steps in lead optimization?

b) What is the purpose of toxicity testing? Descibe procedure for acute toxicity studies

c) State Ehrlich's postulate. With suitable example give its significance in present scenario.

Q2) Attempt any two. **[10]**

a) Describe the susceptibility testing of antifungal agents.

b) Describe gradient plate technique for susceptibility testing. Give its Advantages & Disadvantages.

c) What is the role of CLSI in development of antinfectives.

Q3) Attempt any two. **[10]**

a) Describe anchoring mechanism of pathogenic bacteria.

b) Describe in Vitro & In Vivo assay of tetanus toxin.

c) Write a note on pathogenicity Islands.

Q4) Attempt any two. **[10]**

a) Describe methods of characterization of bioactive molecules from natural sources.

b) Describe the role of phagocytosis in bacterial resistance to host defense.

c) Compare E- test & Kirby Bauer method in susceptibility testing.

P.T.O.

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

a) Enlist various methods to study mode of action of antiinfectives. Describe 'Direct Count' methods for evaluation of antiinfectives.

b) Enlist various drugs targetting cell wall biosynthesis. Illustrate the mechanism of action for any one.

c) With suitable example explain synergism to assess activity of antimicrobial compounds.

Q6) Attempt any two. **[10]**

a) Write a note on pyrogenicity testing of drug.

b) Describe good manufacturing practices for pharmaceutical industries.

c) Explain the objectives of ISO certification scheme related to quality assuarance.

Q7) Attempt any two. **[10]**

a) What is bioavailability of drugs? How it is determined.

b) What is targeted drug delivery? Explain with suitable example.

c) Describe the role of FDA as a regulatory authority in pharmaceutical industry.

Q8) Attempt any two. **[10]**

a) Explain the mechanism of resistance in MRSA.

b) Describe the investigational approaches for SARS.

c) Justify : Microorganisms are considered as weapon of biological war.

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Total No. of Questions : 8]

SEAT No. :

P2949

[Total No. of Pages : 2

[5534]-402
M.Sc. - II
MICROBIOLOGY
MB-802 : Molecular Biology - II
(2013 Pattern) (Semester - IV)

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) ***Neat diagrams must be drawn wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Use of the logarithmic tables & electronic pocket calculators is allowed.***
7) ***Assume suitable data, if necessary.***

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

a) Explain Sanger's sequencing method in detail.

b) Explain alternative gene expression with example.

c) What is epigenetics? Explain role and importance of epigenetics in gene expression.

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

a) What is protein engineering? Explain with example.

b) Explain structure and applications of expression vector.

c) Explain any two methods of gene transfer to host cell.

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

a) Explain RDT used in production of peptide antibodies.

b) Explain RDT used in polyhydroxy alkanoates.

c) Explain RDT used in L-cystine.

P.T.O.

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

a) Explain synthesis of tryptophan by using RDT.

b) Explain any one method for the preparation of CDNA library.

c) Explain production of many proteins from one gene with example.

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

a) Explain the social issues for genetically modified organisms.

b) Explain use of genetically modified animals in preparation and early detection of diseases.

c) Explain applications of gene therapy with example.

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

a) Explain any one degradative pathway used for degradation of xenobiotics.

b) Explain RDT used for production of alcohol from starch.

c) What is Silage? Explain silage production from cellulose.

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

a) Explain genome project of Drosophila.

b) Explain genome project of Plasmodium.

c) Explain genome project of Yeast.

Q8) Write short notes on any two of the following : **[10]**

a) Disadvantages of genetically modified plants.

b) Utilization of starch for silage production.

c) Comparative genomics.

Total No. of Questions : [8]

SEAT No. :

P2950

[Total No. of Pages : 2

[5534]-403
M.Sc. (Part - II)
MICROBIOLOGY
MB - 803 - Microbial Technology
(2013 Course) (Semester - IV)

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

Instructions to the candidates:

1) ***Attempt any three from Q.1 to Q.4***
2) ***Attempt any two from Q.5 to Q.8***
3) ***All questions carry equal marks.***
4) ***Dwaw neat labelled diagram whenever necessary.***
5) ***Figures to the right indicates full marks.***
6) ***Use of logarithmic tables, electronic pocket calculator is allowed.***
7) ***Assume suitable data, if necessary.***

Q1) Attempt any two. **[10]**

a) Explain mode of operation of fed batch fermentation process and state its advantages.

b) Describe Airlift bioreactor with help of a suitable diagram.

c) How power consumption and mass transfer coefficient parameters are affected due to impeller design in a stirred vessel.

Q2) Attempt any two. **[10]**

a) Explain effect of broth rheology on heat and oxygen tansfer in a fermenter.

b) Describe the determination of oxygen-transfer rates in aerated vessels by the sulphite oxidation technique.

c) What are biosensors? Describe various types of biosensors.

Q3) Attempt any two. **[10]**

a) Design a protocol for microbial chitinase production using a suitable microbe.

b) Explain different methods of cell immobilisation for microbial process.

c) Explain the process of patent filing in India for microbial process.

P.T.O.

Q4) Attempt any two. **[10]**

a) Discuss the concept of Newtonian and non-neotonian fluid.

b) Draw a neat labelled diagram CSTR.

c) Enlist various methods used for cell discruption. Explain any one method in detail.

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

a) Write a short note on microbial growth and growth non associated metabolities.

b) Describe the correlation between substrate concentration and microbial growth rate.

c) Explain how polysaccharide production affects the fermentation process.

Q6) Attempt any two. **[10]**

a) Describe biosensors based on Fungal cells.

b) Explain importance of Fungi in food industry.

c) Explain environmental applications of Fungi in brief.

Q7) Attempt any two. **[10]**

a) Explain production of erythropoietin.

b) Design a protocol for production of recombinant hepatitis B vaccine.

c) Explain production of recombinant vaccine for HIV.

Q8) Attempt any two. **[10]**

a) Discuss the validation protocol for quality control.

b) Write a note on ISO certification.

c) Write a protocol for process validation.

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