Total No. of Questions : 5]

SEAT No :

P1508

[Total No. of Pages :2

[5127]-11
M.Sc. -I
MICROBIOLOGY
MB-501: Microbial Diversity and Taxonomy
(2008 Pattern) (Semester-I)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Draw neat labelled diagrams wherever necessary.***
4) ***Use of logarithmic tables and scientific calculator is allowed.***
5) ***Assume suitable data if necessary.***

Q1) Attempt any two of the following: **[16]**

a) Compare and contrast between phenetic and phylogenetic approaches to bacterial classification.

b) Describe the newer approaches for exploring uncultured bacteria.

c) Explain the various measures and indices of microbial diversity.

Q2) Attempt any two of the following: **[16]**

a) Describe how the protein profiles are prepared and used in taxonomy.

b) What are universal primers? Explain how these are applied in microbial taxonomy and diversity.

c) Describe the role of clustering algorithm in the field of molecular evolution.

Q3) Attempt any two of the following: **[16]**

a) Enlist chronologically the methodological strategies for the identification of pure culture.

b) What is the significance of culture independent molecular methods? Describe the whole-genome shotgun technique.

c) Describe the role of sequence alignment in the study of molecular evolution and experimental biology.

P.T.O.

Q4) Write short notes on any four of the following: **[16]**

a) Significance of T-RFLP in bacterial diversity.

b) Transfer of extra chromosomal elements as a tool in taxonomy.

c) Role of flow-cytometry in bacterial taxonomy.

d) Compare FASTA and BLAST.

e) Metagenomic environmental libraries.

Q5) There is outbreak of diarrhea in your city. The patients respond to conventional antibiotics but the causative agent cannot be isolated from stool samples. Develop a methodology to establish the identity of the causative agent in such cases. **[16]**

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Total No. of Questions :5]

SEAT No. :

P1509

[Total No. of Pages :3

[5127] - 12
M.Sc. -I
MICROBIOLOGY
MB-502: Quantitative Biology
(2008 Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Draw neat-labeled diagrams wherever necessary.***
4) ***Figures to the right side indicate full marks.***
5) ***Use of statistical tables and scientific calculator is allowed.***
6) ***Assume suitable data if necessary.***

Q1) Attempt any two of the following: **[16]**

a) Calculate the variance, standard deviation and the coefficient of variation of the following series data:

Yeast Biomass Yield/liter of medium = 17.0, 19.1, 20.0, 20.7, 21.2, 22.7, 22.7, 23.1, 25.2, 26.6.

b) Describe the population models in biology?

c) Explain in detail Non parametric test.

Q2) Attempt any two of the following: **[16]**

a) The result of IQ test are given below. Find out whether there is any change in IQ after the training programme.

Candidate	1	2	3	4	5	6	7
IQ before training	112	120	116	125	131	132	129
IQ after training	120	124	118	129	136	136	125

P.T.O.

b) Explain the concept of stochastic model.

c) The following data relate to the expenditure of the family per month. Represent data by pie diagram.

Items of Expend.	Food	Rent	Clothing	Education	Transport	Miscellaneous
Amount in Rs.	4000	1500	1000	1000	1200	1300

Q3) Attempt any two of the following: **[16]**

a) Explain in detial survey design.

b) Calculate the probability of following:

What is the probability of getting a joker and ace from a pack of 54 cards?

A person is known to hit the target in 4 out of 5 shots. Whereas another person in known to hit the target in 3 out of 4 shots. find the probability of the target being hit at all when they both try.

c) A new drug candidate was administered to 450 persons out of a total 800 persons in a locality where epidemic was prevalent to test its efficacy against malaria. the results are given below in the table. Find out effectiveness of drug against disease.

	Infection	No infection
Drug	200	300
No Drug	250	50

Q4) Write short notes on any four of the following: **[16]**

a) Computer application in Systematics.

b) Kurtosis.

c) Distribution of Sample means.

d) Factorial design.

e) Normal Distribution.

Q5) Attempt any one of the following: **[16]**

a) Following is the data of Mean soil temperature and germination interval for wheat at 10 places are recorded below. Calculate the correlation and regression coefficient (b). Comment on your results.

Mean soil temp.	38	42	45	42	44	40	46	44	43	40
No. of days	21	29	27	27	19	18	19	31	29	33

b) The three unidentified yeast strains were grown in liquid medium at three different incubation temperatures. The wet biomass yield per liter is given below in table. Test whether wet biomass yield depends on strain type and incubation temperature using two factor analysis.

	Yeast strain type		
Incubation Temperature (^oC)	A	B	C
20	6	6	7
30	5	5	8
40	5	4	6

EEE

Total No. of Questions : 5]

SEAT No. :

P1510

[Total No. of Pages : 2

[5127]-13
M.Sc. - I
MICROBIOLOGY
MB - 503 : Cell Organization and Biochemistry
(2008 Pattern) (Semester - I)

Time : 3 Hours] *[Max. Marks : 80]*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of log tables, graph paper, non programmable-electronic pocket calculator is allowed.***
4) ***Assume suitable data if necessary***
5) ***Neat diagrams must be drawn wherever necessary.***

Q1) Attempt any two of the following: **[16]**

a) Compare and constrast between B and Z form of DNA.

b) Justify that: cell -cell signaling plays important role in lifecycle of Myxobacteria.

c) Explain with the help of suitable example the structure and function of fibrous proteins.

Q2) Attempt any two of the following: **[16]**

a) What are steroids? Explain their structure and function with suitable examples.

b) Explain mechanism of inhibition of cell wall synthesis by penicillin.

c) Explain the role of morphogen gradients in *Drosophilla*.

Q3) Attempt any two of the following **[16]**

a) Diagrammatically illustrate structure and function of endoplasmic reticulum.

b) Differentiate between pyranose and furanose form of glucose.

c) Draw labeled diagram of MTOC and comment on its function.

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P.T.O.

Q4) Write short note on any four of the following **[16]**

a) Biological buffers.

b) Prostaglandins.

c) Phases of eukaryotic cell cycle.

d) Enantiomers

e) Applications of biofilms.

Q5) Attempt the following: **[16]**

a) Explain why the absorption of UV light by double-stranded DNA increases (the hyperchromic effect) when the DNA is denatured.What is its application?

b) A group of peptides that influence nerve transmission in certain parts of the brain has been isolated from normal brain tissue. These peptides are known as opioids, because they bind to specific receptors that also bind opiate drugs, such as morphine and naloxone. Some researchers consider these peptides to be the brain's own painkillers.

Using the information below,determine the amino acid sequence of the opioid leucine enkephalin. Explain how your structure is consistent with each piece of information.

i) Complete hydrolysis by 6 M HCl at 110 -C followed by amino acid analysis indicated the presence of Gly,Leu, Phe, and Tyr, in a 2:1:1:1 molar ratio.

ii) Treatment of the peptide with 1-fluoro-2,4- dinitrobenzene followed by complete hydrolysis and chromatography indicated the presence of the 2, 4-dinitrophenyl derivative of tyrosine.No free tyrosine could be found.

iii) Complete digestion of the peptide with chymotrypsin followed by chromatography yielded free tyrosine and leucine, plus a tripeptide containing phe and Gly in a 1:2 ratio.

Total No. of Questions : 5]

SEAT No. :

P1511

[Total No. of Pages : 2

[5127]-21
M.Sc.-I
MICROBIOLOGY
MB - 601 : Instrumentation And Molecular Biophysics
(2008 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of log tables, non programmable-electronic pocket calculator is allowed.***
4) ***Assume suitable data if necessary.***
5) ***Neat diagrams must be drawn wherever necesssary.***

Q1) Attempt any two of the following: **[16]**

a) Explain any one method of fragmentation of molecule in Mass Spectroscopy.

b) Give the differences between Rate zonal and Isopycnic centrifugation.

c) State the biological applications of Affinity chromatography.

Q2) Attempt any two of the following: **[16]**

a) Explain the principle of IR spectroscopy.

b) Describe the instrumentation of X-ray Diffraction.

c) What are radioisotopes and describe their characteristics.

Q3) Attempt any two of the following: **[16]**

a) Diagrammatically explain the principle of GLC.

b) With a neat labeled diagram explain the instrumentation of Mass spectrometer.

c) With the help of a flowchart explain the set up of PAGE.

P.T.O.

Q4) Write short note on any four of the following: **[16]**

a) Physical and chemical properties of amino acids.

b) Chemical shift as NMR parameter.

c) Principle of GC-MS.

d) Neural network.

e) Cerenkov radiation.

Q5) Attempt the following: **[16]**

a) A solution of nucleotide base uracil, in a 1 cm cuvette, has an absorbance at λ_{max} (260 nm) of 0.65. Pure solvent in a matched quartz cuvette has an absorbance of 0.07. What is the molar concentration of uracil solution? Assume the molar absorption coefficient (ε) is 8.2 X $10^3 M^{-1}$ cm^{-1}.

b) In a chromatographic analysis of lemon oil a peak for Limonene has a retention time of 8.36 min with a baseline width of 0.96 min. γ-Terpinene elutes at 9.54 min with a baseline width of 0.64 min. What is the resolution between the two peaks?

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Total No. of Questions : 5]

SEAT No. :

P1512

[Total No. of Pages : 2

[5127]-22
M.Sc. - I
MICROBIOLOGY
MB - 602 :Evolution, Ecology and Environmental Microbiology
(2008 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks : 80]*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Draw neat labelled diagrams wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Use of logarithmic tables, electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

Q1) Attempt any one of the following: **[16]**

a) Describe in detail working of trickling filter with respect to process microbiology, process analysis and operational problems.

b) Explain r and k selection. Describe distinguishing characters of r and k strategy.

Q2) Attempt any two of the following: **[16]**

a) Explain disinfection with chlorine and dechlorination.

b) Explain bioremediation and phytoremediation.

c) Describe various antagonistic interactions in community using appropriate example.

Q3) Attempt any two of the following: **[16]**

a) Comment on molecular evolution and its role in origin of new genes and proteins.

b) Explain the structure of rhizosphere. Describe various interactions which are important in shaping rhizosphere community structure.

c) Describe the diversity of secondary metabolites and its significance.

P.T.O.

Q4) Write short notes on any four of the following: **[16]**

a) UASB process.

b) Neo Darwinism.

c) Disinfection with ultraviolet radiation.

d) Dairy industry waste water treatment process.

e) Mycorrhiza.

Q5) Municipal waste is to be treated with complete mix activated sludge process with recycle. The BOD_5 of influent to the reactor is 250mg/L with flowrate of 10000 m^3/d. The effluent BOD_5 should not be greater than 10mg/L. Assuming MLSS in aeration basin=3500mg/L, MLSS in clarifier sludge=12000mg/L, MCRT=10 days, Kinetic coefficients $k_d=0.06d^{-1}$ and Y=0.6. Determine the following: **[16]**

a) Hydraulic retention time.

b) F/M ratio.

c) The mass of sludge wasted daily.

Total No. of Questions :5]

SEAT No. :

P1513

[Total No. of Pages :2

[5127] - 23

M.Sc. -I

MICROBIOLOGY

MB-603: Microbial Metabolism

(2008 Pattern) (Semester - II)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Use of log tables, graph paper, non programmable-electronic pocket calculator is allowed.***
4) ***Assume suitable data if necessary.***
5) ***Neat diagrams must be drawn wherever necessary.***

Q1) Attempt any two of the following: **[16]**

a) Explain the terms passive-mediated, active transport and secondary active transport with suitable examples.

b) How is ammonia assimilated into biomolecules?

c) Derive the equation for two-substrate enzyme catalyzed reaction with compulsory order single displacement mechanism.

Q2) Attempt any two of the following: **[16]**

a) Describe the energy generation pathway in sulphate reducing bacteria.

b) What are mobile electron carriers? Describe their significance in electron transport chain.

c) What are coupled reactions? Discuss the significance of high energy compounds in such reactions.

P.T.O.

Q3) Attempt any two of the following: **[16]**

a) Diagrammatically illustrate the difference between ETC of photosynthetic plants and photosynthetic bacteria.

b) Explain in breif ETC and ATP formation in NO_3 reducing bacteria.

c) Justify, "It is possible to distinguish between various types of reversible inhibitions based on their respective L-Bplots".

Q4) Write short notes on any four of the following: **[16]**

a) Gibb's free energy.

b) F_1 - F_0 ATPase.

c) Histidine biosynthesis.

d) Allosteric regulators.

e) Regulation of Calvin cycle.

Q5) Attempt the following: **[16]**

a) The precise site of action of a respiratory-chain inhibitor can be revealed by the *crossover technique*. Britton Chance devised elegant spectroscopic methods for determining the proportions of the oxidized and reduced forms of each carrier. This determination is feasible because the forms have distinctive absorption spectra. You are given a new inhibitor and find that its addition to respiring mitochondria causes the carriers between NADH and QH_2 to become more reduced and those between cytochrome *c* and O_2 to become more oxidized. Where does your inhibitor act? Explain.

b) Calculate the actual free energy of hydrolysis of ATP, ΔGp, in human erythrocytes at pH 7 and 37°C. The standard free energy of hydrolysis of ATP is -30.5 kJ/mol, and the concentrations of ATP, ADP and Pi in erythrocytes are 2.25, 0.25, and 1.65 mM respectively, R=8.315 J/mol.

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Total No. of Questions :5]

SEAT No. :

P1514

[Total No. of Pages :3

[5127] - 31

M.Sc.

MICROBIOLOGY

MB-701: Immunology

(2008 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Draw neat-labeled diagrams wherever necessary.***
4) ***Use of logarithmic tables and scientific calculators is allowed.***
5) ***Assume suitable data if necessary.***
6) ***Figures to the right indicate full marks.***

Q1) Attempt any two of the following: **[16]**

a) Explain role of cytokines in regulating the humoral and cell mediate immune responses.

b) Justify, "Self RBCs are protected from complement mediated lysis".

c) Explain role of CD_3-TCR complex in activation of T cells.

Q2) Attempt any two of the following: **[16]**

a) Explain the mechanisms of tolerance induction.

b) Justify, "All immunoglobulin molecules evolved from a common primordial gene".

c) Explain the cytological transformations that occur in normal cell, which may lead to neoplastic growth.

P.T.O.

Q3) Attempt any two of the following: **[16]**

a) Discuss use of different possible / experimental tumor vaccines, giving examples.

b) Explain the protective immune mechanisms in infections with intracellular pathogens.

c) Discuss diagnosis and prognosis of systemic lupus erythomatosus.

Q4) Write short notes on any four of the following: **[16]**

a) Septic shock syndrome.

b) Pathophysiology of Herpes infections.

c) Hemolytic plaque assay.

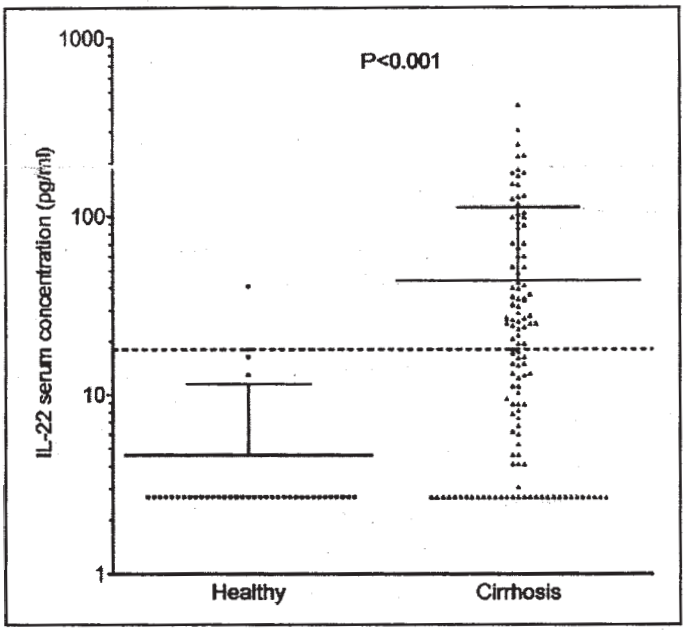
d) Immunological assay of cytokines.

e) Use of animals models in research on autoimmune diseases.

Q5) Interleukin-22 (IL-22), recently identified as a crucial parameter of pathology in experimental liver damage, may determine survival in clinical end-stage liver disease. Liver cirrhosis, the end-stage of various liver diseases, has a poor prognosis. In the cirrhotic liver, IL-22 may be secreted to protect residual healthy liver tissue. Assuming that IL-22 possesses hepatoprotective properties in end-stage liver disease, IL-22 may be a relevant factor for prognosis of liver cirrhosis. **[16]**

In a prospective cohort study including 120 liver cirrhosis patients and 40 healthy donors were analyzed for systematic levels of IL-22 in relation to survival and hepatic complications. A total of 71% of patients displayed liver cirrhosis-related complications at study inclusion. A total of 23% of the patients died during a mean follow-up of 196 $\pm$ 165 days. Elevated levels of IL-22 were associated with ascites ($P = 0.006$), hepatorenal syndrome ($P < 0.0001$), and spontaneous bacterial peritonitis ($P = 0.001$).

Patients with elevated IL-22 (> 18 pg/ml, $n = 57$) showed significantly reduced survival compared to patients with regular (≤ 18 pg/ml) levels of IL-22 (321 days versus 526 days, $P = 0.003$).



IL-22 serum concentrations are elevated in patients with liver cirrhosis (n = 120) compared with healthy individuals (n = 40). Dots indicate IL-22 serum levels in individual patients. The straight horizontal line indicates the mean.

The dotted horizontal line indicates the upper limit of normal for IL-22 of 18 pg/ml. Error bars indicates the standard deviation. Comparison between the two groups was performed using the Mann Whitney U-test.

a) Explain use of conventional biochemical tumor markers in diagnosis of cancer.

b) Based on the given information and the data, discuss possible use of IL-22 in prognosis of different liver diseases, finally culminating in liver cirrhosis

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Total No. of Questions : 5]

SEAT No :

P1515

[Total No. of Pages :2

[5127]-32
M.Sc.
MICROBIOLOGY
MB -702: Molecular Biology- I
(2008 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks : 80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Draw neat- labelled diagrams wherever necessary.***
4) ***Use of logarithmic tables and scientific calculators is allowed.***
5) ***Assume suitable data if necessary.***
6) ***Figures to the right indicate full marks.***

Q1) Attempt any two of the following: **[16]**

a) Explain how the problem at the ends of linear DNA of Adenovirus is solved?

b) Explain double stranded break repair model in *E. coli.*

c) Explain conversion of 30nm chromatin fiber into 10nm chromatin fiber.

Q2) Attempt any two of the following: **[16]**

a) What are telomerase? How they help in solving the end replication problem in eukaryotes?

b) Explain how retroviruses transducer cellular sequences?

c) What is gene imprinting? Explain its regulation by methylation?

Q3) Attempt any two of the following: **[16]**

a) Explain mis- match repair system in *E. coli* and write the name and functions of similar proteins involved in eukaryotes.

b) Explain controlling elements in TnA family.

c) Explain base excision repair system.

P.T.O.

Q4) Write short notes on any four of the following: **[16]**

a) Gene super families

b) Apoptosis

c) c-myc

d) ORC

e) SINES

Q5) Base analogs are the compounds that resemble the natural bases found in DNA and RNA but are not normally found in those macromolecules. Base analogs can replace their normal counterparts in DNA during in vitro DNA synthesis. Four base analogs were studied for their effect on in vitro DNA synthesis using *E.coli* DNA polymerase.The results were as follows, with the Amounts of DNA synthesized expressed as percentages of DNA synthesized from normal base only. **[16]**

From the following data find out:

a) Which bases are base analogs of adenine?

b) Which bases are base analogs of guanine?

c) Which bases are base analogs of thymine?

d) Which bases are base analogs of cytosine?

	Normal Bases Substituted by the Analog			
ANALOG	A	T	C	G
A	0	0	0	25
B	0	54	0	0
C	0	0	100	0
D	0	97	0	0

Total No. of Questions :5]

SEAT No. :

P1516

[Total No. of Pages :2

[5127] - 33

M.Sc.

MICROBIOLOGY

MB-703: Virology

(2008 Pattern) (Semester - III)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Draw neat-labelled diagrams wherever necessary.***
4) ***Use of logarithmic tables and scientific calculators is allowed.***
5) ***Assume suitable data if necessary.***
6) ***Figures to the right indicate full marks.***

Q1) Attempt any two of the following: **[16]**

a) Explain the protein nucleic acid interaction and genome packaging in viruses.

b) Explain the delicate balance between lytic and lysogenic cycle in lambda phage.

c) Explain criteria used in ICTV classification of viruses.

Q2) Attempt any two of the following: **[16]**

a) Justify plaque method is fundamental method for virus detection.

b) Describe the use of different cell cultures in cultivation of viruses.

c) Explain the life cycle of phage T4.

P.T.O.

Q3) Attempt any two of the following: **[16]**

a) Explain how a plant virus can initiate and spreads the infection in plant.

b) Comment on virus induced cell transformation and describe retrovirus mediated oncogenesis.

c) Enlist and describe any one direct method of detection of virus.

Q4) Write short notes on any four of the following: **[16]**

a) Nucleic acid hybridization.

b) Ranikhet disease.

c) Monolayer cell cultures.

d) Prions.

e) Subunit vaccines.

Q5) In an animal infectivity assay, virus preparation is diluted and a fixed volume is inoculated in test animals. A group of 6 animals was used for this test. The data has been given below: **[16]**

Virus Dilution	Test animals dead	Test animals alive
10^{-1}	6	0
10^{-2}	5	1
10^{-3}	4	2
10^{-4}	1	5
10^{-5}	0	6
10^{-6}	0	6

Calculate LD 50 value of original virus preparation.

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Total No. of Questions :5]

SEAT No. :

P1517

[Total No. of Pages :2

[5127] - 41
M.Sc.
MICROBIOLOGY
MB - 801: Pharmaceutical and Medical Microbiology
(2008 Pattern) (Semester -IV)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***Draw neat, labeled diagrams wherever necessary.***
4) ***All questions carry equal marks.***
5) ***Use of the logarithmic table, electronic pocket calculator is allowed.***
6) ***Assume suitable data, if necessary.***

Q1) Answer any two of the following: **[16]**

a) Describe the procedures employed for toxicity testing of a candidate drug.

b) Explain the principles of solvent extraction for bioactive molecules from plants.

c) List the methods employed for lead optimization and explain any one in detail.

Q2) Answer any two of the following: **[16]**

a) List the steps in clinical development of candidate drug. Explain any one in detail.

b) What are the laboratory methods to assess antimicrobial drug combinations?

c) List the factors affecting susceptibility testing of antibacterial agents in solid media. Explain any one in detail.

Q3) Answer any two of the following: **[16]**

a) Explain how bacterial pathogens overcome humoral defense mechanisms of host.

b) Giving suitable examples, explain role of extracellular enzymes in bacterial pathogenesis.

c) Describe susceptibility testing of fungal pathogens.

P.T.O.

Q4) Write short notes on any Four of the following: **[16]**

a) Bioavailability.

b) Virulence genes.

c) Carcinogenicity testing.

d) Siderophores as evasin.

e) Screening methods for anti-infectives.

Q5) *Jatropha* plant parts are used in traditional folklore medicine to cure various ailments.Three solvent extracts (ethanol, methanol and water) from the stem bark of *J. Curcas* were tested for antibacterial activity and compared with streptomycin and ampicillin. The data is given below:

	Zone of Inhibition (mm) (Mean ± SD)				
Test Bacteria	Ethanol (10mg/ml)	Methanol (10mg/ml)	Water (10mg/ml)	Streptomycin (1mg/ml)	Ampicillin (1mg/ml)
Staphylococcus aureus	10 ±0.4	20±0.2	5±2.0	20±0.3	0
Pseudomonas aeruginosa	12±0.5	16±1.1	4±1.1	24±1.5	0
Escherichia coli	11±0.2	14±0.2	7±0.5	0	15±0.4
Shigella dysenteriae	12±0	16±1.3	4±0.2	25±1.5	0
Klebsiella pneumoniae	10±1.0	16±1.5	5±0.8	20±1.1	0
Proteus vulgaris	14±0.2	14±0.5	7±0.1	16±1.2	22±1.2

a) How Jatropha stem bark extract can be used to treat different infectious conditions? **[8]**

b) Describe different methods of susceptibility testing for clinical bacterial isolates. **[8]**

EEE

Total No. of Questions : 5]

SEAT No. :

P1518

[Total No. of Pages : 2

[5127]-42
M.Sc.
MICROBIOLOGY
MB - 802 : Molecular Biology - II
(2008 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks : 80]*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***All questions carry equal marks.***
3) ***Figures to the right indicate full marks.***
4) ***Use of log tables, scientific calculator is allowed.***
5) ***Assume suitable data it necessary.***
6) ***Draw neat labelled diagrams wherever necessary.***

Q1) Attempt any two of the following: **[16]**

a) Explain the rho dependent and rho independent termination of transcription.

b) Describe the role of different types of RNA in regulation of transcription

c) What are the characteristics of genetic code? Write a note on mitochondrial genetic code.

Q2) Attempt any two of the following: **[16]**

a) Explain the process of translation in prokaryotes.

b) Describe the methods of transfer of rDNA into bacterial cell.

c) Write a note on high capacity vectors.

Q3) Draw diagrams of any two of the following: **[16]**

a) Maxam and gilbert method of gene sequencing.

b) PCR

c) Synthesis of c DNA.

P.T.O.

Q4) Write short notes on any four of the following: **[16]**

a) Applications of geneme project.

b) Protein sequencing.

c) Structure of t RNA.

d) Applications of pulse field gel electrophoresis.

e) RNA editing.

Q5) Attempt the following: **[16]**

a) Three different RNA Polymerases are found in all eukaryotic cells, and each is responsible for synthesizing a different class of RNA molecules. How do the characteristics of eukaryotic RNA polymerases differ in terms of their cellular location and products?

b) A gene encodes a polypeptide 30 amino acids long containing an alternating sequence of phenylalanine and tyrosine. What are the sequences of nucleotides corresponding to this sequence in each of the following:

i) The DNA strand that is read to produce the m RNA, assuming that Phe = UUU and tyr = UAU in m RNA.

ii) The DNA strand that is not read.

iii) t RNA's.

Total No. of Questions :5]

SEAT No. :

P1519

[Total No. of Pages :3

[5127] - 43

M.Sc.

MICROBIOLOGY

MB-803: Microbial Technology

(2008 Pattern) (Semester - IV)

Time : 3 Hours] *[Max. Marks :80*

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicates full marks.***
3) ***Draw diagrams wherever necessary.***
4) ***All questions carry equal marks.***
5) ***Use of the logarithmic table and electronic pocket calculator is allowed.***
6) ***Assume suitable data if necessary.***

Q1) Attempt any two of the following: **[16]**

a) Describe the upstream, fermentaiton and downstream processing for chitinase production.

b) With the help of a diagram, describe the construction of an airlift bioreactor. State the situations in which an airlift bioreactor is used.

c) Describe the various types of immobilized cell reactors with suitable diagrams.

Q2) Attempt any two of the following: **[16]**

a) What is K_{La}? Explain any two methods for determination of K_{La}.

b) Explain the principle, construction and operation of a DCO_2 sensor.

c) Elaborate 'In Fed batch culture growth rate decreases due to depletion of essential nutrients'.

P.T.O.

Q3) Attempt any two of the following: **[16]**

a) Describe animal cell culture technology to produce recombinant vaccines.

b) Elaborate the concept of Newtonian and non Newtonian fluids.

c) What is 2-film theory of oxygen transfer? Explain with a suitable diagram.

Q4) Write short notes on any four of the following: **[16]**

a) Write basic concepts of Intellectual Property Rights.

b) Use of fungi as fuel cells.

c) Growth non-associated metabolites.

d) Aeration Number.

e) Downstream processing for Glucose oxidase.

Q5) A wild yeast strain of Candida utilis was used for production of lipase. Fermentation was carried out using optimum media and kinetics of lipase production was studied. **[16]**

Data regarding kinetics of lipase production; lipase activity, total produced proteins and cell growth during 7 days of ferementation are given in table.

Table- Time course of lipase production, total protein and cell growth in optimized medium.

Time (Days)	Cell Growth (Cells $cm^{-3} \times 10^{-8}$)	Total Proteins (mg cm^{-3})	Lipolytic activity (IU dm^{-3})
0	0	0	0
1	0.8	1.5	0.5
2	1.2	2.8	2.2
3	5.5	2.1	4
4	10	1.8	4.8
5	2	2.4	8
6	1.6	2.4	3
7	0.25	0.25	1.8
8	0	0	0

Interpret the results and answer the following:

a) Draw the graphical representation of data for all the parameters.

b) How the cell growth, total proteins and lipase activity are interrelated?

c) At which phase of the growth the maximum lipolytic activity was obtained?

d) Why did lipase activity decreased more rapidly than proteins after reaching peak at death phase of growth?

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