Total No. of Questions : 5]

SEAT No. :

P2120

[Total No. of Pages : 2

[4930]-11
M.Sc. - I
MICROBIOLOGY
MB - 501: Microbial Diversity & Taxonomy
(2008 Pattern)

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) Describe the morphological features used in identification and classification of bacteria.

b) Describe the importance of FAME profiling in bacterial taxonomy.

c) Describe the methods of extracting total bacterial DNA from a habitat.

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

a) Describe the taxonomic significance of steps involved in gene transfer.

b) Compare and contrast Local and Global alignment.

c) Describe the major steps involved in rRNA sequencing with respect to bacterial taxonomy.

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

a) Draw and explain the flow sheet for DNA sequencing.

b) Explain why 16S rRNA is significant in systematic bacteriology.

c) What is a phylogenetic tree? Explain how it is constructed.

P.T.O.

Q4) Attempt any two of the following. **[16]**

a) Justify chemotaxonomy is replacing gene sequencing in bacterial identification.

b) Justify why Shannon index is better than the Simpson's index for expressing bacterial diversity in an ecological sample.

c) Write short note on 'FASTA'.

Q5) The taxonomic resolution of some currently used techniques is shown below. Assess whether the resolutions are correct or not. If not, redraw the diagram with the correct resolutions, and explain your answer. **[16]**

Restriction Fragment length Polymorphism

DNA:DNA hybridization

Ribotyping

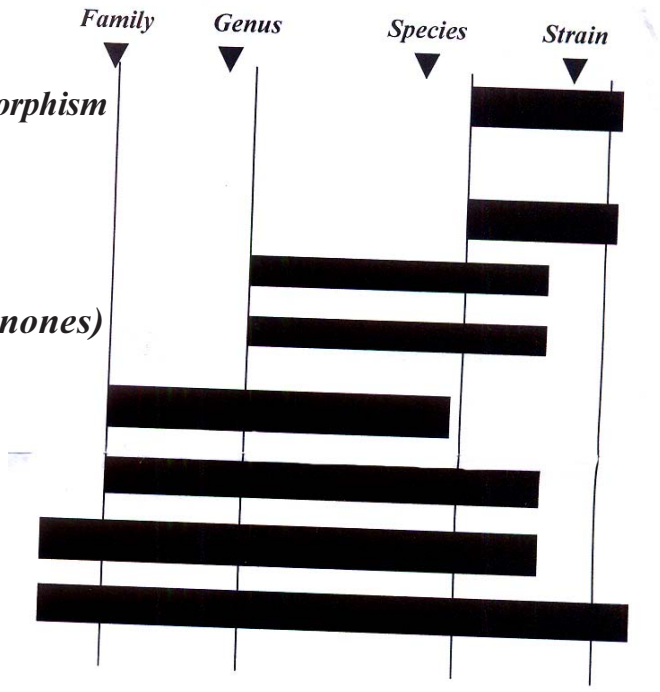
Chemotaxonomic markers (quinones)

%G+C

FAME

DNA sequencing

r-RNA sequencing.



Total No. of Questions : 5]

SEAT No. :

P2121

[Total No. of Pages : 3

[4930]-12
M.Sc. - I
MICROBIOLOGY
MB - 502 : Quantitative Biology
(2008 Pattern)

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.***

Q1) Attempt any two of following. **[16]**

a) Calculate and compare mean and mode of following distribution.

Height	130-140	140-150	150-160	160-170	170-180	180-190	190-200
Frequency	22	44	66	90	77	51	31

b) Following is the data recorded on length of biological object. Calculate variance, standard deviation and coefficient of variation:

Length:63,66,63,67,68,69,70,62,71,71

c) Enlist the non parametric test and give their application and limitations.

Q2) Attempt any two of following. **[16]**

a) Ten rats were fed with certain food supplements over the period. Their body weights were recorded in first and second month as given below in table. Test the hypothesis that food supplement influence the weight of rats at 5% level of significance.

First month weight (gm)	50	60	58	52	51	62	58	55	50	65
Second Month Weight (gm)	56	58	68	61	56	59	64	60	50	62

P.T.O.

b) Represent the following data by a pie diagram:

Country	Birth Rate
China	40
India	33
New Zealand	30
United Kingdom	20
Germany	16
Swedan	15

c) Describe the population models of growth.

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

a) On the basis of information given below about the treatment of 200 patients suffering from a disease, state whether the new treatment is comparatively superior to the conventional treatment.

No. of patients

	Favourable	Not Favourable
New	60	30
Conventional	40	70

b) A biostatistical problem is given to three students A,B and C whose chances of solving it are 1/3, 1/4 and 1/5 respectively. Find out the probability that the problem would be solved.

c) Explain in detail biological databases.

Q4) Attempt any one of following. **[16]**

a) The three strains of *Aspergillus niger* were grown in liquid medium of five different combination of nutrient components. The wet biomass yield per liter is given in below table. Test whether wet biomass yield depends on strain type and medium types using two factor analysis. (Level of significance = 5%)

	Aspergillus niger species		
Media type	A1	A2	A3
M1	35	50	42
M2	45	46	32
M3	40	45	29
M4	42	48	28
M5	38	43	32

b) Following is the data recorded on two variables in population. Calculate correlation and regression coefficient and comment on it.

X	10	8	10	9	10	10	9	11	13	9
Y	11	16	18	19	16	11	17	18	15	19

Q5) Write short notes on any four of following: **[16]**

a) Standard Error

b) Significance level

c) Scales of measurement

d) Poisson distribution

e) Survey Methodology

Total No. of Questions : 5]

SEAT No. :

P2122

[Total No. of Pages : 2

[4930]-13
M.Sc. (Semester - I)
MICROBIOLOGY
MB - 503 : Cell Organisation and Biochemistry
(2008 Pattern)

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 calculator 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) Describe the bonds involved in stabilization of tertiary structure of proteins.

b) Derive Henderson - Hasselbalch equation and state its significance.

c) Give the principle and application of confocal microscopy.

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

a) Diagrammatically illustrate D - series of aldoses.

b) Describe life cycle of Dictiostelium.

c) Justify, ' Morphogen gradients exist in Drossophila egg and are responsible for generation of antero - posterior polarity of embryo'.

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

a) Describe different types of phospholipids found in bacterial cell membrane.

b) Diagrammatically illustrate the protein import in mitochondria.

c) Differentiate between inductive and mesomeric effects.

P.T.O.

Q4) Write short notes on any four of the followings. **[16]**

a) rRNA

b) Vit K

c) Microfilament

d) De- differentiation

e) Biofilms

Q5) a) A sample of a peptide of unknown sequence was treated with trypsin; another sample of same peptide was treated with chymotrypsin. The sequence (N- terminal to C- terminal) of the smaller peptide produced by trypsin digestion were. **[16]**

Met-Val-Ser-Thr-Lys

Val-Ile-Trp-Thr-Leu-Met-Ile

Leu-Phe-Asn-Glu-Ser-Arg

The sequence of smaller peptide produced by chymotrypsin digestion were

Asn-Glu-Ser-Arg-Val-Ile-Trp

Thr-Leu-Met-Ile

Met-Val-Ser-Thr-Lys^{i}-Leu-Phe

Deduce the sequence of the original peptide.

b) What are the concentration of HOAc and OAc in 0.2 M acetate buffer of pH 5.00? The ka for acetic acid is 1.7×10^{6} (pKa = 4.77)

Total No. of Questions : 5]

SEAT No. :

P2123

[Total No. of Pages : 2

[4930]-21
M.Sc. (Semester - II)
MICROBIOLOGY
MB - 601 : Instrumentation and Molecular Biophysics
(2008 Pattern)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***
3) ***All questions carry equal marks.***
4) ***Use of logarithmic tables and scientific calculator is allowed.***
5) ***Assume suitable data if necessary.***
6) ***Neat diagrams must be drawn wherever necessary.***

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

a) Explain the working of Ion exchange chromatography.

b) Describe Isoelectric focussing.

c) Explain the applications of spectro fluorimetry.

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

a) Explain measurement of radio activity using ionization chambers.

b) Elaborate on density gradient centrifugation.

c) Give a brief account of Motifs and Domains.

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

a) Describe methods of protein crystallization.

b) Explain Nuclear overhauser effect. How is it helpful in protein structure determination?

c) Draw and explain components of mass spectrometer.

P.T.O.

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

a) Neural Network.

b) Ion Trap Analyser.

c) ORD.

d) Gel filtration

e) Model Refinement in x-ray crystallography.

Q5) a) NMR measurement have shown that poly *l*-glutamate is a random coil at pH - 7 but becomes α helical as the pH is lowered below 4.5 comment on the observation. **[8]**

b) The absorption coefficient of myoglobin at 580 nm is 15000 M^{-1} Cm^{-1} what is the absorption of 5.62×10^{-5} M solution across a1CM path? What percentage of the incident light is transmitted by this solution? **[8]**

Total No. of Questions : 5]

SEAT No. :

P2124

[Total No. of Pages : 2

[4930]-22
M.Sc. II
MICROBIOLOGY
MB - 602 : Evolution, Ecology and Environmental Microbiology
(2008 Pattern)

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 diagrams wherever necessary.***
4) ***All questions carry equal marks.***
5) ***Use of the logarithmic electronic pocket calculator is allowed.***
6) ***Assume suitable data if necessary.***

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

a) Enlist the various anoxie processes used in wastewater treatment. Describe and differentiate the unit operations for nitrification and denitrification.

b) Discuss the evolutionary stability of cooperation among microorganisms. Explain with suitable examples how the cooperative competitive interactions influence this stability.

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

a) Explain the concepts of r and k selection as applicable to bacteria.

b) Explain the regulations and limits for the wastewater disposal into lakes, rivers and on land.

c) How the plant root exudates do affects the microbial population in the rhizosphere?

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

a) Discuss in brief the evolution of social behavior in microorganisms with suitable examples.

b) Discuss in detail advanced tertiary treatment used in dye industry effluent treatment.

c) Explain principle and working of flocculation as unit process in wastewater treatment.

P.T.O.

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

a) Reuse of treated solid

b) Neo- Darwinism

c) Adsorption using granular and activated carbon

d) Rotating biological contactor

e) Significance of DOM in marine system

Q5) A wastewater has the following characteristics:

Flow rate : 10500 m^3/d, BOD_5 : 280 mg/L

The process by which it is to be treated is the activated sludge process with recycle. The MPCB has imposed a discharge limit of BOD_5 = 8 mg/L. Assuming MLSS in the aeration basin = 3550 mg/L, MLSS in clarifier sludge = 12500 mg/L, MCRT = 8 days, kinetic coefficients, kd = 0.08 d^{-1} and Y = 0.6.

Determine the following:

a) The hydraulic retention time.

b) The mass of the sludge wasted daily.

c) The F/M ratio.

[16]

Total No. of Questions : 7]

SEAT No. :

P2125

[Total No. of Pages : 2

[4930]-23
M.Sc. 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) ***All questions carry equal marks.***
3) ***Figures to the right indicate full marks.***
4) ***Use of log tables, graph papers, scientific calculator is allowed.***
5) ***Assume suitable data if necessary.***
6) ***Draw neat labeled diagrams wherever necessary.***

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

a) Justify - "During competitive inhibition V_{max} remains unaltered, but K_m increase."

b) Describe the biochemistry of nitrogen fixation process in diazotrophs.

c) State laws of thermodynamics and illustrate with help of biological example.

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

a) Describe the principle and operation of adsorption chromatography in purification of enzymes.

b) Describe the energy generation pathway in methanogens.

c) Diagrammatically illustrate 'Z scheme' of plants used for generation of ATP and NADPH.

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

a) Justify "Various enzymes are involved in NH_3 assimilation".

b) Describe the structure and function of bacterial ATPASE.

c) What are liposomes? How are they useful?

P.T.O.

Q4) Write short note on (any four): **[16]**

a) Glutamate dehydrogenase.

b) Proton motive force

c) Rubisco

d) Passive diffusion

e) Cyclic photophosphorylation

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

a) The following results are obtained for an enzyme catalyzed reaction:

Substrate conc. (mM)	Initial velocity ($\mu M\ min^{-1}$)
5.0	147
6.67	182
10.0	233
20.0	323
40.0	400

Calculate K_m and V_{max}

b) Calculate the ΔG for the hydrolysis of ATP at P^H 7.0 & 25°C under steady state conditions (as in a living cell) in which the concentration of ATP, ADP & Pi are maintained at 10^{-3} m, 10^{-4} m & 10^{-2} m respectively.

Total No. of Questions : 5] **SEAT No. :**

P2126 **[Total No. of Pages : 2**

[4930]-31
M.Sc. - III
MICROBIOLOGY
MB - 701 : Immunology
(2008 Pattern)

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 the application of cytokines in treatment, giving suitable examples.

b) Discuss the immuno-regulatory role of IL-4 and IFN-gamma.

c) Describe the pathophysiology of septic shock syndrome.

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

a) Giving the experimental evidences, explain the mechanism of central tolerance development.

b) Justify, "All invertebrate species possess primordial cell mediated immunity".

c) Explain spatial control mechanisms for regulation of complement system, giving suitable examples.

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

a) Discuss the immuno-surveillance mechanisms in acquiring protection against tumor development.

b) Give the use of immunological and biochemical markers in tumor diagnosis.

c) Describe the symptoms and diagnosis of phagocytic deficiency diseases.

P.T.O.

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

a) Symptoms of complement deficiency diseases

b) Prognosis of HIV-AIDS

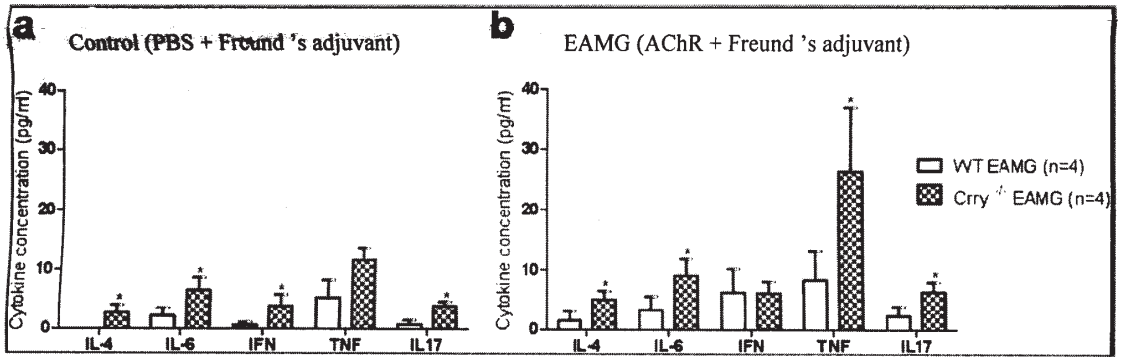
c) Hemolytic plaque assay

d) IL - 1 and fever

e) Use of inbred animals in immunology research

Q5) Experimental Autoimmune Myasthenia Gravis (EAMG) is the most common animal model used to study autoimmune disorder of neuromuscular transmission. The disease is caused by the breakdown of the acetylcholine receptor (AChR). It is known that Complement Receptor 1-Related gene/ protein Y deficiency (Crry–/–) modulates the adaptive immune response and EAMG outcome.

To check whether there were any differences in production of cytokines followed by AChR immunization. *Ex vivo* cytokine production from blood plasma collected at Day 63 post immunization from mock immunized wild type (WT) and Crry –/– mice and AChR immunized mice (WT EAMG and Crry –/– EAMG) was analyzed with cytometric bead arrays. Individual cytokine concentrations are shown in pg/ml. Asterisks (*) indicate values $p<0.05$ between complement regulator sufficient WT and complement regulator deficient Crry–/– mice (Figure a - control (mock immunized), Figure b - EAMG).



Results shown are representative of three independent analyses (n=4–6 mice per experimental group).

Based on the given data explain the following :

a) Effect of AChR immunization on cytokine levels plasma of Crry –/– EAMG. **[4]**

b) Role of pro-inflammatory cytokines in myasthenia gravis. **[4]**

c) With the help of diagram explain the pathophysiology of myasthenia gravis. **[8]**

Total No. of Questions : 5] **SEAT No. :**

P2127 **[Total No. of Pages : 2**

[4930]-32
M.Sc. - III
MICROBIOLOGY
MB - 702 : Molecular Biology - I
(2008 Pattern)

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 calculator 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 in brief site specific recombination with suitable example.

b) Explain the role of DNA pol-III in synthesis of leading and lagging strand.

c) Explain in brief replication features of single stranded phage.

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

a) Explain the role of Rb proteins in cancer.

b) Describe Cot ½ curve and its application.

c) Comment on the controlling of Tn A transposition.

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

a) Elaborate the role of ARC complex in eukaryotes.

b) Describe the mechanism of regulation of SOS operon.

c) Explain acetylation and its effect on structure and function of chromatin.

P.T.O.

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

a) Ty elements

b) Apoptosis

c) Gene conversion

d) Base excision repair

e) LINES

Q5) a) The genes of an *E.coli* bacterium (average dimension: 1-5 μm long, about 1 μm diameter) are carried on a single, very large DNA molecule more than 1 mm long. This molecule must be highly folded inside the cell, raising perplexing problems about the logistics of DNA replication and DNA directed RNA and protein synthesis. To get an idea of the magnitude of this problem calculate the percentage occupied by DNA in a bacterial cell with a volume of π μm^3 and a chromosome 1mm long. **[8]**

b) Predict the base composition of the total DNA synthesized by DNA polymerase on templates provided by equimolar mixture of two complimentary strands of bacteriophage DNA. The base composition of one of the strand is given :

Adenine – 24.7%, Guanine – 24.1%., Cytosine – 18.5% , Thymine – 32.7%.

Justify your prediction. **[8]**

Total No. of Questions : 5] **SEAT No. :**

P2128 **[Total No. of Pages : 2**

[4930]-33
M.Sc. -III
MICROBIOLOGY
MB - 703 : Virology
(2008 Pattern)

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.***

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

a) Explain the replication patterns seen in RNA viruses?

b) How do DNA vaccines differ from recombinant DNA vaccines? How are they helpful in treating viral infections?

c) Describe the life cycle of TMV?

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

a) M13 phage is used as recombinant vector.

b) Transmission of some viruses can occur without vector.

c) Retro viruses are oncogenic.

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

a) Lysogeny establishment in phage lambda.

b) Flow cytometry for detection of virus.

c) Any one nucleic acid hybridization method for detection of virus.

P.T.O.

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

a) Viriods

b) Shadow casting to know the morphology of virus

c) Objectives of ICTV

d) Indicator plants

e) Interferons

Q5) The table below depicts the mortality and morbidity outcome among 295 infants with neonatal HSV infection

Extent of Disease	Treatment (%)		
	Placebo	Vidarabine	Acyclovir
Dead	11	10	5
Alive	2	14	39
Normal	50	50	43
Side Effects	50	36	29

a) How is neonatal HSV infection caused? **[4]**

b) What is the mode of action of Vidarabine and Acyclovir? **[3]**

c) Which one is effective out of the two? **[2]**

d) Why do antivirals show side effect? **[4]**

e) What is the mechanism of resistance to acyclovir? **[3]**

Total No. of Questions : 5] **SEAT No. :**

P2129 **[Total No. of Pages : 2**

[4930]-41
M.Sc. MICROBIOLOGY
MB - 801 : Pharmaceutical and Medical Microbiology
(2008 Pattern)

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) Define the terms : Lead compound, Lead optimization, Candidate durg. Explain any one in detail.

b) Explain Adverse Durg Reactions (ADR) giving suitable examples.

c) What is bioavailability of a drug?

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

a) Explain the toxicity testing methods used for development of a candidate drug.

b) What are the guidelines of CLSI for susceptibility testing of antimicrobial agents?

c) Explain the pharmacokinetic studies carried out for a candidate drug.

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

a) Giving suitable examples, explain role of pili as adhesion mechanism of bacterial pathogens.

b) Explain the mode of action and assay of tetanus toxin.

c) Discuss in detail, the use of agar diffusion method for susceptibility testing of antibacterial agents.

P.T.O.

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

a) Pathogenicity islands

b) Rabbit iliac loop test

c) Objectives of phase II clinical trials

d) Susceptibility testing for antifungal agents

e) Principles of rational drug discovery

Q5) Methanol extracts from leaves of traditionally used medicinal plants were tested for their antibacterial activity against the bacterial strains associated with infectious disease; using microdilution method. MIC and MBC results were compared with known antibacterial agents.

Plant species	**MIC (MBC) (μ g/mL)**				
	Gram-negative bacteria		**Gram-positive bacteria**		
	E.coli	**P. aeruginosa**	**B. cereus**	**B. subtilis**	**S. aureus**
Aglaia odorata [Chinese perfume plant]	No inhibition	No inhibition	500 (500)	1,000 (2,000)	500 (1,000)
Cratoxylum formosum [pink mempat]	1,000 (2,000)	2,000 (>2,000)	125 (125)	125 (250)	125 (250)
Streptomycin sulfate	10 (10)	10 (20)	5 (10)	2.5 (5)	5 (10)
Chloramphenicol	1.25 (2.5)	80 (80)	2.5 (2.5)	0.63 (1.25)	5 (5)

a) From the data given, Comment on possible use of these extracts. **[4]**

b) Give principle of solvent extraction. **[4]**

c) Define the terms MIC and MBC. **[4]**

d) Explain the procedure in brief for determination of MIC and MBC. **[4]**

Total No. of Questions : 5] **SEAT No. :**

P2130 **[Total No. of Pages : 2**

[4930]-42
M.Sc. (Semester - IV)
MICROBIOLOGY
MB - 802 : Molecular Biology - II
(2008 Pattern)

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 calculators is allowed.***
5) ***Assume suitable data if necessary.***
6) ***Draw neat labelled diagrams wherever necessary.***

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

a) Give the structure of RNA polymerase II and explain its role to initiate transcription in eukaryotes.

b) Give structure of tRNA and explain the role of tRNA in translation.

c) Justify, guide RNA is necessary for RNA editing.

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

a) Explain the role of molecular chaperons in protein folding.

b) Give applications of southern blotting.

c) Write a note on high capacity vectors.

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

a) Flowchart of gene library and cDNA library.

b) Give flowsheet of DNA microarray and enlist their use in genomics.

c) Diagrammatic representation of eukaryotic translation process.

P.T.O.

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

a) Expression vectors

b) Role of Ti plasmid in genetic engineering

c) Gene annotation

d) Pyrosequencing

e) Alternative splicing

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

a) Discuss the post transcriptional processing events that takes place on primary transcripts of eukaryotic rRNA & protein coding genes.

b) What would be the word size need to be if instead of four the number of different bases in mRNA were

i) Two

ii) Three

iii) Five

Total No. of Questions : 5] **SEAT No. :**

P2131 **[Total No. of Pages : 2**

[4930]-43
M.Sc.
MICROBIOLOGY
MB - 803 : Microbial Technology
(2008 Pattern)

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 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) Justify "Newtonian fluids obey Newton's law of viscous flow while non Newtonian do not". Discuss the various types of non-Newtonian fluid with their rheogram.

b) Describe the commercial production of Pullulan with the help of flow chart. Discuss the various process parameters critical for product yield.

c) Describe the advantages and limitations of Batch and Continuous processes.

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

a) Describe construction of Air lift bioreactor. State situations in which air lift bioreactor is used.

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

c) What is Process Validation? Give standard protocol for Process Validation.

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

a) What are biosensors? Enlist different type of biosensors, explain pH sensor in detail.

b) Describe the different type of impellers. Explain flow patterns produced by Rushton turbine and propellers.

c) Explain the use of fungi in bioremediation with appropriate examples.

P.T.O.

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

a) Packed bed reactor

b) Advantages of synthetic vaccines

c) N_P

d) Yield coefficient

e) Forms of IPR

Q5) Protease production by *Bacillus subtilis* with free and immobilized cells was examined in this study. Entrapment method of immobilization was used with gelatin, polyacrylamide, calcium alginate and agar matrices and protease production was studied compared to equivalent weight of free cells. Fig given below represent the comparative protease production by different matrices over a time period of 48 h of incubation, **[16]**

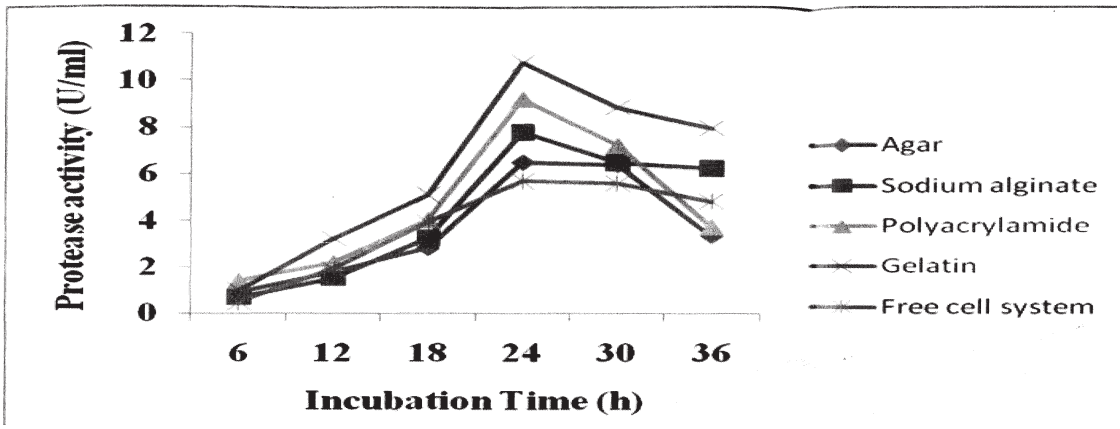


Fig 1. Time course of protease production by Immobilized Cells of *Bacillus subtilis* in different matrices.

Interprete the results and answer the following :

a) Is the process of immobilization beneficial for protease production? If yes specify.

b) Why agar shows less protease activity than the gelatin?

c) How can you increase the efficiency of protease production by using which parameters?