

Seat Number

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MB - 301

Applied and Environmental Microbiology

P. Pages : 2

Time : Three Hours

Max. Marks : 80

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Draw a neat labelled diagram wherever necessary.
5. All questions are compulsory and carry equal marks.

1. Attempt any eight of the following.

16

- a) Ice nucleation.
- b) Define Bioreporter.
- c) Explain probing microbes.
- d) Resazurin test.
- e) Draw a neat labelled diagram of TF.
- f) What is viable count.
- g) Define lignocellulose.
- h) Explain need of biological waste water treatment.
- i) Write a note on composting.
- j) Describe bioluminescence gene.

2. Attempt any two of the following.

16

- a) Give applications of bioremediation.

- b) Describe biological conversion of lignocellulose.
- c) Explain secondary treatment process for sewage.
3. Attempt any two of the following. 16
- a) Explain microbiological examination of meat & meat products.
- b) Explain aerobic attached growth treatment.
- c) Give any two methods of bioremediation.
4. Attempt any two of the following. 16
- a) Explain Bioreporter gene with examples.
- b) Give detail account of Mycotoxin.
- c) Explain Biomarker genes with examples.
5. Attempt any four of the following. 16
- a) Methylene blue reduction test.
- b) Applications of compost.
- c) Explain Bioluminescence gene.
- d) Biological nitrogen removal.
- e) Sampling methods for food.
- f) Pond treatment process.

Seat Number

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MB - 401

Fermentation Technology

P. Pages : 2

Time : Three Hours

Max. Marks : 80

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicate full marks.
6. Draw neat labelled diagrams wherever necessary.

1. Attempt any eight of the following.**16**

- a) Substrates used for Ethanol production.
- b) Enlist organisms involved production of IMP and GMP.
- c) Define copyright and trademarks.
- d) What is primary and secondary metabolites give example of each.
- e) Define HPLC, give its applications.
- f) Define KLa, give its significance.
- g) Define stoichiometry of microbial growth.
- h) Define Liquid - liquid chromatography.
- i) Give applications of recombination products.
- j) Cumulative feedback inhibition.

2. Explain any two. 16
- a) Cell disruption by enzymatic way.
 - b) Strain improvement of primary metabolites.
 - c) Production and recovery of hyaluronic acid.
3. Attempt any two. 16
- a) Outline the process of insulin production.
 - b) Give basic concept of patent and geographical indications.
 - c) Explain product purification by affinity chromatography.
4. Attempt any two. 16
- a) Explain kinetics of batch fermentation.
 - b) Comment on: Control of process parameters.
 - c) Explain role of FDA in food industries.
5. Write notes on any four. 16
- a) DO probes.
 - b) SOP.
 - c) Transgenic materials.
 - d) 2nd generation ethanol.
 - e) DPT.
 - f) Cassette separation.
 - g) Monoclonal antibodies.

Seat Number

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MB - 201 :
Microbial Genetics

P. Pages : 2**Time : Three Hours****Max. Marks : 80****Instructions to Candidates :**

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. All questions carry equal marks.
6. Draw neat labelled diagram wherever necessary.

1. Answer any eight of following.

16

- a) How prokaryotic genome is different from eukaryotic genome.
- b) Give any two examples of viruses containing circular ds DNA.
- c) Explain-adaptive mutation.
- d) How heterochromatin plays role in expression of gene.
- e) Briefly explain – Neurospora genome.
- f) What is means frameshift mutation.
- g) Define plasmid. What is significance of plasmid to yeast.
- h) Explain- role of restriction- modification system in brief.
- i) What is means- Riboswitch.
- J) Enlist any four characteristics of T4 virus genome.

2. Answer **any two** of following. 16
- a) Discuss mechanism of replication in ds DNA containing viruses.
 - b) Explain mechanism of spontaneous mutation.
 - c) Explain- Host range mutation in viruses.
3. Answer **any two** of following. 16
- a) Enlist & explain characteristics of bacterial plasmid.
 - b) Discuss gene regulation mechanism in Lysogeny attainment.
 - c) Explain – RNA silencing.
4. Answer **any two** of following. 16
- a) Explain significance of mutation in strain improvement of bacteria.
 - b) Discuss the post-transcriptional gene regulation.
 - c) Enlist and explain types of plasmid.
5. Write short note on **any four**. 16
- a) Par region.
 - b) Genome of E. coli.
 - c) Point mutation.
 - d) Reverse transcription.
 - e) Cis-acting gene.
 - f) DNA dependent RNA polymerase.

Seat Number

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MB - 101
Microbial Diversity
(Old)

P. Pages : 2**Time : Three Hours****Max. Marks : 80****Instructions to Candidates :**

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions carry equal marks.
5. Draw neat labelled diagram wherever necessary.

1. Attempt any eight of following.

16

- a) Define – Species.
- b) Explain – significance of bacteriorhodopsin.
- c) Define – Taxonomy.
- d) Define – Alkalophile.
- e) Explain with example – parenchymatous algae.
- f) Define – Mycoses.
- g) Give significance of algal aplanospore.
- h) Explain – ellipsoid yeast.
- i) Define – ID₅₀.
- j) Explain – Prion.

2. Attempt any two of following.

16

- a) Explain biochemistry & physiology of adaptation for thermophile.

- b) Explain structure of algal cell.
- c) Discuss biotechnological significance of fungi.

3. Attempt any two of following.

16

- a) Discuss various methods commonly used in virology.
- b) Explain – HIV
- c) Explain significance of algae.

4. Attempt any two of following.

16

- a) Explain newly emerging virus.
- b) Discuss isolation & cultivation of alkalophile.
- c) Discuss PFGE.

5. Write short note on any four of following.

16

- a) Species.
- b) Mould.
- c) TMV.
- d) Plaque assay.
- e) DNA probe.
- f) Kaposi's sarcoma.

Seat Number

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MB - 302

Molecular Biology and Bioinformatics

P. Pages : 2

Time : Three Hours

Max. Marks : 80

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions carry equal marks.
5. Draw neat and labelled diagrams wherever necessary.

1. Answer in brief any eight.

16

- a) Twisting number of DNA.
- b) Write reaction for tRNA activation.
- c) Enlist protein databases.
- d) Uniprot.
- e) Name the Processes of mRNA Processing.
- f) EMBL.
- g) Structure of mRNA.
- h) Give the types of BLAST Program.
- i) Gen Bank.
- j) Promoter escape.

2. Answer the following any two.

16

- a) Explain the mechanism for translation regulation.

- b) What is transcription regulation?
- c) Explain signal hypothesis in bacteria.
3. Answer the following any two. 16
- a) Explain denaturation and renaturation phenomena of DNA.
- b) How Proteins are degraded in cell?
- c) Write a note on structure of ribosome and tRNA activation.
4. Answer the following any two. 16
- a) How phylogenetic analysis can be done Using Bioinformatics?
- b) How Proteins are targeted to mitochondria in eukaryotes?
- c) Explain transcription Process of bacteria.
5. Write short note on any four. 16
- a) HSP.
- b) Multiple sequence alignment.
- c) tRNA.
- d) Zinc-finger motif.
- e) General transcription factors.
- f) Anti-termination.

Seat Number

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MB - 202

Microbial Enzymology

P. Pages : 2

Time : Three Hours

Max. Marks : 80

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to right indicate full marks.

1. Attempt any eight.**16**

- a) What is transferase ?
- b) Discuss LDH ?
- c) Enlist the applications of Pullulanases.
- d) What is feedback inhibition?
- e) Advantages of multienzyme complexes.
- f) What is holoenzyme?
- g) Explain enzyme activity.
- h) What is Zymogens?
- i) Explain acid-base catalysis.
- j) Explain the concept of enzyme turnover.

2. Attempt any two.**16**

- a) Give the characteristics & biotechnological significance of extremozymes of thermophiles.

- b) What is enzyme inhibition ? Explain non-competitive inhibition.
- c) Explain PDH complex.

3. Attempt any two.

16

- a) Explain the concept & significance of K_m & V_{max} .
- b) Derive Michaelis – menten equation.
- c) Explain source, significance & biotechnological applications of amylase.

4. Attempt any two.

16

- a) Discuss the detail mechanism of catalysis in serine proteases.
- b) Explain the regulation of enzyme by covalent modification.
- c) Explain source, significance & biotechnological applications of pectinases.

5. Attempt any four.

16

- a) Non-aqueous enzymology.
- b) Classification of enzymes.
- c) Feed-forward stimulation.
- d) Covalent catalysis.
- e) Mixed inhibition.
- f) Double reciprocal plot.

Seat Number

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MB - 102
Microbial Biochemistry
(Old)

P. Pages : 2

Time : Three Hours

Max. Marks : 80

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicate full marks.
6. Draw a neat labelled diagrams wherever necessary.

1. Attempt any eight.

16

- a) Explain the structural stability of protein.
- b) What is α -helix of protein ?
- c) Give the classification of carbohydrates.
- d) Enlist the functions of lipids.
- e) Give the names of key enzymes of glyoxylate cycle.
- f) Explain hydrogen bonding.
- g) Draw the structure of AMP.
- h) Enlist the types of cellular transport.
- i) What is substrate level phosphorylation ?
- j) Draw the structure of Maltose.

2. Describe any two of the following.

16

- a) Mitochondrial ETC.

- b) C4 pathway.
- c) EMP pathway & it's bioenergetics.
3. Explain any two of the following. 16
- a) De Novo pathway of purine biosynthesis.
- b) HMP pathway in detail.
- c) Classification of lipids.
4. Explain any two of the following. 16
- a) β -oxidation of fatty acids.
- b) Reactions of Glyoxylate cycle.
- c) Types of cellular transport.
5. Write short note on any four. 16
- a) Inhibitors of ETC.
- b) Ramchandran plot.
- c) Salvage pathway of pyrimidine biosynthesis.
- d) FAS complex.
- e) ATP synthase complex.
- f) Na/K⁺ ATPase.

Seat Number

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MB - 303

Pharmaceutical Microbiology

P. Pages : 2

Time : Three Hours

Max. Marks : 80

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicates full marks.
6. Draw a neat labelled diagrams wherever necessary.

1. Comment on any four. 16
 - a) Synthetic peptide vaccines.
 - b) ICH process.
 - c) Asparaginase.
 - d) Z-value.
 - e) Amantadines.
 - f) Packaging of pharmaceutical product.

2. Attempt any two. 16
 - a) Explain methods of preservations.
 - b) Explain mode of action & adverse effects of griseofulvin.
 - c) Explain the concept of FDA regulation & pharmacopeia.

3. Attempt any two.

16

- a) Explain the design of sterile product manufacturing unit.
- b) Explain sterilization of pharmaceuticals by Radiation.
- c) Explain mode of action & prophylactic usage of aminoglycosides.

4. Attempt any two.

16

- a) Explain the production of SK & SD.
- b) Explain the peptidomimetic & strategies for drug discovery.
- c) Explain the quality control in pharmaceuticals.

5. Write short notes on any four.

16

- a) Immunoserum.
- b) Live attenuated viral vaccines.
- c) GMP.
- d) Disinfectants.
- e) Quinolone.
- f) Macrolides.

Seat Number

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MB - 403

Agricultural Microbiology

P. Pages : 2

Time : Three Hours

Max. Marks : 80

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicate full marks.
6. Draw a neat labelled diagram wherever necessary.

1. Answer following any eight.

16

- a) What is PSM.
- b) Define rhizosphere.
- c) Enlist two examples of s-solubilisers.
- d) Give functions of mycorrhizae.
- e) Define:
 - i) VAM.
 - ii) EM
- f) Enlist the types of microbial interaction.
- g) What is rhizodegradation.
- h) What is BT.
- i) Define phylloplane.
- j) What is phytoremediation.

2. Explain any two of the following. 16
- Explain Etiology, symptoms and control of sigatoka disease of banana.
 - Explain Microbial Production and formulation of Trichoderma.
 - Describe in detail process of nodulation.
3. Attempt any two of the following. 16
- Describe in detail microbial communities and plant protection.
 - Explain biological control of post harvest diseases.
 - Give detail account on structural and biochemical plant defense mechanism.
4. Explain any two of the following. 16
- Explain different strategies for plant disease management.
 - Give brief account on control of plant pathogens by genetic engineering.
 - Explain etiology, symptoms and control of Banana bunchy top disease.
5. Write a note on any four of the following. 16
- Strategies for study of rhizosphere and mycorrhizae community.
 - Ectomycorrhizae.
 - Tikka disease of ground nut.
 - Nitrogen fixers.
 - Vertical resistance.
 - Biocontrol agents.

Seat Number

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MB - 203
Immunology

P. Pages : 2**Time : Three Hours****Max. Marks : 80****Instructions to Candidates :**

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory and carries equal marks.
5. Figures to the right indicates full marks.

1. Attempt following any eight.**16**

- a) -----organ is Known as "Mother of all cells"
- b) Thymus produces-----hormone.
- c) MHC restriction.
- d) Define Immunotolerance.
- e) What do you mean by Allergen and immunogen?
- f) Importance of TH:TS ratio.
- g) What is atopy? Give its types.
- h) What are vaccines? Give their types.
- i) Monoclonal and polyclonal antibodies.
- j) Enlist the enzymes and substrates used in ELISA.
- k) What are opsonins? Give their role.
- l) Which graft is 100% accepted and which graft is 100% rejected.

2. Attempt following any two. 16
- a) Give the structure and functions of thymus.
 - b) Classical pathway of complement.
 - c) Mechanism of cell mediated immunity.
3. Attempt following any four. 16
- a) HLA typing.
 - b) Functions of macrophages.
 - c) Types of Antigen.
 - d) Somatic gene recombination theory.
 - e) Sub-types of T. cells and their functions.
 - f) Causes of autoimmune diseases.
4. Attempt following any two. 16
- a) Mechanism of Immunotolerance.
 - b) Principle and applications of RIA.
 - c) Types and mechanism of Inflammation.
5. Attempt following any four. 16
- a) Functions of Microphages.
 - b) Functions of cytokines.
 - c) Properties of Ag.
 - d) Serum sickness.
 - e) Types of graft with one example of each.
 - f) Tumor Antigens.

Seat Number

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CA - 102
Linux Operating System
(Old)

P. Pages : 2**Time : Three Hours****Max. Marks : 75****Instructions to Candidates :**

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.

1. Attempt any three.**15**

- a) Describe the tar command with its option.
- b) Explain in brief head and tail command with an example.
- c) What do you mean by Linux distribution ? Explain any two distribution in brief.
- d) Explain the command of find with example.
- e) What do you mean by command line argument in shell script ? How are these argument handled.

2. Attempt any three.**15**

- a) Explain the features of Linux.
- b) Write a short note on /etc/fstab file.
- c) Explain the following command with example.
 - i) chgrp
 - ii) chown
- d) How the group is created and manages in Linux.
- e) Explain the mount and unmount command in detail.

3. Attempt any three.

15

- a) How to change the permission of file in Linux.
- b) Why V₁ editor is suitable for creating files than cat command ? Explain V₁ editor in details.
- c) How the default permission are change in files.
- d) Discuss the input redirection with suitable example.
- e) What is mean by remote login ? How to remotely login in linux.

4. Attempt any three.

15

- a) Explain the cron utility in details.
- b) How the jobs are place in background for execution and manage these jobs.
- c) Which process place the print files on print queue? Explain different client how manage the print queue.
- d) How to file system maintenance in Linux.
- e) Write short note on History of Linux.

5. Attempt any three.

15

- a) Explain the different environment variable of Linux.
- b) How to navigate file in Linux using command.
- c) Write a short note on grip utility, with example.
- d) Write a short note on choosing and changing window manager and desktop.
- e) Does the Linux support modules ? What is the benefit of modules is Linux.

Seat Number

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MB - 101
Microbial Diversity
(242111)

P. Pages : 2

Time : Three Hours

Max. Marks : 60

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions carry equal marks.
5. Draw neat labelled diagram wherever necessary.

1. Answer in brief any six.

12

- i) Explain with suitable example - Psychrophile.
- ii) Define - Dimorphic Fungi
- iii) Explain - algal aplanospore
- iv) Enlist various types of plastids.
- v) Define - Prion. Give any example.
- vi) Briefly explain - Kaposi's Sarcoma.
- vii) What is mycoses.

2. Attempt any two :

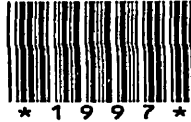
12

- i) Explain - Newly emerging viruses.
- ii) Discuss the Cytomorphology & ultrastructure of hyphae.
- iii) Explain - significance of algae.

3. Attempt any two : 12
- Explain the taxonomic utility of technique - RAPD.
 - Enlist various techniques used in virology. Explain any two techniques.
 - Define alkalophile. Explain cultivation strategies commonly used for alkalophile.
4. Attempt any two : 12
- Explain biochemistry & physiology of adaptation to extreme high temperature by bacteria.
 - Discuss - ultrastructure of various viruses.
 - Explain classification of bacteria based on salt concentration requirement.
5. Write short note on any three : 12
- Barophile
 - Taxonomic rank
 - Carrageenan
 - TMV
 - Siphonous algae.

Seat Number

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MB - 102
Microbial Biochemistry
(242112)

P. Pages : 2

Time : Three Hours

Max. Marks : 60

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Draw neat, labelled diagrams wherever necessary.

1. Attempt any six. 12
 - a) Give the reaction of PDH complex.
 - b) What is facilitated diffusion?
 - c) Give the irreversible reactions of glycolysis.
 - d) Give the basic structure of amino acid.
 - e) What is motif & folds?
 - f) The significance of HMP pathway.
 - g) What is free energy?
 - h) Comment on substrate level phosphorylation.

2. Answer the following any two. 12
 - a) Give the classification & functions of proteins.
 - b) Explain purine nucleotide biosynthesis.
 - c) Explain mitochondrial ETC in detail.

3. Answer the following any two. 12
- a) Comment on inhibitors of ETC.
 - b) Explain the reactions of Krebs cycle.
 - c) Explain fatty acid biosynthesis in detail.
4. Answer the following any two. 12
- a) Explain C₃ Pathway in detail.
 - b) Explain HMP pathway in detail.
 - c) Explain the ultrastructure of cell membrane.
5. Write short notes on any four. 12
- a) Glyoxylate pathway.
 - b) FAS Complex.
 - c) Carnitine shuttle.
 - d) Structural stability of nucleic acids.
 - e) β -pleated sheets.
 - f) Liposomes for transduction.

Seat Number

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MB - 103

Bio - Instrumentation
(242113)

P. Pages : 2

Time : Three Hours

Max. Marks : 60

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory and carry equal marks.
5. Figures to the right indicate full marks.
6. Draw neat labelled diagrams wherever necessary.

1. Answer the following any six. 12
 - a) Enlist the types of gels used in gel filtration.
 - b) Enlist different types of buffers with example.
 - c) Define isoelectric pH.
 - d) What is partition coefficient?
 - e) Define relative retention time.
 - f) Define Beer and Lambert's law.
 - g) Define rad.
 - h) Briefly explain chromic shifts.
2. Answer the following any two. 12
 - a) Principle and applications of SDS-PAGE.
 - b) Principle and applications of SEM.
 - c) Henderson Hasselbalch equation.

3. Answer the following **any two**. 12
- a) Principle and applications of gel filtration.
 - b) Principle and working of double beam DV-VIS. Spectrophotometer.
 - c) Image processing in electron microscope.
4. Answer following **any two**. 12
- a) Intensity shifts.
 - b) Fixation and staining of specimen in SEM.
 - c) Principle and working of Gas chromatography.
5. Answer following **any four**. 12
- a) Comparative account of SEM and TEM.
 - b) Comparative account of paper and TLC.
 - c) Factors affecting electrophoresis.
 - d) Enlist different properties of radioisotopes.
 - e) Measurement of radioactivity.
 - f) Principle of IEF.
