

00 MAY 2025

Total No. of Pages : 02

Roll No.

Total No. of Questions : 09

B.Sc. Hons. (Microbiology) (Sem.-2)

MOLECULAR BIOLOGY

Subject Code : BSMB-205-19

M.Code : 79876

Date of Examination: 05-05-2025

Max. Marks : 60

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly:

- a) Who discovered the DNA double helix structure?
- b) Define DNA topology.
- c) What are topoisomerases?
- d) Name two types of genetic material.
- e) What is semi-conservative replication?
- f) What is the function of DNA ligase?
- g) What is a rolling circle model of DNA replication?
- h) What is a promoter in transcription?
- i) Define RNA polymerase.
- j) What is RNA splicing?

SECTION-B

2. Explain the process of DNA denaturation and renaturation.
3. Describe the different types of DNA.
4. Explain the θ (theta) mode of DNA replication.
5. Explain the primary structure of DNA.
6. Describe the role of spliceosome machinery in transcription.

SECTION-C

7. a) Discuss catabolic repression of lac operon.
b) Discuss replication process as it occurs on leading strand of DNA.
8. Describe initiation of transcription in E. coli.
9. a) Explain photoreactivation and excision repair mechanism.
b) Illustrate various inhibitors of translation.



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Roll No. ☐☐☐☐☐☐☐☐☐☐

Total No. of Questions : 09

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B.Sc. (Honours) (Microbiology) (Sem-2)

BACTERIOLOGY

Subject Code : BSMB201-19

M.Code : 79872

Date of Examination : 26-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly:

- a) Difference between cell and bacteria.
- b) Write chemical composition of bacterial cell membranes.
- c) What is the importance of serial dilution in bacteriological techniques?
- d) How pure culture can be maintained?
- e) Which type of disinfectants are used for microbial control?
- f) Write formula for calculating generation time.
- g) Write general characteristics of thermoproteus.
- h) Write ecological significance of gram-negative bacteria.
- i) Write economic importance of gram-positive bacteria.
- j) Write applications of confocal microscopy.

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SECTION - B

2. Explain the effect of antibiotics and enzymes on the cell wall.
3. Elaborate TEM with its diagram.
4. Write in detail about culture media with its types.
5. What are the physical methods of microbial control? Explain.
6. Discuss phylogenetic overview of nanoarchaeota and thermophiles.

SECTION - C

7. Define cell membrane with its structure, functions and its chemical composition.
8. What is the importance of anaerobic bacteria and explain its cultivation techniques.
9. Discuss in detail about culture media.



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Total No. of Pages : 02

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Bachelor of Science - Honours (Microbiology) (Sem.-2)
FUNDAMENTALS OF BIOCHEMISTRY

Subject Code : BSMB203-19

M.Code : 79874

Date of Examination: 19-05-2025

Max. Marks : 60

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. **Write briefly :**
 - a) Define stereoisomerism in monosaccharides with an example.
 - b) Differentiate between D and L isomers of monosaccharides.
 - c) What are epimers? Give an example.
 - d) Explain the concept of anomers in monosaccharides.
 - e) What are lipid micelles and how are they formed?
 - f) What is the formula to find the total area covered by a lipid monolayer?
 - g) Mention two structural differences between mRNA and tRNA.
 - h) Explain the role of glycoproteins in biological systems.
 - i) Describe the role of cellulose in plant cells.
 - i) Define biochemistry and its significance in understanding life processes.

SECTION-B

2. Explain the structural and functional classification of lipids.
3. Discuss the properties and functions of different types of polysaccharides.
4. Describe the Watson-Crick model of DNA.
5. Calculate the pI of an amino acid with pK_a values of 2.1 and 9.8.
6. Explain the sources, structures and functions of any two water-soluble vitamins.

SECTION-C

7. Discuss the primary, secondary, tertiary and quaternary structures of proteins with examples.
8. Calculate the molar extinction coefficient using Beer-Lambert's law for a DNA solution with an absorbance of 0.75, a path length of 1 cm and a concentration of 50 $\mu\text{g/ml}$.
9. Describe the role of glycolipids and glycoproteins in cell recognition and signaling.



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Bachelor of Science - Honours (Microbiology) (Sem.-2)

MICROBIAL PHYSIOLOGY AND METABOLISM

Subject Code : BSMB207-19

M.Code : 79878

Date of Examination : 22-05-2025

Time : 3 Hrs.

Max. Marks : 60

Total No. of Pages : 02

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

1. Write briefly :

- a) Define LPS synthesis.
- b) Define methanogenesis.
- c) Explain the term synchronous growth.
- d) What is Pasteur Effect?
- e) What is the function of iron uptakes in microbes?
- f) Define oxidative phosphorylation.
- g) What is group translocation?
- h) Explain denitrification.
- i) What is generation term?
- j) Explain homolactic fermentation.

SECTION - B

2. Discuss the process of ammonia assimilation.
3. Explain the methods used to measure microbial growth.
4. Describe the metabolism of lactose by bacteria.
5. Discuss the concept of uniport, symport and antiport.
6. Explain the difference between oxygenic and anoxygenic photosynthesis.

SECTION - C

7. Write a short note on oxidative phosphorylation in bacterial metabolism and compare it with mitochondrial ETC.
8. Compare batch and continuous culture and explain the significance of generation time and specific growth rate.
9. Explain nutrient uptake mechanism focusing on facilitated diffusion and active transport.



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B.Com. (Hons.) / BA(JAMC) / BHMCT / B.Sc. (FD/MLS) / BBA (SIM) / BBA / BTM (Sem.-2)

ENVIRONMENTAL STUDIES

Subject Code : EVS-102-18

M.Code : 75831

Date of Examination : 05-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. Attempt ALL questions in SECTION-A, Each question carry 2 marks
2. Attempt any FOUR questions from SECTION-B, Each question carry 10 marks.

SECTION - A

1. Answer all parts of the question :

- a) Define biomes.
- b) Define ecological succession.
- c) What is meant by food chain?
- d) List any four air pollutants which affect materials.
- e) What are the causes of soil erosion?
- f) List any two major global effects of air pollution.
- g) Name any two methods of wasteland reclamation.
- h) What is meant by desertification?
- i) How does acid rain occur?
- j) What are GHGs? Name any four GHGs in the descending order of their global warming potential.

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SECTION - B

2. Critically examine how environmental benign is the various alternate energy resources?
3. Explain the energy flow in a typical marine ecosystem.
4. Discuss the uses, functions and values of forest resources. List the causes and effects of its degradation.
5. Consider India as a mega biodiversity nation; explain the biogeographical regions of India and its biodiversity hot spots.
6. *"Increasing sea level and climate change are major impacts of environmental pollution"* Discuss the various global effects.
7. List and contrast the major environmental problems in urban and rural areas. Suggest remedial measures.

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Total No. of Questions : 09

B.Sc. Hons. (Microbiology) (Sem.-4)

ANALYTICAL TECHNIQUES IN MICROBIOLOGY

Subject Code : BSMB407-20

M.Code : 92105

Date of Examination : 27-05-2025

Max. Marks : 60

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

1. Write briefly :
 - a) Define radioactive labeling.
 - b) Write about partition chromatography.
 - c) Define the paper electrophoresis.
 - d) Give an account of x ray diffraction.
 - e) Discuss about paper electrophoresis
 - f) Define spin spin splitting.
 - g) Discuss about rotational and vibrational spectra.
 - h) Give the significance of zonal centrifugation
 - i) Discuss the basic principle of GLC.
 - i) Define relaxation process.

SECTION - B

2. Describe centrifugation in detail and discuss the factors affecting sedimentation velocity.
3. Write a detailed note on isoelectric focusing of proteins with examples.
4. Enlist the factors affecting chemical shift.
5. Write a brief note on Agarose electrophoresis with its importance.
6. Explain the principle of UV spectroscopy and its importance.

SECTION - C

7. Describe the types of pumps used in HPLC.
8. Describe the instrumentation of UV spectrophotometer in detail.
9. Explain the theory of Raman spectroscopy. Discuss the quantum mechanical reason for Raman Effect.



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Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

Bachelor of Science / Honours (Microbiology) (Sem.-4)

FOOD AND DAIRY MICROBIOLOGY

Subject Code : BSMB-405-20

M.Code : 92103

Date of Examination : 23-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

I. Write briefly :

- a) Explain the role of protease in food poisoning.
- b) How do microorganisms use food as a substrate?
- c) What is Whey protein concentrate?
- d) Define radiation as a food preservation technique.
- e) What are the factors affecting the composition of milk?
- f) Define the process of pickling.
- g) How are the enzymes used in the production of fruit juices?
- h) Define balanced diet.
- i) What are the nutritive values of milk?
- j) How does fermentation affect the flavor of tea?

SECTION-B

2. Explain how temperature affects food preservation?
3. Discuss the role of catalase in food processing.
4. Outline the process of biomass recovery in single cell protein.
5. Explain the process of milk grading and its criteria.
6. Discuss the role of microorganisms in the production of fermented bread.

SECTION-C

7. Explain the production process, types of substrates and advantages of mushroom cultivation.
8. Discuss the microbiology, process, and benefits of traditional fermented foods.
9. Discuss the standards, grading, and newer concepts in dairy products in India.



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Total No. of Questions : 09

Total No. of Pages : 02

Bachelor of Science - Honours (Microbiology) (Sem.-6)

MICROBIAL BIOTECHNOLOGY

Subject Code : BSMB603-20

M.Code : 92519

Date of Examination : 19-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

1. Write briefly :

- a) Growth stoichiometry
- b) Overproduction
- c) Solid-state fermentation.
- d) Stirred tank reactor.
- e) Hollow fiber bioreactor.
- f) SCO
- g) Aeration
- h) Biogas
- i) Nutraceuticals
- j) Sauerkraut

SECTION - B

2. What is the role of biocatalysts in organic chemical synthesis?
3. How to maintain the energy requirement and maximum biomass yield?
4. Discuss the types of fermentation processes.
5. Explain fermentation design with special reference to airlift fermenter and stirred tank reactors.
6. Write the procedure for the production of beer and wine.

SECTION - C

7. Explain the method of cultivation of Sauerkraut and Probiotics.
8. Illustrate the design and types of fermenter.
9. Discuss the components and types of microbial fermentation process.



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Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. Honours (Microbiology) (Sem.-4)
AGRICULTURAL MICROBIOLOGY
Subject Code : BSMB403-20

M.Code : 92101

Date of Examination : 20-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

1. Write briefly :

- a) What elements primarily compose the lithosphere?
- b) Which element is vital for energy transfer in cells and is often limiting in the soils?
- c) What is the main form of sulphur in the soil?
- d) What role do protozoa play in the soil ecosystems?
- e) How do viruses impact soil microbial populations?
- f) What is the significance of nitrogen fixation in the soil?
- g) Which symbiosis involves legumes and Rhizobium bacteria?
- h) How do legume nodules utilize hydrogen metabolism?
- i) What factors influence the Rhizobium-legume symbiosis?
- j) What are actinomycetes known for producing?

SECTION - B

2. Differentiate between mineralization and immobilization in soil microbiology.
3. What are the primary elements that compose the lithosphere?
4. Describe the nutrition sources for bacteria, actinomycetes and fungi in the soil.
5. Describe the cycles of phosphorus, sulphur, and nitrogen in soil.
6. Explain the role of pathogen enzymes in plant pathogenesis, focusing on their production.

SECTION - C

7. Elaborate on the nature of the symbiotic relationship between microorganisms and plants. Provide examples of beneficial symbiotic relationships.
8. Describe the factors that control the successful symbiotic relationship between legumes and Rhizobium bacteria. How do environmental conditions play a role in this symbiosis?
9. Explain the process of nitrogen fixation also discuss the role of pathogen enzymes in plant pathogenesis.



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Total No. of Questions : 11

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B.Sc. (Microbiology) (Sem.-4)
PHYCOLOGY AND MYCOLOGY
Subject Code : BSMB401-20

M. Code : 92099

Date of Examination : 06-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
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3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION - A

I. Write briefly :

- a) Differentiate between homothallic and heterothallic fungi.
- b) A microscopic field has a diameter of 0.2 mm. If 20 algal cells are visible across the field, calculate the average cell size.
- c) Name two genera of Cyanophyceae and write their key features.
- d) In a culture, fungal growth increased from 2g to 16g in 3hours. Calculate the number of generations.
- e) Write any two applications of red algae.
- f) A fungal colony grows at a rate of 0.8 mm hour. How much area (in mm²) will it cover in 6 hours assuming a circular shape?
- g) Define and give one example of a dimorphic fungus.
- h) What is lichen? Mention one ecological role.
- i) Calculate the dilution factor if 1 mL of algal culture is diluted with 99 mL of distilled water.
- j) What is the significance of the ascus in Ascomycetes?

SECTION - B

2. Describe the life cycle of Volvox and its occurrence.
3. Write a note on cellular slime molds with reference to Dictyostelium.
4. Discuss any five applications of fungi in agriculture.
5. Explain the pathogenesis and control of Trichophyton infections.
6. Differentiate between Candida and Alternaria with respect to their classification and somatic structure.

SECTION - C

7. In a culture of Chlorella, OD increased from 0.2 to 1.6 in 6 hours.
 - a) Calculate the number of generations.
 - b) Calculate the specific growth rate (μ).
 - c) Draw the growth curve based on data.
8. Explain the classification of fungi with diagrams and one example for each class.
9. Discuss the types, causes, and control of fungal diseases in humans (dermatophytic, systemic and opportunistic).

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Total No. of Questions : 09

Bachelor of Science - Honours (Microbiology) (Sem.-6)

RECOMBINANT DNA TECHNOLOGY

Subject Code : BSMB601-20

M.Code : 92517

Date of Examination : 05-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES:

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SECTION - A

- I. Answer the following :
 - a) Write the few applications of Recombinant DNA technology.
 - b) Define vectors.
 - c) What is RT-PCR?
 - d) What are vaccines? Give examples.
 - e) Define Cosmid Vectors with examples.
 - f) Write the characteristics of multipurpose cloning vectors.
 - g) Give few examples of different types of bacterial vaccines.
 - h) Write the different uses of Bioplastics.
 - i) What are Heterologous proteins?
 - i) Give few examples of genetically modified genes used in the

SECTION - B

2. Explain the process of synthesis of DNA.
3. Write a short note on bioplastics.
4. What are shuttle and bacterial vectors and write their merits and demerits.
5. Explain the different genetically modified genes used in agriculture.
6. Explain the recombinant production of viral vaccine.

SECTION-C

7. Explain the use of rDNA technology in production of insulin.
8. Explain the role of genetically engineered *Pseudomonas* in Bioremediation, Phytoremediation and Bioleaching.
9. Explain the process of production of antibiotics by fermentation.



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Bachelor of Science-Honours (Microbiology) (Sem.-6)

BIOPESTICIDES & BIOFERTILIZERS

Subject Code : BSMB607-20

M.Code : 92523

Date of Examination : 26-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
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SECTION - A

1. Write briefly :
 - a. Define botanicals along with example.
 - b. Define Impediments.
 - c. Write any two uses of Biopesticides.
 - d. What are biofertilizers?
 - e. Write the use of Mycorrhiza.
 - f. Write the importance of strain selection.
 - g. Define Shelf life.
 - h. Write the significance of liquid biofertilizer.
 - i. Write any two functions of QC.
 - j. Name one fungal biofertilizer.

SECTION - B

2. Write a short note on the mass production technology of biopesticides.
3. Describe the importance of cyanobacterial fertilizers.
4. Write a note on liquid biofertilizers.
5. Write the classification of biopesticides with example.
6. Write the applications of biopesticides.

SECTION - C

7. Discuss the types of biofertilizers and their role in promoting the plant growth and productivity.
8. Describe factors influencing the efficacy of biofertilizers.
9. Write a short note on any two :
 - a) Fungal biofertilizers
 - b) Marketing of biofertilizers.
 - c) Potential of biopesticides.



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Bachelor of Science - Honours (Microbiology)(Sem.-6)

PLANT MICROBIAL INTERACTIONS

Subject Code : BSMB-605-20

M.Code : 92521

Date of Examination : 22-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
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SECTION - A

- 1. Write briefly :**

- Symbiosis
- Lichens
- Exotoxins
- Parasitism
- Plant microbial interaction
- Plant pathology
- Rhizosphere
- Microbes
- Parasites
- Commensalism.

SECTION - B

2. Give an account on Toxicology of microbes in relation to medicinal plants and vegetables.
3. Discuss the various diseases caused by microbial plant parasites.
4. Give an account on Root-root interaction and Root microbe interaction.
5. Differentiate between Endotoxins and Exotoxins.
6. Discuss nutrients and microbial defense mechanisms.

SECTION - C

7. Discuss the contribution made by different scientist in plant microbial interaction.
8. Discuss the role of antimicrobial agent in various plant extracts.
9. Write an account on different microbes and plant interactions.



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