

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

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) 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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00 MAY 2017

Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

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

Total No. of Questions : 09

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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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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Total No. of Questions : 09

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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

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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

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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.
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) 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 Pages : 02

Total No. of Questions : 09

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.
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 botanicals along with example.
- b. Define Inpediments.
- 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.
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 :**

- 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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B.Com (Honours)/B.A. (JAMC)/ B.Sc. Honours (Microbiology / Nutrition and Dietetics)/B.Sc. (AI&ML)/B.Sc. (BT/FD/IT/G&WD)/MLS/OTT/
Radiotherapy Technology/B.Voc. (Child Caregiver)/

BTTM/BHMCT/BBA/BCA/IT (Sem-1)

HUMAN VALUES, DE-ADDICTION AND TRAFFIC RULES

Subject Code : HVPE101-18

M.Code : 93322

Date of Examination : 07-01-2026

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. Section-A is compulsory ONE mark each.
3. Section-B contains FIVE questions of FOUR marks each attempt all questions.
4. Section-C contains FIVE questions of SIX marks each attempt all questions.

SECTION-A

(10 × 1 = 10)

1. Answer the following :

i) What is the content of self exploration?

ਆਤਮ-ਅਨੁਵੇਸ਼ਣ ਦੀ ਵਿਸ਼ਾ-ਵਸਤੂ ਕੀ ਹੈ?

ਸਵੈ-ਪੜਚੋਲ ਦੀ ਵਿਸ਼ਾ ਵਸਤੂ ਕੀ ਹੈ?

ii) What is Artistic-Value?

ਕਲਾਤਮਕ-ਮੁੱਲ ਕੀ ਹੈ?

ਕਲਾਤਮਕ-ਮੁੱਲ ਕੀ ਹੈ?

iii) What is Material Order?

ਸਾਮਗਰੀ ਆਦੇਸ਼ ਕੀ ਹੈ?

ਸਾਮਗਰੀ ਆਦੇਸ਼ ਕੀ ਹੈ?

iv) What is innateness?

ਸੁਆਭਾਵਿਕਤਾ ਕੀ ਹੈ?

ਸਵਾਭਾਵਿਕਤਾ ਕੀ ਹੈ?

v) Explain harmony in family?

ਪਰਿਵਾਰ ਮੇਂ ਤਾਲਮੇਲ ਕੇ ਬਾਰੇ ਮੇਂ ਬਤਾਓ।

ਪਰਿਵਾਰ ਵਿੱਚ ਤਾਲਮੇਲ ਦੇ ਬਾਰੇ ਵਿੱਚ ਦੱਸੋ।

vi) What are the activities and needs of self and body?

ਆਤਮ ਔਰ ਸਰੀਰ ਦੀ ਗਤੀਵਿਧੀਆਂ ਔਰ ਆਵਸ਼ਯਕਤਾਏਂ ਕੀਆਂ ਹਨ?

ਸਵੈ ਅਤੇ ਸਰੀਰ ਦੀਆਂ ਜ਼ਰੂਰਤਾਂ ਅਤੇ ਗਤੀਵਿਧੀਆਂ ਕੀ ਹਨ?

vii) What are the different patterns of differentiation?

ਭੇਦਭਾਵ ਕੇ ਵਿਭਿੰਨ ਪੈਟਰਨ ਕੀਆਂ ਹਨ?

ਫਰਕ ਦੇ ਵੱਖ ਵੱਖ ਪੈਟਰਨ ਕੀ ਹਨ?

viii) What do you mean by Respect?

ਆਪ ਕਾ ਸ਼ਰਫ਼ ਸੇ ਕੀਆ ਮਤਲਬ ਹੈ?

ਤੁਹਾਡਾ ਆਦਰ ਤੋਂ ਕੀ ਮਤਲਬ ਹੈ?

ix) How the value "Guidance" is related with Self.

ਮੂਲ "ਸਾਗਦਸ਼ਨ" ਸਵਯੰ ਕੇ ਸਾਥ ਕੈਸੇ ਸੰਬੰਧਿਤ ਹੈ?

ਮੁੱਲ ਅਗਵਾਈ ਸਵੈ ਦੇ ਨਾਲ ਕਿਵੇਂ ਸਬੰਧਤ ਹੈ?

x) What is Gratitude?

ਕੁਤਜ਼ਨਾ ਕੀ ਹੈ?

ਕ੍ਰਿਤਗਿਅਤਾ ਕੀ ਹੈ?

SECTION-B

(5 × 4 = 20)

2. How do you mean by values? How do they differ from skills? How values and skills are complementary.

ਮੂਲਾਂ ਸੇ ਆਪ ਕੀਆਂ ਸਮਝਦੇ ਹੋ? ਕੇ ਕੌਸ਼ਲ ਸੇ ਕਿਸ ਪ੍ਰਕਾਰ ਭਿੰਨ ਹੋ? ਮੂਲਾਂ ਔਰ ਕੌਸ਼ਲ ਏਕ-ਦੂਸਰੇ ਕੇ ਪੂਰਕ ਕੈਸੇ ਹੋ?

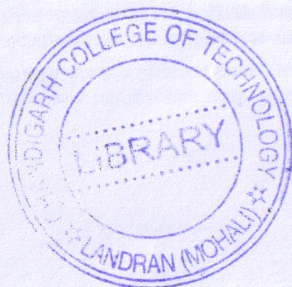
ਮੁੱਲਾਂ ਤੋਂ ਤੁਹਾਡਾ ਕੀ ਮਤਲਬ ਹੈ? ਉਹ ਹੁਨਰਾਂ ਤੋਂ ਕਿਵੇਂ ਵੱਖਰੇ ਹਨ? ਮੁੱਲ ਅਤੇ ਹੁਨਰ ਕਿਵੇਂ ਪੂਰਕ ਹਨ?

3. What are pre conditionings? What is their source?

ਪੂਰਵ-ਸ਼ਾਨਤਾਏਂ ਕੀਆਂ ਹਨ? ਤਨਕਾ ਸਰੋਤ ਕੀ ਹੈ?

ਪੂਰਬ-ਸ਼ਾਨਤਾਵਾਂ ਕੀ ਹਨ? ਉਨ੍ਹਾਂ ਦਾ ਸਰੋਤ ਕੀ ਹੈ?

[M-93322]



(S-17) 2142

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4. Differentiate between intention and competence. How do we come to confuse between the two?

इरादा और क्षमता के बीच क्या अंतर है? कैसे हम गलती करते हैं?

ਇਰਾਦਾ ਅਤੇ ਸਮਰੱਥਾ ਦੇ ਵਿੱਚ ਕੀ ਅੰਤਰ ਹੈ? ਕਿਵੇਂ ਅਸੀਂ ਗਲਤੀ ਕਰਦੇ ਹਾਂ?

5. What do you mean by your natural acceptance? Illustrate with examples. Is it invariant with the time and place?

आपकी स्वाभाविक स्वीकृति से आपका क्या अभिप्राय है? उदाहरण सहित स्पष्ट कीजिए। क्या यह समय और स्थान के साथ अपरिवर्तनीय है?

ਤੁਹਾਡੀ ਕੁਦਰਤੀ ਸਵੀਕ੍ਰਿਤੀ ਤੋਂ ਤੁਹਾਡਾ ਕੀ ਮਤਲਬ ਹੈ? ਉਦਾਹਰਣਾਂ ਨਾਲ ਸਮਝਾਓ। ਕੀ ਇਹ ਸਮੇਂ ਅਤੇ ਸਥਾਨ ਨਾਲ ਬਦਲਦਾ ਹੈ?

6. "To be in a state of harmony is happiness". Examine the statement and illustrate it with two examples from your day-to-day life.

"सद्भाव की स्थिति में रहना खुशी है"। कथन की जाँच करें और इसे अपने दैनिक जीवन के दो उदाहरणों से स्पष्ट करें।

"ਇਕਸੁਰਤਾ ਦੀ ਸਥਿਤੀ ਵਿੱਚ ਰਹਿਣਾ ਖੁਸ਼ੀ ਹੈ"। ਕਥਨ ਦੀ ਜਾਂਚ ਕਰੋ ਅਤੇ ਇਸਨੂੰ ਆਪਣੇ ਰੋਜ਼ਾਨਾ ਜੀਵਨ ਵਿੱਚੋਂ ਦੋ ਉਦਾਹਰਣਾਂ ਦੇ ਨਾਲ ਸਮਝਾਓ।

SECTION-C

(6 × 5 = 30)

7. Right understanding + Relationship = Mutual fulfillment. Illustrate with two examples for each.

सही समझ + रिश्ता = पारस्परिक पूर्ति। प्रत्येक के लिए दो उदाहरणों के साथ उपरोक्त को स्पष्ट करें।

ਸਹੀ ਸਮਝ + ਰਿਸ਼ਤਾ = ਆਪਸੀ ਪੂਰਤੀ। ਹਰੇਕ ਲਈ ਦੋ ਉਦਾਹਰਣਾਂ ਦੇ ਨਾਲ ਉਪਰੋਕਤ ਨੂੰ ਦਰਸਾਓ।

8. How is a human-being co-existence of Self and Body? Explain Pre-Conditioning, Sensation and Natural-Acceptance.

इंसान स्वयं और शरीर का सह-अस्तित्व कैसे है? पूर्व-मान्यता, संवेदना और प्राकृतिक-स्वीकृति समझाओ।

ਮਨੁੱਖ ਸਵੈ ਅਤੇ ਸਰੀਰ ਦਾ ਸਹਿ-ਅਸਤਿਤਵ ਕਿਵੇਂ ਹੈ? ਪੂਰਵ-ਮਾਨਤਾ, ਸੰਵੇਦਨਾ ਅਤੇ ਸਹਿਜ-ਸਵਿਕਰਿਤੀ ਸਮਝਾਓ।

9. Compare the Four Orders in Nature on the basis of their salient aspects.

मुख्य पहलुओं के आधार पर प्रकृति में चार आदेशों की तुलना करें।

ਮੁੱਖ ਪਹਿਲੂਆਂ ਦੇ ਆਧਾਰ ਉੱਤੇ ਕੁਦਰਤ ਵਿੱਚ ਚਾਰ ਆਦੇਸ਼ਾਂ ਦੀ ਤੁਲਨਾ ਕਰੋ।

10. Critically examine the state of society today in context with fulfillment of the comprehensive human goal.

व्यापक मानवीय लक्ष्य की पूर्ति के सन्दर्भ में आज समाज की स्थिति का आलोचनात्मक परीक्षण करें।

ਵਿਆਪਕ ਮਨੁੱਖੀ ਟੀਚੇ ਦੀ ਪੂਰਤੀ ਦੇ ਸੰਦਰਭ ਵਿੱਚ ਅੱਜ ਸਮਾਜ ਦੀ ਸਥਿਤੀ ਦੀ ਗੰਭੀਰਤਾ ਨਾਲ ਜਾਂਚ ਕਰੋ।

11. The problem today is that the desires, thoughts and expectations are largely set by pre conditionings or sensations. Examine this statement.

आज समस्या यह है कि इच्छाएँ, विचार और अपेक्षाएँ काफी हद तक पूर्व-स्थितियों या संवेदनाओं द्वारा निर्धारित होती हैं। इस कथन का परीक्षण करें।

ਅੱਜ ਸਮੱਸਿਆ ਇਹ ਹੈ ਕਿ ਇੱਛਾਵਾਂ, ਵਿਚਾਰਾਂ ਅਤੇ ਉਮੀਦਾਂ ਜ਼ਿਆਦਾਤਰ ਪੂਰਵ-ਸ਼ਰਤਾਂ ਜਾਂ ਸੰਵੇਦਨਾਵਾਂ ਦੁਆਰਾ ਨਿਰਧਾਰਤ ਕੀਤੀਆਂ ਜਾਂਦੀਆਂ ਹਨ। ਇਸ ਕਥਨ ਦੀ ਜਾਂਚ ਕਰੋ।



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Note : Any student found attempting answer sheet from any other person(s), using incriminating material or involved in any wrong activity reported by evaluator shall be treated under UMC provisions.

Student found sharing the question paper(s)/answer sheet on digital media or with any other person or any organization/institution shall also be treated under UMC.

Any student found making any change/addition/modification in contents of scanned copy of answer sheet and original answer sheet, shall be covered under UMC provisions.

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

Bachelor of Science - Honours (Microbiology) (Sem.-1)

CHEMISTRY - I

Subject Code : BSMB-103-19

M.Code : 78981

Date of Examination : 09-01-2026

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 do you mean by hemolytic and heterolytic fission?
- b) What do you mean by Aufbau principal?
- c) Explain enantiomers.
- d) Define the chirotopic centre.
- e) What do you mean by optical activity?
- f) Define meso compounds.
- g) Define the chiral centres.
- h) Define the polarity of bond.
- i) Explain the Heisenberg's uncertainty principle.
- j) Define the bond energy.

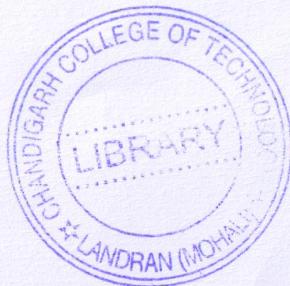
SECTION - B

2. Explain the Flying-Wedge projection.
3. Explain the Schrodinger wave equation.
4. Explain the geometrical isomers with examples.
5. What Stereogenic atom?
6. Explain the Stereoisomerism.

SECTION - C

7. Explain the concept of Topicity of Ligands.
8. Explain the R/S system.
9. Explain the Racemic mixture.

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

BACTERIOLOGY

Subject Code : BSMB201-19

M.Code : 79872

Date of Examination : 06-12-2025

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 gram positive and gram-negative cell wall.
- b) How ribosomes are different from mesosomes?
- c) What are the different stages of sporulation?
- d) Elaborate different methods for stocking of pure culture.
- e) Write applications of dark field microscopy.
- f) What is the procedure for accessing non-culturable bacteria?
- g) Write general characteristics of *pyrococcus* and *thermoplasma*.
- h) Write ecological significance of gram-positive bacteria.
- i) Write economic importance of gram-negative bacteria.
- j) Write applications of Fluorescence microscope.

SECTION - B

2. Explain the mechanism of gram staining and acid-fast staining.
3. Write in detail about different techniques of microscopic techniques.
4. Elaborate chemical methods of microbial control.
5. Explain nutritional requirements in bacteria.
6. Discuss phylogenetic overview of *Sulfolobus* and *Thermoproteus*.

SECTION - C

7. Explain in detail about chemical methods of microbial control.
8. Explain Phase contrast microscope with its diagram.
9. Explain different asexual methods of reproduction.

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Total No. of Pages : 02

Total No. of Questions : 09

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

FUNDAMENTALS OF BIOCHEMISTRY

Subject Code : BSMB203-19

M.Code : 79874

Date of Examination: 09-12-2025

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) Define peptide bond with its properties.
- b) What is the significance of mutarotation in monosaccharides?
- c) Describe the secondary structure of proteins with examples.
- d) What is the role of Coenzyme A in metabolic pathways?
- e) Differentiate between reducing and non-reducing sugars with examples.
- f) What are the effects of acid and alkali on DNA?
- g) What are phosphoglycerides? Mention role in membranes.
- h) Calculate the number of peptide bonds in a polypeptide chain formed by 8 amino acids.
- i) Differentiate between homo and hetero polysaccharides.
- j) What are the properties of purines and pyrimidines?

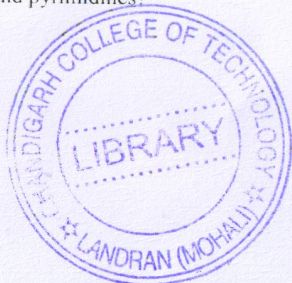
SECTION-B

2. Describe the various forms of DNA and their characteristics.
3. Explain the functions of fat-soluble vitamins with examples.
4. Describe the structure, properties and functions of lipopolysaccharides.
5. Calculate the pH of a solution containing 0.01 M acetic acid ($K_a = 1.8 \times 10^{-5}$) and 0.02M sodium acetate using the Henderson-Hasselbalch equation.
6. What are the types of glycoconjugates and explain their roles?

SECTION-C

7. Explain the principles of UV absorption by nucleic acids. Describe how absorbance measurements are used to estimate DNA and RNA concentrations?
8. A solution containing 10 mg of nucleic acid in 2 mL has an absorbance of 0.45 at 260 nm. Calculate the concentration using the known extinction coefficient of 20 U_g/mL/cm.
9. Explain the concept of Van der waals interactions and salt bridges in biological systems with examples.

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Total No. of Questions : 09

MICROBIAL PHYSIOLOGY AND METABOLISM

M.Code : 79878

Date of Examination : 13-12-2025

Time : 3 Hrs.

Max. Marks : 60

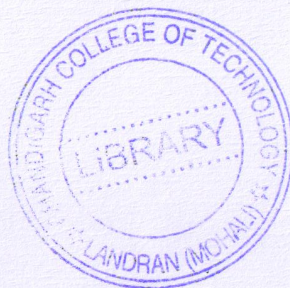
INSTRUCTIONS TO CANDIDATES :

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 :

- Define microbial growth and generation time.
- Differentiate between batch culture and continuous culture.
- What is a diauxic growth curve?
- Write two roles of lipopolysaccharides (LPS) in Gram-negative bacteria.
- What is facilitated diffusion?
- Mention any two functions of bacterial flagella.
- Differentiate between EMP and ED pathways.
- Define methanogenesis and give one example of a methanogenic microbe.
- What are nitrifying bacteria?
- Define biological nitrogen fixation.



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SECTION-B

2. Discuss the effect of temperature and pH on microbial growth.
3. Explain primary and secondary active transport mechanisms in microorganisms.
4. Describe the process of oxidative phosphorylation.
5. Write a short note on mixed-acid fermentation.
6. Discuss the characteristics of cyanobacteria and their role in photosynthesis.

SECTION-C

7. Describe in detail the various phases of the bacterial growth-curve.
8. Explain carbohydrate metabolism through the TCA cycle and its regulation.
9. Write an elaborate account on nitrogen metabolism with reference to nitrate and ammonia assimilation.

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Total No. of Pages : 02

Total No. of Questions : 09

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

MOLECULAR BIOLOGY

Subject Code : BSMB 205-19

M.Code : 79876

Date of Examination : 11-12-2025

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. What are split genes?
- b. What is the function of miRNA?
- c. Define aminoacyl tRNA synthetase.
- d. What is the significance of translation fidelity?
- e. Name two inhibitors of protein synthesis.
- f. What is a transcription factor?
- g. Define histone acetylation.
- h. What are lac and trp operons?
- i. What is yeast mating type switching?
- j. What is bidirectional replication?

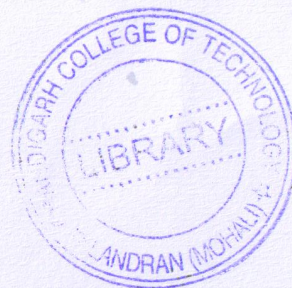
SECTION - B

2. Explain post-transcriptional processing.
3. Discuss the differences between prokaryotic and eukaryotic transcription.
4. Discuss catabolic repression of lac operon.
5. Describe the regulation of gene expression in prokaryotes.
6. Explain the role of DNA methylation in chromatin structure.

SECTION - C

7. a) Write the activities of chemical mutagens.
b) Explain the process of transcription in prokaryotes and eukaryotes in detail.
8. Explain the mechanisms of transcriptional regulation in both prokaryotes and eukaryotes.
9. a) Discuss the process of translation, including initiation, elongation, and termination.
b) How does mismatched DNA repaired in E.coli?

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Total No. of Pages : 02

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B.Sc.Honours (Microbiology) (Sem.-3)

VIROLOGY

Subject Code :BSMB301-19

M.Code :90367

Date of Examination: 18-11-2025

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:

- What is interferon?
- Draw the structure of bacteria.
- What are the stages of infection?
- How does the virus affect the immunity system?
- What is the difference between VSV & SV40 viruses?
- What is transduction?
- Write a note on the tobacco mosaic virus.
- What is lambda regulon?
- Define capsid symmetry.
- Write a note on the lysogenic cycle.

SECTION-B

2. Write a note on the classification of virus.
3. What is a lytic cycle in virus.
4. Discuss about the life cycle of virus.
5. Write a detail about the general principle of viral vaccination.
6. Write a short note on the application of phases in microbial genetics.

SECTION-C

7. What is a retrovirus? Write the silent future and replication pattern of retrovirus.
8. What are antiviral compounds? Write a note on interferon with its suitable example^
9. Define virus. Explain the isolation, purification and cultivation of the virus in detail.

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Total No. of Pages : 02

Total No. of Questions : 09

B.Sc. (Hons.) Microbiology(Sem.-3)

MICROBIAL GENETICS

Subject Code :BSMB303-19

M.Code :90369

Date of Examination:20-11-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- 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) Explain Transduction.
 - b) What is replication?
 - c) What is translation?
 - d) What is silent mutation?
 - e) Define mutator genes.
 - f) Define Hfr stains.
 - g) What is frameshift?
 - h) Explain colicinogenic.
 - i) Define plasmid amplification.
 - j) Define true revertants.

SECTION-B

2. What is conjugation? explain its discovery and mechanism.
3. Explain mutagens in brief.
4. Difference between LFT and HFT lysates.
5. Write a note on duplication and deletion.
6. Difference between conditional and lethal mutations.

SECTION-C

7. Define plasmids. Explain the phenomenon of plasmid incompatibility with suitable examples.
8. Describe gene mapping by recombination and co-transduction of markers.
9. Write a brief note on Prokaryotic transposable elements.

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Total No. of Questions : 09

Total No. of Pages : 02

B.Sc- Honours (Microbiology) (Sem.-3)

MICROBES IN ENVIRONMENT

Subject Code :BSMB305-19

M.Code :90371

Date of Examination: 24-11-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- 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 Ecosystems.
- b) What do you understand by sludge process?
- c) What is hydrostatic pressure?
- d) Write a note on mutualism with suitable example.
- e) What is the importance of sewage?
- f) Discuss the effect of temperature on microbial growth.
- g) Give a brief account on oxidation ponds.
- h) What is synergism?
- i) What are biofilms? How to prevent biofilms?
- j) What do you understand by solid waste disposal?

SECTION - B

2. Define extremophiles. Describe microbes thriving at high and low pH.
3. What is aeromicroflora? Give a detailed account on dispersal of microbes.
4. Write a detailed note on ruminants.
5. Discuss in detail about tertiary sewage treatment.
6. What is solid waste management? Describe various sources and types of solid waste.

SECTION - C

7. Discuss in detail about positive microbial interactions.
8. Describe aquatic environment related to microflora of fresh water and marine habitats.
9. What is liquid waste management? What is the composition and strength of sewage related to BOD and COD?

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1 | M-90371

2 | M-90373

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Sc- Honours (Microbiology) (Sem.-3)
MICROBIOLOGICAL ANALYSIS IN AIR AND WATER
Subject Code :BSMB307-19
M.Code :90373
Date of Examination:27-11-2025

Time : 3 Hrs.

Max. Marks :30

INSTRUCTIONS TO CANDIDATES :

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

SECTION-A

1. Write briefly:

- a) Define aero microbiology.
- b) What are indoor air microbes?
- c) Define infectious dust.
- d) Write different forms of discharge of microbes.
- e) Define biocidal agents with example.
- f) What are aquatic microorganisms?
- g) What do you mean by most probable number?
- h) What is Plate count enumeration method?
- i) Name any three water borne diseases.
- j) Name three levels of testing of MPN test

SECTION - B

2. Write different methods of bioaerosol sampling.
3. Write the significance of microbes in Pharma industries.
4. Write note on Electrostatic Precipitation.
5. What are different methods of treatment of potable water?
6. Write a note on reverse osmosis.

SECTION - C

7. Differentiate between passive sampling and active sampling of aero microbes.
8. Write in details about membrane filter technique.
9. What are different methods to detect portability of water?

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

Bachelor of Science -Honours (Microbiology) (Sem.-3)

BIOSTATISTICS

Subject Code :BSMB308-19

M.Code :90374

Date of Examination : 29-11-2025

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 :

- Define Median.
- Define Type II error.
- Calculate range for the data 75, 22, 50, 17 and 91.
- Give the Degrees of freedom formula for residuals in two way ANOVA.
- Give two advantages of Chi square test.
- Define intercept.
- What is the probability to get four on dice when dice is thrown once?
- Define Variable.
- Define null hypothesis.
- Define Skewness.

SECTION – B

2. Calculate median for the given data :

Class interval	0-5	5-10	10-15	15-20	20-25
Frequency	2	5	9	3	5

3. Write a note on Binomial Distribution.
4. Give the salient features of regression.
5. Two types of drugs were used on 5 and 7 patients for reducing their weight Drug A was Imported and Drug B is indigenous.

The Decrease in weight after using 6 months as follows :

Drug A	10	12	13	11	14		
Drug B	8	9	12	14	15	10	9

Is there a significant difference in the efficacy of the two drugs (For $v=10$ $t_{0.05}$ is 2.223).

6. Briefly discuss about Chi Square test.

SECTION - C

7. The following mistakes per page were observed in a book :

No. of mistakes per page	0	1	2	3	4
No. of times the mistake occurred	211	90	19	5	0

Fit a poisson distribution to fit data. (Given $e^{-0.439} = 0.6447$).

8. Perform Two Way ANOVA for the data :

Plots of land	Treatments			
	A	B	C	D
I	38	40	41	39
II	45	42	49	36
III	40	38	42	42

- a) Is there any significant difference is there between plots of land?
 - b) Is there any significant difference is there between treatments?
- [For $F_{0.05}(3,6)$ is 4.74 and $F_{0.05}(2,6)$ is 5.14.]
9. Discuss briefly about :
- a) Kurtosis
 - b) Mann-Whitney Test

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

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

PHYCOLOGY AND MYCOLOGY

Subject Code :BSMB401-20

M.Code :92099

Date of Examination :06-12-2025

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) Define phycology.
- b) Name any two genera of Chlorophyceae.
- c) What is the economic importance of algae?
- d) Give two differences between cellular and true slime molds.
- e) Name a disease caused by *Aspergillus*.
- f) What is the function of lichen in nature?
- g) List two features of Rhodophyceae.
- h) Name a fungal infection of the skin.
- i) What are mycotoxins?
- j) Give an example of Zygomycetes.

SECTION-B

2. Explain the role of fungi in bioremediation.
3. Discuss the structure and function of diatoms.
4. Briefly describe opportunistic fungal infections.
5. Illustrate the occurrence and somatic structure of *Penicillium*.
6. Discuss the agricultural applications of algae.

SECTION-C

7. Detail the occurrence, thallus organization and life cycle of *Chara*.
8. Discuss the symptoms, pathogenesis and control of dermatophytoses in detail.
9. Explain with examples the applications of algae and fungi in food and medicine.

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Total No. of Questions : 09

Total No. of Pages : 02

B.Sc - Honours (Microbiology) (Sem.-5)

ENZYME TECHNOLOGY

Subject Code :BSMB509-20

M.Code :92515

Date of Examination :29-11-2025

Time : 3 Hrs.

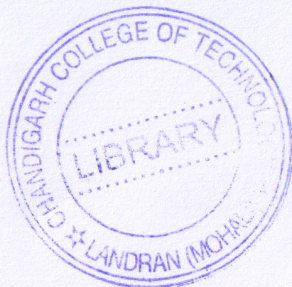
Max. Marks : 60

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. Define holoenzyme and apoenzyme with one example each.
 - b. What are coenzymes? Give any two examples.
 - c. Write any two factors affecting enzyme activity.
 - d. Define enzyme specificity with an example.
 - e. What is the unit of enzyme activity?
 - f. Explain the term "turnover number" of an enzyme.
 - g. Write any two differences between activators and inhibitors.
 - h. Define the active site of an enzyme.
 - i. Mention any two effects of temperature on enzyme activity.
 - j. What is the role of pH in enzyme-catalyzed reactions?



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SECTION-B

2. Explain the general characteristics of enzymes and discuss the factors affecting enzyme activity.
3. Describe the structure and functional differences of holoenzyme and apoenzyme with examples.
4. Write a short note on the nomenclature and classification of enzymes.
5. Explain the mechanism of enzyme action and the concept of the active site.
6. Discuss the effect of temperature and pH on enzyme catalysis with suitable examples.

SECTION-C

7. Describe in detail the various methods of enzyme inhibition and explain their physiological significance in metabolic regulation.
8. Discuss the factors affecting enzyme kinetics with suitable graphs showing the effects of substrate concentration, enzyme concentration, pH and temperature.
9. Explain the industrial production and downstream processing of microbial enzymes, highlighting examples from food or pharmaceutical industries.

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Total No. of Questions : 09

Total No. of Pages : 02

B.Sc- Honours (Microbiology) (Sem.-5)

IMMUNOLOGY

Subject Code : BSMB501-20

M.Code :92507

Date of Examination :18-11-2025

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) Define B-cell epitope.
 - b) What is the role of pattern recognition receptors?
 - c) Define cytokine receptor and its significance.
 - d) List two granulocytic cells and their functions.
 - e) What is meant by cross-reactivity?
 - f) What is flow cytometry used for in immunology?
 - g) What are adjuvants? Mention one example.
 - h) Name two examples of organ-specific autoimmune diseases.
 - i) What is agglutination?
 - j) Name the loci encoding MHC in mice.

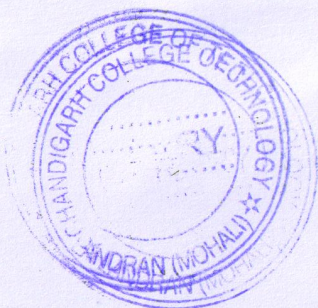
SECTION - B

2. Explain the inheritance pattern of MHC molecules.
3. Explain the process of haematopoiesis with reference to immune cell development.
4. Write a short note on Radioimmunoassay.
5. Describe the role of cytokines in immune regulation and their therapeutic use.
6. Describe the structure and functions of IgM.

SECTION - C

7. Write an overview of transplantation immunology and graft rejection mechanisms.
8. Explain the maturation, activation and differentiation of B cells.
9. Discuss in detail the regulation of the complement system.

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Total No. of Questions : 09

B.Sc. Honours (Microbiology) (Sem.-5)

MEDICAL MICROBIOLOGY

Subject Code : BSMB 503-20

M.Code : 92509

Date of Examination : 20-11-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

- 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 is Virulence and Pathogenicity?
 - b. Define nosocomial infections.
 - c. Mention any two pathogens responsible for respiratory disease.
 - d. Name two Gram-negative bacteria causing gastrointestinal diseases.
 - e. Explain opportunistic infection with an example.
 - f. Which virus is responsible for HIV and AIDS?
 - g. Write the Mechanism of action of Amantadine.
 - h. Give general characteristics of antimicrobial agents.
 - i. What is the principle of the Kirby-Bauer method?
 - j. Explain blood-borne infection.

SECTION-B

2. Discuss the pathogenesis, prophylaxis and control of COVID-19.
3. Explain the process of transmission and spread of infection with example.
4. Describe the pathogenesis, transmission and control of *Mycobacterium* infection.
5. Write a note on *Leishmaniasis* and *Malaria*.
6. Give the mechanism of action of antiviral agents.

SECTION-C

7. Write a detailed note on emerging viral infections (HIV, Monkeypox, Hepatitis).
8. Discuss various antimicrobial agents and their modes of action.
9. Describe host-pathogen interaction in detail and explain factors influencing infection.

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Total No. of Questions : 09

Total No. of Pages : 02

B.Sc. Honours (Microbiology) (Sem.-5)

B.S.C. Honours (Microbiology) (Semi.-5)
BIOSAFETY AND INTELLECTUAL PROPERTY RIGHT

Subject Code : BSMB-505-20

M.Code : 92511

Date of Examination : 24-11-2025

Time : 3 Hrs.

Max. Marks :30

INSTRUCTIONS TO CANDIDATES :

- INSTRUCTIONS TO CANDIDATES :**
1. SECTION-A is COMPULSORY consisting of TEN questions carrying ONE mark each.
 2. SECTION-B contains FIVE questions carrying TWO AND A HALF marks each and students have to attempt any FOUR questions.
 3. SECTION-C contains THREE questions carrying FIVE marks each and students have to attempt any TWO questions.

SECTION-A

1. Write briefly :
 - a. Define Good Laboratory Practice.
 - b. What is allergenicity?
 - c. What is meant by sterility testing?
 - d. Define D-value in sterilization.
 - e. What is a Biosafety Cabinet?
 - f. Mention anyone Biosafety Level and its purpose.
 - g. What is the role of Institutional Ethics Committee?
 - h. What is meant by Intellectual Property Rights (IPR)?
 - i. Give one example of Geographical Indication.
 - j. What is meant by Traditional Knowledge?

SECTION-B

2. Explain the concept of Good Laboratory Practices in the pharmaceutical industry.
3. Describe the principle of heat sterilization and its significance.
4. Write a note on the concept of biosafety levels for infectious agents.
5. Discuss the composition and role of the Biosafety Committee.
6. Explain the significance of patents as a form of Intellectual Property.

SECTION-C

7. Discuss the importance of Quality Assurance and Quality Management in Pharmaceuticals.
8. Explain in detail the design and layout of a sterile product manufacturing unit.
9. Describe various types of Intellectual Property Rights and their importance in R&D.

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B.Sc - Honours (Microbiology) (Sem.-5)
COMPUTER SCIENCE AND BIOINFORMATICS

Subject Code : BSMB 507-20

M.Code : 92513

Date of Examination : 27-11-2025

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. Define Input devices.
- b. What is the function of CPU?
- c. What do you mean by molecular evolution?
- d. Define Functional Units.
- e. Give two applications of Bioinformatics.
- f. Define Phylogeny.
- g. What is the use of DNA sequence in databases?
- h. Define Alignment.
- i. Define data and mention one use.
- j. Give two examples of structure databases.



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SECTION - B

2. What are different types of memory used in Computers? Explain briefly.
3. Write a note on Spreadsheets.
4. Briefly discuss about goals and limitations of Bioinformatics.
5. Give an account of FASTA.
6. Enlist basic concepts of Computer organization.

SECTION - C

7. Discuss, how databases are created and managed in Bioinformatics?
8. Write a note on :
 - a. Multiple Sequence alignment.
 - b. Applications of Bioinformatics.
9. Explain in detail about phylogenetic analysis and its significance in studying microbial diversity.

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