

**THIRD SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY)  
EXAMINATION, NOVEMBER 2021**

(CBCSS)

Microbiology

MBG 3E 03—MICROBIAL TAXONOMY

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

**General Instructions**

1. *In cases where choices are provided, students can attend all questions in each section.*
2. *The minimum number of questions to be attended from the Section / Part shall remain the same.*
3. *The instruction if any, to attend a minimum number of questions from each sub section / sub part / sub division may be ignored.*
4. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

**Part A**

*Answer any four briefly.  
Each question carries 2 weightage.*

1. What is three domain classification ?
2. Comment on Bacteroides.
3. What is r RNA sequencing ?
4. What is Southern blotting ?
5. Write about five kingdom classification.
6. Comment on Cyanobacteria.

(4 × 2 = 8 weightage)

**Part B**

*Write short essays on any four.  
Each question carries 3 weightage.*

7. Phylogenetic and Phenetic system of classification.
8. FISH.
9. Chlamydia.

**Turn over**

10. Western blotting.
11. Actinomycetes.
12. Chemolithotrophs.

(4 × 3 = 12 weightage)

### Part C

*Answer any two of the following.  
Each question carries 5 weightage.*

13. Explain characters and classification of Archebacteria.
14. Discuss agglutination and precipitation reactions.
15. Describe PCR and ELISA.
16. Explain four biochemical tests used in conventional classification.

(2 × 5 = 10 weightage)

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**THIRD SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY)  
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Microbiology

MBG 3E 02—CELL BIOLOGY

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

**General Instructions**

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**Section A (Short Answer Type Questions)**

*Answer any four of the following.*

*Each question carries 2 weightage.*

1. Write a note on nucleolus and its function ?
2. How do the peroxisomes assemble ?
3. What is meant by second messengers ? Explain with examples.
4. What is the role of Rb and p53 in cell cycle ?
5. Explain the process of necrosis.
6. What are the properties of cancer cells ?

(4 × 2 = 8 weightage)

**Turn over**

**Section B (Short Essay Type Questions)**

*Answer any four of the following.*

*Each question carries 3 weightage.*

7. Describe molecular transport across nuclear envelope.
8. What are marker enzymes ? Explain with examples.
9. Explain the role of cytoskeleton in cell movement.
10. What are microtubules ?
11. Differentiate Meiosis 1 and 2.
12. Explain molecular signalling pathway of Akt.

(4 × 3 = 12 weightage)

**Section C (Essay Type Questions)**

*Answer any two of the following.*

*Each question carries 5 weightage.*

13. Explain in detail the structure and functions of cell membrane.
14. Discuss elaborately the structure and functions of mitochondria.
15. Delineate in detail the sorting and transport of proteins in the cell.
16. Describe the characteristic features of neurons and its electrical properties, resting potential and action potential.

(2 × 5 = 10 weightage)

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Microbiology

MBG 3E 01—DIAGNOSTIC MICROBIOLOGY

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

**General Instructions**

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3. *The instruction if any, to attend a minimum number of questions from each sub section / sub part / sub division may be ignored.*
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*(Draw Diagrams Wherever Necessary)*

**Section A**

*Write short notes on any four of the following.*

*Each question carries 2 weightages.*

1. BacT-Alert blood culture system.
2. Nested PCR.
3. AFLP.
4. rRNA typing.
5. ELISA.
6. NASBA.

(4 × 2 = 8 weightages)

**Turn over**

**Section B**

*Write short essays on any **four** of the following.*

*Each question carries 3 weightages.*

7. Immunochromatography.
8. cDNA library.
9. FRET technology.
10. Indirect immunofluorescence.
11. Differentiate Southern blotting and Western blotting.
12. Branched DNA (bDNA) assay.

(4 × 3 = 12 weightages)

**Section C**

*Write essays on any **two** of the following.*

*Each question carries 5 weightages.*

13. Write a note on the automated systems for identification of pathogens based on biochemical profile.
14. Discuss about the advances in probe-amplification techniques for infectious disease diagnosis.
15. Discuss about the microarray-based characterization and identification of pathogens.
16. Discuss the methods for detection and antimicrobial susceptibility testing of *Mycobacterium tuberculosis*.

(2 × 5 = 10 weightages)

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Microbiology

MBG 3C 10—MOLECULAR BIOLOGY

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

**General Instructions**

1. *In cases where choices are provided, students can attend all questions in each section.*
2. *The minimum number of questions to be attended from the Section/Part shall remain the same.*
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4. *There will be an overall ceiling for each Section / Part that is equivalent to the maximum weightage of the Section / Part.*

**Section A (Short Answer Type Questions)**

*Answer any four of the following.  
Each question carries 2 weightage.*

1. Human Telomerase.
2. mRNA stability.
3. Forces stabilizing DNA structure.
4. Intein splicing.
5. Riboswitches.
6. pRb and p53 genes.

(4 × 2 = 8 weightage)

**Section B (Short Essay Type Questions)**

*Answer any four of the following.  
Each question carries 3 weightage.*

7. Mechanism of DNA supercoiling.
8. Briefly explain post transcriptional modifications.

**Turn over**

9. Explain the structure and function of t-RNA.
10. Explain Operon concept and Lac operon in detail.
11. What is RNA interference and explain different RNAi mechanisms.
12. Brief account on viral and cellular oncogenes.

(4 × 3 = 12 weightage)

### Section C (Essay Type Questions)

*Answer any two questions.*

*Each question carries 5 weightage.*

13. Describe chemical composition of DNA.
14. Describe Meselson and Stahl's experiments to prove semi conservative replication.
15. Explain molecular mechanism of prokaryotic transcription.
16. Describe regulation of gene expression by RNA.

(2 × 5 = 10 weightage)



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Microbiology

MBG 3C 09—MEDICAL MICROBIOLOGY

(2019 Admission onwards)

Time : Three Hours

Maximum : 30 Weightage

**General Instructions**

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*Draw Diagrams Wherever Necessary.*

**Section A**

*Write short notes on any four of the following.*

*Each question carries 2 weightage.*

1. Pathogenicity of *E. coli*.
2. Japanese encephalitis.
3. Piedra.
4. Mycetoma.
5. Antifungal agents.
6. Cholera toxin.

(4 × 2 = 8 weightage)

**Turn over**

**Section B**

*Write short essays on any four of the following.*

*Each question carries 3 weightage.*

7. Pathogenesis and laboratory diagnosis of amoebic dysentery.
8. Write a note on superficial mycoses.
9. Describe the morphology and pathogenicity of *Giardia lamblia*.
10. Write a note on emerging viral diseases.
11. Write a note on etiology, pathogenesis and laboratory diagnosis of enteric fever.
12. Compare and contrast the morphological, cultural and biochemical properties of *Staphylococcus* and *Streptococcus*.

(4 × 3 = 12 weightage)

**Section C**

*Write essays on any two of the following.*

*Each question carries 5 weightage.*

13. Write a note on different types of antimicrobial agents used for therapeutic purpose.
14. Write a note on Helminthic parasites of medical importance.
15. Discuss the etiology, pathogenesis and immunoprophylaxis of Rabies.
16. Describe the etiology, pathogenesis laboratory diagnosis and immunoprophylaxis of Diphtheria.

(2 × 5 = 10 weightage)

**THIRD SEMESTER P.G. DEGREE EXAMINATION, NOVEMBER 2021**

(CCSS)

Microbiology

MBG 3E 01—BIOINSTRUMENTATION

(2019 Admissions)

Time : Three Hours

Maximum : 80 Marks

**Section A***Write about each of the following in two or three sentences.**Each question carries 2 marks.*

1. What is the principle of thin layer chromatography ?
2. Write about electrophoretic mobility.
3. Principle of PFGE.
4. Real time PCR.
5. Write the principle of RAPD.
6. DNA microarray.
7. Ultracentrifugation.
8. Applications of phase contrast microscopy.
9. Differentiate between SEM and TEM.
10. Write down the principle of ELISA.
11. Mention the difference between Southern blotting and Northern blotting.
12. Write the principle of chemiluminescence.
13. Compare SDS PAGE and Native PAGE.
14. Mention the uses of Ethidium bromide in Molecular Biology.
15. How will you calculate the resolving power of a microscope.
16. Uses of LC/MS.
17. Atomic Force Microscopy.

**Turn over**

18. Ion exchangers in chromatography.
19. Thermal cyclers.
20. Principle behind colorimeter.

(20 × 2 = 40 marks)

### Section B

*Write notes on or discuss any five of the following.*

*Each question carries 8 marks.*

21. Briefly explain the principle and applications of important PCR based molecular techniques.
22. Write down the principle and instrumentation of various chromatographic techniques.
23. Discuss about nucleic acid sequencing methods.
24. Discuss the principle, working and applications of Radioimmunoassay.
25. Discuss the importance of NMR- Spectroscopy in molecular structure elucidation.
26. Explain the principle and instrumentation of Scanning and Transmission Electron Microscopy.
27. Explain the working principle and components of Spectrophotometer.

(5 × 8 = 40 marks)

## THIRD SEMESTER P.G. DEGREE EXAMINATION, NOVEMBER 2021

(CCSS)

Microbiology

MBG 3C 13—MEDICAL MICROBIOLOGY AND EMERGING DISEASES

(2019 Admissions)

Time : Three Hours

Maximum : 80 Marks

## Section A

*Answer all in two or three sentences.**Each question carries 2 marks.*

1. EHEC.
2. Multidrug resistance.
3. Bioterrorism.
4. Ebola.
5. CD4 receptor for HIV.
6. Coagulase.
7. M protein.
8. MRSA.
9. Lyme disease.
10. Avian flu.
11. TSST.
12. Transmission of different types of plague.
13. Peptic ulcer.
14. Horizontal gene transfer.
15. Prions.
16. SARS.
17. Endotoxic shock.
18. Onychomycosis.
19. Travellers' diarrhea.
20. Pili.

(20 × 2 = 40 marks)

**Turn over**

**Section B**

*Write notes or discuss on any five.  
Each question carries 8 marks.*

21. Write about mechanism of action of exotoxins of Gram positive bacteria.
22. Describe any two vector borne emerging viral diseases.
23. Give an account on Cryptococcosis.
24. Write briefly on the virulence determinants of pathogens.
25. Explain Toxoplasmosis.
26. Discuss the epidemiology and pathogenesis of tetanus.
27. Give an account on the factors contributing emergence and re-emergence of infectious diseases.

(5 × 8 = 40 marks)

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**THIRD SEMESTER P.G. DEGREE EXAMINATION, NOVEMBER 2021**

(CCSS)

Microbiology

MBG 3C 12—ENVIRONMENTAL MICROBIOLOGY

(2019 Admissions)

Time : Three Hours

Maximum : 80 Marks

**Section A***Write about each of the following in 2 or 3 sentences.**Each question carries 2 marks.*

1. *Acidithiobacillus thiooxidans*.
2. Synergism.
3. Nif gene.
4. Rhizosphere.
5. Phylloplane.
6. *Rhizobium*.
7. Ectomycorrhiza.
8. Free living nitrogen fixers.
9. Droplet nuclei.
10. Standard plate count.
11. Airborne viral infection.
12. BOD.
13. Rotating Biological contractor.
14. Sewage.
15. Indicator micro-organisms.
16. Biosensors.
17. Flocs.

**Turn over**

18. Bio-deterioration.
19. Bio-leaching.
20. GMOs.

(20 × 2 = 40 marks)

### Session B

*Write note on or discuss any five of the following.*

*Each question carries 8 marks.*

21. Discuss various types of positive interactions occurred among micro-organisms in soil.
22. Discuss the various steps involved in phosphorous cycle.
23. Examine various methods involved in the quantification of micro-organisms in air.
24. Discuss various steps involved the treatment of waste water.
25. Prioritize the relevance of microbial films and add a note on the steps involved in biofilm formation.
26. Elaborate in detail the step involved in the bacteriological analysis of drinking water.
27. Discuss the applications of micro-organisms in biocorrosion..

(5 × 8 = 40 marks)