S–2564

Sub. Code
23BMC2C1

B.Sc. DEGREE EXAMINATION, APRIL 2026.

Second Semester

Microbiology and Clinical Lab Technology

GENERAL MICROBIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is spontaneous generation?
2. Write contributions of Edward Jenner
3. Define Pili.
4. Define Carboxysomes.
5. Comment on Crystal violet.
6. Give example for anaerobic photosynthetic bacteria.
7. What is antimicrobial resistance.
8. Give example for Enriched medium.
9. Comment on fluorescence microscopy.
10. Comment on TEM.

Part B (5 × 5 = 25)

Answer **all** the questions. Choosing either (a) or (b).

11. (a) Write short notes on contributions of Robert Koch to microbiology.

Or

(b) Add brief note on Whittaker's five kingdom.

12. (a) Describe the cell wall structure of Gram-positive bacteria.

Or

(b) Add short note on structure and functions of flagella.

13. (a) Write short note on endospore staining methods.

Or

(b) Give a brief account bacterial growth curve

14. (a) Write brief note on physical method of sterilization.

Or

(b) Discuss in brief about factors influencing microbial growth.

15. (a) Illustrate the principles and functions of phase contrast microscopy.

Or

(b) Add a brief note on principles of compound microscope.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss in detail about classification of bacteria according to Bergey's manual.

17. Write elaborate note on cell membrane structure and functions.

18. Explain in detail about nutritional types of bacteria.

19. Give elaborate note on different types of growth media.

20. Write detailed note on scanning electron microscope.

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S–2565

Sub. Code
23BMC2S1

B.Sc. DEGREE EXAMINATION, APRIL 2026

Second Semester

Microbiology and Clinical Lab Technology

HUMAN ANATOMY AND HAEMATOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is synatptic signaling?

2. Define cell junctions and name their types.

3. Mention the functions of connective tissue.

4. Define axial skeleton bones.

5. What is cerebrospinal fluid?

6. Define hormones.

7. Name any two types of leukocytes.

8. What is the normal function of RBCs?

9. What is fibrinolysis?

10. Name two blood clotting inhibitors.

Part B (5 × 5 = 25)

Answer **all** the questions choosing either (a) or (b).

11. (a) Explain the structure and functions of cell membrane.

Or

(b) Illutrate contact-dependent signaling with a neat diagram.

12. (a) Classify and describe tissues with suitable examples.

Or

(b) Describe about structure and organization of integumentary system.

13. (a) Explain the role of the hypothalamus in hormone regulation.

Or

(b) Describe the organization of the peripheral nervous system.

14. (a) Interpret the composition and functions of Leukocytes.

Or

(b) Summarize the significance of the coagulation phase in haemostasis.

15. (a) List out the clotting factors and their functions.

Or

(b) Explain about the mechanism of platelet plug formation.

Part C

(3× 10 = 30)

Answer any **three** questions.

16. Discuss the importance of cell in maintaining homeostasis.

17. Explain in detail about muscular system with their types, physiology of contraction and neuromuscular junction.

18. Describe the structure and functions of the brain with neat diagram.

19. Categorize the composition and functions of blood with special reference to RBCs, WBCs and platelets.

20. Explain the various blood disorders caused by abnormal blood clotting.

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S–2566

Sub. Code
23BMC2S2

B.Sc. DEGREE EXAMINATION, APRIL 2026.

Second Semester

Microbiology and Clinical Lab Technology

MICROBIAL PHYSIOLOGY AND METABOLISM

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is batch culture?
2. Define osmophilism.
3. Recall group translocation.
4. Why is iron uptake important for microbes?
5. Mention the importance of phycobilins.
6. State out photophosphorylation.
7. Name two sugar degradation pathways.
8. How does bacterial ETC differ from mitochondrial ETC?
9. Predict ammonia assimilation.
10. Show the importance of nitrogen metabolism in the ecosystem.

Part B (5 × 5 = 25)

Answer **all** questions. Choosing either (a) or (b).

11. (a) How does temperature affect microbial growth?

Or

(b) Explain the importance of continuous culture in microbiology.

12. (a) Differentiate between passive diffusion and facilitated diffusion.

Or

(b) Discuss the role of siderophores in microbial iron uptake.

13. (a) Distinguish cyclic and non-cyclic electron transport with suitable explanation.

Or

(b) Compare and contrast oxygenic and anoxygenic photosynthesis.

14. (a) Describe the major steps and enzymes involved in the ED pathway.

Or

(b) Briefly explain about the key steps of gluconeogenesis.

15. (a) Conclude assimilatory and dissimilatory nitrate reduction.

Or

(b) Prioritize the steps involved in denitrification and mention its significance.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Illustrate diauxic growth with an example and its significance in microbial metabolism.

17. Explain the different types of transport systems and mention their biological importance.

18. How do prokaryotic photosynthetic systems differ from eukaryotic photosynthetic systems?

19. Describe the major steps of TCA cycle and add a note on its role in aerobic respiration.

20. Narrate in brief account on the complete nitrogen cycle, including all major nitrogen transformations.

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S–2569

Sub. Code
23BMC4C1

B.Sc. DEGREE EXAMINATION, APRIL 2026

Fourth Semester

Microbiology and Clinical Lab Technology

MOLECULAR BIOLOGY AND MICROBIAL GENETICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What genetic material is found in DNA?
2. Define genetic code.
3. What is conjugation?
4. State about SOS repair.
5. Mention the enzymes involved in DNA replication.
6. What is the function of the D-loop?
7. Define Translation.
8. What is an oncogene?
9. Define Operon.
10. What is an intron?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Describe briefly the Watson and Crick model of DNA.

Or

(b) Describe the Griffith experiment to prove DNA as the genetic material.

12. (a) Write short note on chemical mutagens and give its mode of action.

Or

(b) Explain the transformation process of Gene transfer among bacteria.

13. (a) Interpret on semi conservative mode of DNA replication in detail.

Or

(b) Outline the proteins involved in DNA replication and add a note on mechanism of DNA replication.

14. (a) Write short note on RNA polymerase and mention its types and functions.

Or

(b) Interpret on the mechanism of reverse transcription in RNA's.

15. (a) Describe the lac operon concept with suitable explanation.

Or

(b) Outline the purpose of ras protein in expressive regulation of oncogenes.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Discuss the structure and function of DNA and elaborate its types with suitable explanation.

17. Summarize the role of pili and mechanism of conjugation in bacteria.

18. Discuss the various models of replication and explain any one type in detail with neat diagram.

19. Highlight the differences between prokaryotic and eukaryotic transcription process.

20. Criticize on trp operon concept and mention the gene regultion during the expression of trp operon.

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S–2570

Sub. Code
23BMC4S1

B.Sc. DEGREE EXAMINATION, APRIL 2026.

Fourth Semester

Microbiology and Clinical Lab Technology

COMMUNICABLE AND NON-COMMUNICABLE DISEASES

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What do you mean by chronic disease? List some chronic diseases.

2. Mention the effects of radiation on human health.

3. What is mucormycosis?

4. List the symptoms of rabies.

5. Find the lifestyle factors that contributes to obesity.

6. Define stroke with suitable explanation.

7. Name the parasite responsible for Chagas disease.

8. Outline the symptoms of malaria.

9. Add short note on inactivated vaccines.

10. Give examples of vaccine-preventable diseases.

Part B (5 × 5 = 25)

Answer **all** questions. Choosing either (a) or (b).

11. (a) Differentiate between communicable and non-communicable diseases.

Or

(b) Describe household air pollution and its health consequences.

12. (a) Outline the transmission, symptoms and prevention of H1N1 influenza.

Or

(b) Determine the symptoms and preventive strategies for chikungunya.

13. (a) Explain the risk factors and symptoms of cardiovascular diseases.

Or

(b) Illustrate the causes and complications of diabetes.

14. (a) Examine the role of blood transfusions in the spread of AIDS.

Or

(b) Summarize the clinical features and transmission of leishmaniasis.

15. (a) Formulate the significance of vaccines in the control of childhood diseases.

Or

(b) What are the common sources of nosocomial infections?

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain in detail the role of environmental and lifestyle factors in the rise of non-communicable diseases.

17. Give a detailed account of typhoid fever including causative agent, symptoms, prevention and treatment.

18. Discuss the common risk factors of NCDs and strategies for their prevention.

19. Elaborate the life-cycle; symptoms, prevention and treatment of Amoebiasis.

20. Describe the different types of vaccines with examples and mention their mechanisms.

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S–2571

Sub. Code
23BMC4S2

B.Sc. DEGREE EXAMINATION, APRIL 2026

Fourth Semester

Microbiology and Clinical Lab Technology

ENVIRONMENTAL MICROBIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is meant by soil microbe diversity?

2. Define aerosols.

3. List out the microorganisms involved in sulphur cycling.

4. Define Mutualism.

5. What is the purpose of the presumptive coliform test?

6. Give structure of slow sand filter.

7. Name the microbes involved in copper leaching.

8. Define bioremediation.

9. What is biohazard?

10. Mention some biosafety measures in environmental monitoring.

Part B (5 × 5 = 25)

Answer **all** the questions choosing either (a) or (b).

11. (a) Describe in brief about the methods of examining air microflora.

Or

(b) Explain the composition of Lithosphere.

12. (a) Enumerate the factors influencing carbon cycle.

Or

(b) Illustrate the different types of interactions between microorganisms.

13. (a) Explain the principle of chlorination in water disinfection.

Or

(b) Summarize on significance of secondary sewage treatment with suitable examples.

14. (a) Differentiate between in-situ and ex-situ microbial leaching.

Or

(b) Describe the importance of genetically engineered microbes in environmental clean up.

15. (a) Mention the biosafety guidelines for handling hazardous microorganisms.

Or

(b) Outline the importance of biosafety measures in laboratories.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain phylloplane microflora in detail, including morphological and physiological characteristics.

17. Discuss nitrogen cycling with reference to nitrogen fixation, nutrification and denitrification.

18. Assess the various tests used for coliform detection in drinking water.

19. Enumerate the process and application of microbial leaching in metal recovery.

20. Explain in detail about the types of hazardous emission and how to protect it in detail.

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S–2572

Sub. Code
23BMC5C1

B.Sc. DEGREE EXAMINATION, APRIL 2026.

Fifth Semester

Microbiology and clinical Lab Technology

SYSTEMATIC BACTERIOLOGY AND VIROLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Mention important virulence factors of *Staphylococcus aureus*.
2. List clinical manifestations of *Neisseria gonorrhoeae*.
3. Write the diagnostic tests used for tuberculosis.
4. Find exotoxin producing species of *Clostridium*.
5. Spell the causative agent of epidemic typhus and find its vector
6. What are the clinical symptoms of leptospirosis?
7. Define viral envelope? Give an example of an enveloped virus.
8. Add an account on the symptoms of mumps.
9. Give simplified note on the significance of tissue cultures.
10. What is the endpoint dilution assay?

Part B (5 × 5 = 25)

Answer **all** the questions. Choosing either (a) or (b).

11. (a) Describe the pathogenicity and lab diagnosis of *Shigella dysenteriae*.

Or

(b) Discuss the virulence factors, diseases, and laboratory diagnosis of *Streptococcus Pyogenes*.

12. (a) Write in detail account on *Haemophilus influenzae* type b infections.

Or

(b) Analyse the steps involved in Ziehl-Neelsen staining technique.

13. (a) Determine briefly the laboratory diagnosis of rickettsial infections.

Or

(b) Draw and explain the life cycle of *Chlamydia trachomatis*.

14. (a) Explain Baltimore classification with suitable examples.

Or

(b) Critically comment on pathogenesis and clinical features of yellow fever.

15. (a) Illustrate a brief note on embryonated egg inoculation -methods and their applications in virus cultivation.

Or

(b) Evaluate the haemagglutination assay in detail and its mention applications in virology.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Discuss opportunistic infections caused by *Pseudomonas aeruginosa* in immunocompromised patients.

17. Examine about Proteus species with emphasis on swarming motility, pathogenicity, and diagnosis.

18. Describe in detail the epidemiology, pathogenicity, laboratory diagnosis and treatment of *Borrelia burgdorferi*.

19. Elaborate the structure and replication cycle of T4 bacteriophage.

20. Write an essay on visualization and enumeration of virus particles using different laboratory techniques.

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S–2574	Sub. Code
	23BMC5C3

B.Sc. DEGREE EXAMINATION, APRIL 2026

Fifth Semester

Microbiology and Clinical Lab Technology

RECOMBINANT DNA TECHNOLOGY AND MOLECULAR DIAGNOSTICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is the role of restriction endonucleases in rDNA technology?

2. Define linkers in rDNA technology.

3. Find the applications of cloning vector.

4. Spell out the significance of cosmids.

5. Mention one application of electroporation.

6. Critically comment-on-liposome-mediated gene transfer.

7. Explain about colony hybridization.

8. Infer automated DNA sequencing.

9. Expand RAPD and mention its application.

10. Recall the importance of molecular beacons.

Part B (5 × 5 = 25)

Answer **all** the questions, choosing either (a) or (b).

11. (a) Describe the role of Klenow fragment in recombinant DNA technology.

Or

(b) Explain in detail the process of ligation and its significance in gene cloning.

12. (a) Examine the structure, properties and applications of pBR322 vector.

Or

(b) Write the applications and limitations of plasmid vectors.

13. (a) Define the basic principle and process of microinjection in gene transfer.

Or

(b) Differentiate between direct selection and blue-white colony selection.

14. (a) Outline the steps involved in constructing a cDNA library.

Or

(b) Evaluate the working principle and procedure of colony PCR.

15. (a) Discuss the principle and applications of FISH.

Or

(b) Mention applications of DNA fingerprinting in forensic science.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Distinguish elaborately about linkers and adaptors with suitable examples.

17. Explain shuttle vectors and expression vectors with their applications.

18. Give a detailed account of healthcare products produced from GEMOs.

19. Write an essay on chromosome walking and chromosome jumping with their applications in genome mapping.

20. Determine the principle, types and applications of real-time PCR in diagnostics.

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S–2577

Sub. Code
23BMC6C1

B.Sc. DEGREE EXAMINATION, APRIL 2026

Sixth Semester

Microbiology and Clinical Lab Technology

CLINICAL PARASITOLOGY AND MYCOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Give two examples of human parasites.

2. What is the most common method of testing parasites?

3. Draw and label the structure of Entamoeba histolytica.

4. What are the four types of protazoa?

5. Define cutaneous Mycosis.

6. Write any four antifungal drugs.

7. Define Mycotoxins.

8. What are some common symptoms of fungal infections?

9. Write some main groups of parasitic Nemat helminths.

10. How do helminths interact with the host's immune system?

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Write common pathogenic effects of human parasites.

Or

(b) How do parasites evade the host's immune systems? Provide specific examples.

12. (a) Describe the pathogenesis of Haemoflagellates.

Or

(b) Explain the lifecycle of the plasmodium.

13. (a) Write the typical symptoms of tinea pedis and how is it diagnosed?

Or

(b) Explain the treatment options for superficial candidiasis of the skin.

14. (a) Write some hypersensitivity risk factors for developing actinomycosis.

Or

(b) How does immune system respond to fungal infections in individuals with weakned immunity?

15. (a) Discuss about epidemiology of Taenia Solium.

Or

(b) State the general characters of Wuchereia bancrofti.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Write an essay about Direct diagnostic methods for parasitic infections?

17. Discuss about lifecycle, epidemiology, pathogenesis and clinical sign of Balantidium.

18. Write an essay about systematic mycosis and critically comment on the types and clinical significance.

19. Give a brief note on antifungal chemotherapy.

20. Describe about morphology, lifecycle and pathogenesis of Ascaris lumbricoides.

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S–2578

Sub. Code
23BMC6C2

B.Sc. DEGREE EXAMINATION, APRIL 2026

Sixth Semester

Microbiology and Clinical Lab Technology

CLINICAL BIOINSTRUMENTATION AND DIAGNOSTICS

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What are the main sources of biomedical signals?

2. State the difference between analytical and diagnostic medical instruments?

3. Mention the function of electrodes in EMG.

4. What is the normal adult respiration rate?

5. Define oxygen saturation.

6. Infer about audiometer.

7. Spell the basic principle of IR spectroscopy?

8. Find the uses of ultra centrifugation in biology.

9. What is the principle of adsorption chromatography?

10. How to calculate Rf value in chromatography?

Part B (5 × 5 = 25)

Answer **all** the questions, choosing either (a) or (b).

11. (a) Explain the classification of medical instruments based on their application.

Or

(b) Write short notes on instruments used in the neurological system.

12. (a) Illustrate the working principle of an EEG with a labelled block diagram.

Or

(b) Describe the indirect method of blood pressure measurement using a sphygmomanometer.

13. (a) Conclude the working principle and applications of an apnoea monitor.

Or

(b) Differentiate between wedge spirometer and ultrasonic spirometer.

14. (a) Determine the basic principle and instrumentation of UV spectroscopy.

Or

(b) Elaborate the working principle of centrifugation with examples of its applications.

15. (a) Compare paper chromatography with thin layer chromatography.

Or

(b) Critically comment on the instrumentation of gas chromatography.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Draw and explain the generalized medical instrumentation system block diagram, detailing the role of each unit.

17. Compare and contrast the working principle and applications of average heart rate meter and Instantaneous heart rate meter with suitable explanation.

18. Explain impedance pneumography with a neat block diagram and mention its applications.

19. Evaluate the instrumentation of a visible spectrophotometer and mention its applications in detail.

20. Narrate in brief account on the working principle, instrumentation and applications of HPLC.

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S–2579

Sub. Code
23BMC6E1

B.Sc. DEGREE EXAMINATION, APRIL 2026.

Sixth Semester

Microbiology and Clinical Lab Technology

Elective — AGRICULTURAL MICROBIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Define commensalism.

2. What is Rhizosphere?

3. Write about characters of *Bacillus Thuringiensis*?

4. Explain about NPV.

5. Define nitrification.

6. Which element is mostly fixed by biofertilizer?

7. What do you mean by nodulation in roots?

8. Which enzyme is responsible for ammonia assimilation?

9. What is the basic concept of microbial transformation?

10. What are the factors affecting mineralization?

Part B (5 × 5 = 25)

Answer **all** questions. Choosing either (a) or (b).

11. (a) Write the physical and chemical properties of soil.

Or

(b) Explain mechanism of parasitism with suitable examples.

12. (a) Outline the root-knot disease caused by nematode.

Or

(b) Describe the plant disease caused by mycoplasma.

13. (a) Explain the role of biofertilizers in field performance.

Or

(b) Write detail note on phosphate solubilizing microbes.

14. (a) Describe the role of cyanobacteria is nitrogen fixation.

Or

(b) Simplify the process of Nitrogen cycling in free living nitrogen fixing bacteria.

15. (a) Explain the role of microbes in the weathering of minerals.

Or

(b) Outline the microbial transformation of carbon cycling.

Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Elaborate a note on microbial interaction between plants.

17. Discuss about biopesticides and mention its importance in detail.

18. Differentiate azotobacter and azospirillum and briefly mention their function in nitrogen fixation,

19. Discuss briefly on mechanism of symbiotic nitrogen fixation.

20. Describe the factors involved mineralization and mention the significance of mineralizaion.

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S–2580

Sub. Code
23BMC6E2

B.Sc. DEGREE EXAMINATION, APRIL 2026

Sixth Semester

Microbiology and Clinical Lab Technology

Elective –ENVIRONMENTAL MICROBIOLOGY

(CBCS – 2023 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define Lithosphere.

2. What are the key roles of soil microbes in nutrient cycling?

3. Expand and explain about MPN test.

4. Define aerosols.

5. What is single cell protein?

6. Draw and label oxidation lagoons.

7. Write some examples of bioremediation technologies.

8. What is microbial leaching?

9. What is biological containment?

10. Define Biosafety.

Part B (5 × 5 = 25)

Answer **all** questions choosing either (a) or (b).

11. (a) Compare the role of bacteria & fungi in soil ecosystems.

Or

(b) Discuss about steps involved in phospherus cycle.

12. (a) Describe about role of sedimentation in water purification.

Or

(b) Elaborate causes of air pollution and add a note on air borne diseases.

13. (a) Classify the solid wastes and mention their role in single cell protein production.

Or

(b) Write about physical and chemical properties of sewage.

14. (a) Write about the steps involves in microbial degradation of pollutants in heterogeneous environment.

Or

(b) What are the key factors affecting bioleaching efficiency?

15. (a) How can biohazards betransmitted and give critical comments on hazardous emission.

Or

(b) Write about safety monitoring procedures in Microbiology labs.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Write an essay about nitrogen cycling and elaborate the microbes and mechanism involved in nitrogen cycle.

17. Explain in detail about the steps involved in filtration of water and add a note on water disinfection.

18. Elaborate about types sewage treatment systems with suitable explanation.

19. Discuss about in situ and ex situ copper and uranium mining.

20. Describe about Biomonitority of waste water toxics and critically comment on the significance of toxic deposits in water.

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