**S–2652**

| Sub. Code |
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| 23BMB1C1 |

**B.Sc. DEGREE EXAMINATION, APRIL 2026**

**First Semester**

**Marine Biology**

**FUNDAMENTALS OF MARINE BIOLOGY**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. Define Mid-oceanic ridges

2. Abyssal plains

3. Ferrel cell

4. Coriolis effect

5. Write the principle behind the Winkler method?

6. Differentiate - Hardness and Alkalinity.

7. Compensation point

8. Foraminifera

9. Atoll

10. Nekton.

## Part B (5 × 5 = 25)

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

11. (a) What are ocean expeditions? What are the aims of expeditions?

Or

(b) Elaborate on historical developments in oceanography.

12. (a) Give an account of factors involved in forming winds.

Or

(b) Give a short note on the difference between waves and tides.

13. (a) Briefly explain the significance of biogeochemical cycles and nutrient cycling.

Or

(b) Describe the physical properties of seawater.

14. (a) Demonstrate the classification of phytoplanktons.

Or

(b) What are the adaptations of zooplanktons for survival?

15. (a) Elaborate on biodiversity of estuarine area.

Or

(b) Briefly explain the brackish water ecosystem.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain in detail on the zonation of the marine environment and distribution of biota.

17. How do changes in the physical properties of seawater affect the survival of biotic communities?

18. Write an essay on "Minerals of the marine environment and the significance".

19. Describe the methods of estimating the primary and secondary productivity of the ocean.

20. Explain about the functions, types and biodiversity of mangroves.

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**S–2653**

| Sub. Code |
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| 23BMB2C1 |

**B.Sc. DEGREE EXAMINATION, APRIL 2026**

**Second Semester**

**Marine Biology**

**ANIMAL DIVERSITY**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. Asymmetry.

2. Cnidaria.

3. Bipinnaria.

4. Gastropoda.

5. Osmoregulation.

6. Hemichordata.

7. Pharyngeal slits.

8. Vestigial organs.

9. Nerve chord.

10. Amphioxus.

## Part B (5 × 5 = 25)

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

11. (a) Describe the tracheal system of insects.

Or

(b) Explain the different types of coeloms.

12. (a) Write a short note on minor phyla pogonophora.

Or

(b) Explain the general features of porifera with examples.

13. (a) Write a brief note on Cephalochordata.

Or

(b) What are the characteristics of Gnathostomata? Explain with examples.

14. (a) Write about the classifications in Pisces.

Or

(b) Explain about salient features of phylum Chordata.

15. (a) Describe the comparative account of brain in vertebrates.

Or

(b) Write a short note on respiratory organs in fish.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe mode of locomotion in protozoans.

17. Explain about the different types of symmetry with suitable examples.

18. Explain about origin and classification of Urochordata.

19. Explain accessory respiratory organs in fish.

20. Describe about the comparative account of stomach in mammals.

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**S–2654**

| Sub. Code |
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| 23BMB3C1 |

**B.Sc. DEGREE EXAMINATION, APRIL 2026**

**Third Semester**

**Marine Biology**

**CELL AND DEVELOPMENTAL BIOLOGY**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. Fluid mosaic model

2. Oxidative phosphorylation

3. S phase

4. Signal molecules

5. Polar bodies

6. Spemann's organizer

7. Endometrium

8. Morphallaxis

9. Pluripotent

10. Mesenchymal stem cells.

## Part B (5 × 5 = 25)

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

11. (a) Explain the structure and functions of the endoplasmic reticulum.

Or

(b) List out the structure and functions of the nucleolus.

12. (a) Elucidate the control mechanisms of the cell cycle in eukaryotes.

Or

(b) Summarize the significance of apoptosis in development and disease.

13. (a) Describe the stages of oogenesis and its significance.

Or

(b) Write a detailed note on the construction of a fate map and its importance.

14. (a) Explain the structure and functions of extra-embryonic membranes in chick development.

Or

(b) Discuss the concept of regeneration with suitable examples.

15. (a) Elucidate the types of stem cells based on their potency.

Or

(b) Explain the role of stem cells in bone marrow transplantation.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Explain the ultra-structure and chemical composition of the plasma membrane.

17. Discuss the types of signal molecules involved in cell communication.

18. Demonstrate the process of spermatogenesis with suitable diagrams.

19. Write an essay on the hormonal control of amphibian metamorphosis.

20. Explain the process of in vitro fertilization and its role in assisted reproductive technology.

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**S–2655**

**Sub. Code**
**23BMB3C2**

**B.Sc. DEGREE EXAMINATION, APRIL 2026**

**Third Semester**

**Marine Biology**

**FISHERY BIOLOGY**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. Molluscs

2. Cichlids

3. Meristic characters

4. Filter feeders

5. Nauplius

6. Gravid

7. Fingerlings

8. Anadromous

9. Fisheries Management

10. Fisheries science.

## Part B

(5 × 5 = 25)

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

11. (a) Describe the classifications of fin fishes.

Or

(b) Describe the classifications of shellfishes.

12. (a) Elaborate on the major morphometric characters of fishes.

Or

(b) Describe the respiratory system in fishes.

13. (a) Explain the larval development stages in crustaceans.

Or

(b) Give an account on age, growth, length and weight relationship in fishes.

14. (a) What is meant by spawning? Enumerate the factors favouring spawning.

Or

(b) Describe the types of fish migration strategies.

15. (a) Write an account on principles of fisheries management.

Or

(b) Write a short note on fisheries regulations.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Describe the physical features of the Bay of Bengal and the distribution of biota.

17. Explain in detail about the nervous system anatomy of fish.

18. Demonstrate the reproductive strategies in fishes and shell fishes.

19. Explain the concept of parental care among the fishes and the significance.

20. Write an essay on "Fisheries conservation and ecosystem sustainability".

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**S–2656**

| Sub. Code |
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| 23BMB4C1 |

**B.Sc. DEGREE EXAMINATION, APRIL 2026**

**Fourth Semester**

**Marine Biology**

**ANIMAL PHYSIOLOGY AND BIOCHEMISTRY**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. Carbohydrate

2. Radula

3. Chlorocruorin

4. Thermoreceptors

5. Chromophore

6. Acid base balance

7. Covalent bond

8. Disaccharides

9. Unsaturated fatty acids

10. Lipoproteins.

## Part B (5 × 5 = 25)

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

11. (a) Explain the different types of food consumed by marine organisms with suitable examples.

Or

(b) Write a note on the filter-feeding habit of plankton-feeding crustaceans.

12. (a) Describe the different respiratory volumes and capacities with suitable diagrams.

Or

(b) Explain the structure and functions of the nervous system in marine organisms.

13. (a) Write the process of bioluminescence and evaluate its biological significance.

Or

(b) Explain the mechanisms of osmotic regulation and ion regulation in marine animals.

14. (a) Justify the role of biomacromolecules as an energy source in living organisms.

Or

(b) Describe the classification of amino acids and list the essential amino acids.

15. (a) Elucidate the structural and functional significance of essential fatty acids.

Or

(b) Discuss briefly on the synthesis of cholesterol in living organisms.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Summarize the feeding mechanisms of herbivorous, carnivorous and omnivorous fishes.

17. Explain the role of hormones and neurohormones in the physiology of marine animals.

18. Evaluate the role of acid-base balance regulation in maintaining homeostasis of marine animals.

19. Discuss the classification of proteins and their structural levels of organization.

20. Write an essay on the classification of lipids with suitable examples.

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**S–2657**

| Sub. Code |
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| 23BMB4C2 |

**B.Sc. DEGREE EXAMINATION, APRIL 2026**

**Fourth Semester**

**Marine Biology**

**AQUACULTURE**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. CIFE

2. Coastal aquaculture

3. Raft culture

4. IMTA

5. Intensive farming

6. Gas bubble disease

7. Hatchery

8. Live feed

9. MPEDA

10. Feed Conversion Ratio.

## Part B

(5 × 5 = 25)

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

11. (a) Explain the status of coastal aquaculture in India.

Or

(b) Describe about the importance of Inland aquaculture.

12. (a) Write a short note on suitable soil for aquafarm construction.

Or

(b) Describe about the site selection for aquaculture.

13. (a) Explain about the economic importance of marine macroalgae.

Or

(b) Write about the different methods involved in open sea farming.

14. (a) What are the different types of hatcheries?

Or

(b) Describe about the importance of live feed culture in aquaculture.

15. (a) Write a brief note on feed formulation procedure.

Or

(b) Write a short note on feed ingredients and its nutritive value.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Write an account on international status of aquaculture and its socio-economic issues.

17. Explain in detail about seaweed farming and its types.

18. Describe in detail — Fish farm management practices.

19. Describe about shellfish hatchery and its management.

20. Explain the role of non-governmental agencies in fisheries development.

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**S–2658**

| Sub. Code |
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| 23BMB5C1 |

**B.Sc. DEGREE EXAMINATION, APRIL 2026**

**Fifth Semester**

**Marine Biology**

**MARINE POLLUTION**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. Biological Oxygen Demand

2. Biomagnification

3. Food-web

4. Stormwater

5. MARPOL

6. Exxon Valdez

7. DDT

8. Conservative pollutant

9. Cadmium poisoning

10. Red tide phenomenon.

## Part B (5 × 5 = 25)

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

11. (a) Explain the various sources of marine pollution.

Or

(b) Write a short account on BOD and its significance.

12. (a) Illustrate the impact of sewage pollution on marine environment.

Or

(b) What are the major effects and sources of microplastics pollution on marine organisms?

13. (a) What are the sources of oil pollution on marine environment?

Or

(b) Describe types and properties of oil spills.

14. (a) Briefly discuss about DDT and its effects on marine environment.

Or

(b) Describe about the sources of pesticide in the marine environment.

15. (a) Write a short note on mercury pollution and impacts on human health.

Or

(b) What are the roles and significance of GESAMP?

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Write an essay on the classification of major marine pollutants.

17. Explain about the major sources and effects of sewage pollution on marine environment.

18. Write a detailed account on fate of oil pollution and its treatment methods.

19. Write an essay on impacts of pesticides on the environment.

20. Explain about sources and impacts of heavy metal pollution.

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**S–2660**

| Sub. Code |
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| 23BMB5C3 |

**B.Sc. DEGREE EXAMINATION, APRIL 2026**

**Fifth Semester**

**Marine Biology**

**SEAFOOD PROCESSING TECHNOLOGY**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. CSW.

2. Dry Ice

3. Oxidation

4. Autolysis

5. Refrigerant

6. Antibiotics

7. Retorting

8. Exhausting

9. Agar Agar

10. CIFA.

## Part B (5 × 5 = 25)

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

11. (a) Write a note on the methods of fish handling and transportation on board fishing vessels and on shore.

Or

(b) Describe the manufacture of ice and discuss the importance of ice quality in fish storage.

12. (a) Write a note on the post-mortem changes in fish and their role in spoilage.

Or

(b) Explain the biochemical and microbiological changes during fish spoilage.

13. (a) Write notes on: (i) Fish curing methods, (ii) Role of salt in fish preservation.

Or

(b) Discuss in detailed about advantages of freeze drying.

14. (a) Explain the steps involved in fish canning process with a neat flow chart.

Or

(b) Summarise the spoilage problems associated with canned foods and describe the preventive measures adopted.

15. (a) Explain the production and applications of fish by-products.

Or

(b) Describe the industrial and commercial uses of seaweed-derived products like agar-agar, algin and carrageenan.

**Part C** (3 × 10 = 30)

Answer any **three** questions.

16. Summarise the role of refrigerated sea water systems and insulated containers in maintaining the freshness of fish during transportation.

17. Describe the chemical changes and microbial load influencing fish quality after harvest.

18. Discuss the use of antibiotics and chemicals in fish processing and their implications for food safety.

19. Draw a neat flow chart for the canning of sardines and explain each step briefly.

20. Elaborate on packaging and transportation techniques of fresh and processed fish.

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**S–2661**

| Sub. Code |
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| 23BMB5E1 |

**B.Sc. DEGREE EXAMINATION, APRIL 2026**

**Fifth Semester**

**Marine Biology**

**Elective – MARINE RESOURCES**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. Polymetallic sulphides.

2. Magma

3. Ocean floor

4. Gas hydrates

5. Demersal fishes

6. Macroalgae

7. Alkaloids

8. Anti-inflammatory drugs

9. Paralytic Shellfish Toxins

10. Conotoxins

## Part B (5 × 5 = 25)

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

11. (a) Write a short note on deep ocean mining.

Or

(b) Describe about the ocean resource conservation strategies.

12. (a) What are the methods adopted for marine mineral explorations?

Or

(b) Describe a modern method to identify mineral deposits on the seafloor.

13. (a) Write a detailed note on fishing vessel management.

Or

(b) Write about the reasons for fisheries resources depletion.

14. (a) What are marine bioactive compounds? Elaborate with molluscans as an example.

Or

(b) Describe the classifications of marine drugs.

15. (a) Discuss and differentiate – toxin and venom.

Or

(b) What are the causes and impacts of algal blooms?

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Write an essay on the significance of marine resource conservation.

17. Describe the sources and applications of marine minerals.

18. Write a detailed note on marine microalgae as a potent bioresource.

19. Describe in detail - Pharmacological applications of sponges.

20. What are the applications of marine biotoxins? Explain with examples

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**S–2662**

| Sub. Code |
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| 23BMB5E2 |

**B.Sc. DEGREE EXAMINATION, APRIL 2026**

**Fifth Semester**

**Marine Biology**

**Elective – AQUARIUM FISH KEEPING**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. Live bearer

2. Java Fern

3. Gravels

4. Aerator

5. Probiotics

6. Algae

7. Dropsy

8. Gill Flukes

9. Hypophysation

10. Spawning

## Part B (5 × 5 = 25)

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

11. (a) Explain the different types of aquaria and discuss their importance in education and recreation.

Or

(b) Differentiate between exotic and indigenous ornamental fishes with suitable examples, and analyze their role in the aquarium trade.

12. (a) Describe the essential construction materials required for designing a freshwater and marine aquarium.

Or

(b) Illustrate the role of pumps, filters, aerators and lights in maintaining the aquarium environment with suitable examples.

13. (a) Explain the key steps involved in the care and maintenance of an aquarium.

Or

(b) Discuss the criteria you would use for selecting suitable ornamental fishes for a freshwater aquarium.

14. (a) Describe the methods of prevention and control of fish diseases in an aquarium.

Or

(b) Discuss the role of good management practices in reducing the occurrence of fish diseases.

15. (a) Describe the brooder management practices essential for successful hatchery production.

Or

(b) Discuss the different breeding techniques used for ornamental fishes.

**Part C** (3 × 10 = 30)

Answer any **three** questions.

16. Evaluate the present status and future prospects of aquarium fish culture and trade in India compared to the global scenario.

17. Describe the advantages and limitations of using different construction materials in aquarium design.

18. Analyze the role of feeds and probiotics in improving fish health and maintaining water quality in aquaria.

19. Explain the management of bacterial, fungal, and viral diseases in ornamental fishes. Describe the methods of prevention and control

20. Explain the design and construction of fish hatcheries and farms with reference to their functional requirement

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**S–2663**

| Sub. Code |
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| 23BMB6C1 |

**B.Sc. DEGREE EXAMINATION, APRIL 2026**

**Sixth Semester**

**Marine Biology**

**IMMUNOLOGY AND GENETICS**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. Passive immunity

2. Bursa of Fabricius

3. Allergic reactions

4. Monoclonal antibodies

5. Law of segregation

6. Epistasis

7. Codominance

8. Haemophilia

9. Alkaptonuria

10. Euthenics

## Part B (5 × 5 = 25)

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

11. (a) Differentiate between active and passive immunity with examples.

Or

(b) Explain the role of thymus and bone marrow in immune responses.

12. (a) Summarize the major functions of immunoglobulins in immune defense.

Or

(b) Write a note on autoimmune diseases and their causes.

13. (a) Describe Mendel's law of segregation with suitable examples.

Or

(b) Explain the inheritance of skin colour in man as an example of polygenic trait.

14. (a) Write a short note on linkage and crossing over in Drosophila with suitable examples.

Or

(b) Give an account on the inheritance pattern and molecular basis of haemophilia.

15. (a) Discuss the characteristics, causes, and consequences of Klinefelter syndrome.

Or

(b) Explain the concepts of eugenics.

**Part C** (3 × 10 = 30)

Answer any **three** questions.

16. Discuss the different types of immunity in living organisms.

17. Explain the methods used in the diagnosis and treatment of autoimmune diseases.

18. Elucidate the concept of epistasis and differentiate between dominant and recessive epistasis.

19. Discuss the concepts of intersexes, gynandromorphs, and sex mosaics with examples.

20. Explain the concept of inborn errors of metabolism with suitable examples.

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**S–2664**

| Sub. Code |
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| 23BMB6E1 |

**B.Sc. DEGREE EXAMINATION, APRIL 2026**

**Sixth Semester**

**Marine Biology**

**Elective – COASTAL DISASTER MANAGEMENT**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** the following questions.

1. Hazard.
2. Disaster.
3. Habitat
4. Sea level change
5. Mitigation assessment.
6. Disaster Mitigation.
7. Climate
8. Natural disaster
9. Geohazard
10. Meterology

## Part B (5 × 5 = 25)

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

11. (a) Write a short note on hazard as natural process.

Or

(b) Give an account on method of evaluating the hazard.

12. (a) Give an account on marine resource depletion.

Or

(b) Write a short note on earth quakes.

13. (a) Write a short note on environmental hazard.

Or

(b) Evaluate and explain various types of mitigation measures.

14. (a) Explain the about nature and humanity

Or

(b) Write a short note on loss of resources.

15. (a) Give an account on tents in climatology.

Or

(b) Explain about natural disaster reduction.

## Part C

(3 × 10 = 30)

Answer any **three** questions.

16. Write in detail about the benefits and importance of disasters.

17. Explain in detail about the preventative measures and early warning systems.

18. Write an essay on causes, characteristics and effects of various disasters.

19. Write in detail about the relationship of nature, humanity and development.

20. Give a detailed account on seismic activities and training for emergency management.

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**S–2665**

**Sub. Code**
**23BMB6E2**

**B.Sc. DEGREE EXAMINATION, APRIL 2026**

**Sixth Semester**

**Marine Biology**

**Elective – MARINE BIOFOULING AND MANAGEMENT**

**(CBCS – 2023 onwards)**

Time : 3 Hours Maximum : 75 Marks

**Part A** (10 × 2 = 20)

Answer **all** questions.

1. Corrosion.

2. Oxidation.

3. Biofilm.

4. Pollution.

5. Biocorrosion.

6. Name two biofouling causing organisms.

7. *In situ* cultivation.

8. Imposex.

9. Antifoulants.

10. Dry docking.

## Part B (5 × 5 = 25)

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

11. (a) Describe about the basic aspects of corrosion.

Or

(b) Give an account on mechanism of corrosion.

12. (a) Describe the process of macro fouling.

Or

(b) Write in detail about the factors inducing biofouling.

13. (a) Assess the role of macro fouling communities.

Or

(b) Evaluate various varieties of bacterial communities in the initial stages of biofouling.

14. (a) Write a short note on mariculture.

Or

(b) Give an account on marine vessels.

15. (a) Justify the use of antifouling chemicals in marine structures.

Or

(b) How is biofouling controlled'? What are the methods adopted to control fouling biota?

## Part C (3 × 10 = 30)

Answer any **three** questions.

16. What is Corrosion? Explain in detail about the types and mechanism of corrosion.

17. Give a detailed account on basics of biofouling.

18. Describe in detail about the role of microorganisms in biocorrosion.

19. Give a brief account on economic losses and health hazards of biofouling.

20. Write an essay on the importance of anti fouling paints and measures.

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