R7351	Sub. Code
	548301

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Third Semester

Integrated Marine Biology

INVERTEBRATES

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Polymorphic

2. Coral reefs

3. Medusa

4. Particulate feeding

5. Veliger

6. Moulting

7. Zoea larva

8. Torsion

9. Tube feet

10. Coelom

Part B (5 × 5 = 25)

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

11. (a) Describe the morphological characteristics of protozoan.

Or

(b) Explain the reproduction in protozoan with suitable example.

12. (a) Explain the functional morphology of Nemertinea and Phoronida.

Or

(b) Discuss the anatomical and morphological characteristics of chaetognatha.

13. (a) Give short note on feeding mechanism in Polychaete.

Or

(b) Briefly explain the adaptive radiation in Polycheate.

14. (a) Write about the molluscan classification with suitable example.

Or

(b) Give an account on the general characters of Mollusca.

15. (a) Comment on the regeneration in Echinodermata with example.

Or

(b) Explain the water vascular system in Echinodermata.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss in detail about the theories on coral reefs with suitable examples.

17. Illustrate about the palaeontology and evolution of brachiopoda.

18. Describe the reproduction and larval development in polychaeta with example.

19. Elaborate on the phylogenetic relationship in phylum mollusca.

20. Describe the reproduction and larval forms of Echinodermata with example.

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R7352	Sub. Code
	548302

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Third Semester

Integrated Marine Biology

VERTEBRATES

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Acrania
2. Epoch
3. Acanthodia
4. Connecting link
5. Stem reptiles
6. Crocodile and alligator
7. Marsupium
8. Sudoriferous gland
9. Blastopore
10. Splanchnopleure

Part B (5 × 5 = 25)

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

11. (a) Elaborate the classification of Chordata with suitable examples.

Or

(b) Write a short account on the origin of Chordates.

12. (a) Explain the evolution and adaptive radiation of chondrichthyes and Osteichthyes.

Or

(b) Discuss in detail about the affinities of urodela and Apoda.

13. (a) Discuss the origin and evolution of Seymouria.

Or

(b) Write a note on marine lizards.

14. (a) Explain the general characteristics of mammals and write its outline classification.

Or

(b) Write an account on skin deviation in mammals.

15. (a) Describe the formation of germ layers in fishes.

Or

(b) What you understand about axis formation and explain its significance.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Elaborate the chordate features and discuss the origin of chordates through geological time scale.

17. Write a detailed account on special features and affinities of urodela and Apoda.

18. Write an essay on adaptive radiation of contemporary reptiles.

19. Discuss an evolution of man.

20. Describe the embryogenesis of fish.

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R7353	Sub. Code
	9MB3A1

M.Sc. (Integrated Marine Biology) DEGREE EXAMINATION, NOVEMBER – 2022

Third Semester

Allied III – BOTANY– I

(PLANT DIVERSITY, PLANT PATHOLOGY AND ANATOMY THALLOPHYTA)

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Hormorgonia

2. Floridean starch

3. Haircap moss

4. Seta

5. Small club moss

6. Glossopodium

7. Microsporophyll

8. Monoecious

9. Simple tissue

10. Sclerenchyma

Part B (5 × 5 = 25)

Answer **all** questions

11. (a) Explain about oscillatorial movement.

Or

(b) List out the main characters of Rhodophyceae.

12. (a) Briefly explain the general characters of Polytichum.

Or

(b) Discuss about the Life history of Moss.

13. (a) List out the general characters of *Selaginella*.

Or

(b) Discuss about the Life history of *Selaginella*.

14. (a) List out the general characters of *Pinus*.

Or

(b) Explain about the structures of *Pinus*.

15. (a) Write about the types of simple tissue.

Or

(b) Discuss about the secondary thickening in dicot stem.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write an essay on the life cycle pattern of *Polysiphonia*.

17. Describe in detail about the causes, symptoms and preventive measures of bunchy top of banana.

18. Give an account on the life cycle pattern in *Selaginella*.

19. Give a detailed account on the life cycle pattern in *Pinus*.

20. Write an essay on the complex tissue.

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R7813	Sub. Code
	548901

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Ninth Semester

Integrated Marine Biology

MARINE MICROBIOLOGY

(CBCS – 2018 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

All questions carry equal marks.

1. What is tropical rainforests of the sea?
2. Define meroplankton with example.
3. How do you use Niskin water sampler?
4. Note on Bongo net and its application.
5. What is PDA?
6. Define pure culture.
7. Mention the role of nitrosomonas.
8. Note on sulphur-reducing bacteria.
9. What is spirulina?
10. Define probiotics.

Part B (5 × 5 = 25)

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

11. (a) Give a short account on types of estuaries and their microbial diversity.

Or

(b) Discuss briefly about extremophiles and their role in marine environment.

12. (a) Explain the various methods of microbial sampling from sea water.

Or

(b) Explain the procedure adopted during sediment sampling from coastal environment.

13. (a) List out various methods of identification of Gram +ve bacteria.

Or

(b) Describe the various types of culture media for fungus and their preparation.

14. (a) Write a short account on carbon cycle.

Or

(b) Discuss the role of microbes on phosphorous cycle.

15. (a) Describe the procedure adopted in mushroom culture.

Or

(b) Write a short account on exopolysaccharides.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write a detailed account on microbial diversity in mangrove ecosystem.

17. Discuss in detail about the different types of plakton nets and their characteristics.

18. Write an elaborate account on use of molecular markers for genome analysis and bacterial identification.

19. Explain the role of microbes in nutrient cycle.

20. Give a detailed account on the role of microorganisms in fermentation technology.

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R7814	Sub. Code 548902

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Ninth Semester

Integrated Marine Biology

ENVIRONMENTAL IMPACT ASSESSMENT

(CBCS – 2018 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

All questions carry equal marks.

1. What is EIA?
2. What is CRZ and its importance?
3. Define Biotic community.
4. Note on spatial replication.
5. Define spring and neap tide.
6. Define benthos with example.
7. What are marine bioindicators?
8. Define taxonomic sufficiency.
9. Note on Bary – Curtis similarity.
10. What is ABC curves?

Part B (5 × 5 = 25)

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

11. (a) Explain the types of impact assessment.

Or

(b) Discuss the key elements of an EIA process.

12. (a) What is sample and sample design? Explain the methods of sample collection.

Or

(b) Give a brief account on air quality index.

13. (a) Explain the various physical factors of marine environment.

Or

(b) Describe the characteristics of fecal coliform and its impacts.

14. (a) Discuss benthic quality index and its applications.

Or

(b) Give an account on EIA monitoring and management.

15. (a) What are univariate measures? Explain its uses.

Or

(b) Explain multivariate dispersion indices with suitable example.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Give a detailed account on objectives, Laws, notifications and reforms of CRZ in India.

17. Discuss in detail about the spatial and temporal replication in biotic communities.

18. Write an essay on hydrodynamics, physical and chemical characteristics of marine environment.

19. Give a detailed account on biological indicators.

20. Write an essay on principal component analysis and its applications.

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R7815	Sub. Code
	548903

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Ninth Semester

Integrated Marine Biology

RESEARCH METHODS IN MARINE BIOLOGY

(CBCS – 2018 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

All questions carry equal marks.

1. What is a research abstract?
2. Define predictive data analysis.
3. Note on haematoxylin and its uses.
4. How do you estimate moisture content?
5. Define centripetal force.
6. Define pH.
7. Define Rf value.
8. Note on thermocycler.
9. Define Kurtosis with example.
10. Note on NCBI.

Part B (5 × 5 = 25)

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

11. (a) Describe the types of literature review methods.

Or

(b) Write an account on methods of presentation of results in research.

12. (a) Write a short account on staining techniques in histology.

Or

(b) Briefly discuss the principles and applications of histochemistry.

13. (a) Describe the principle, procedure and applications of atomic absorption spectrophotometer.

Or

(b) Write a short account on types and applications of centrifuge.

14. (a) Explain the principles and applications of different types of chromatography.

Or

(b) Write an account on cDNA library.

15. (a) Explain mean, median, mode and standard deviation with suitable data.

Or

(b) Discuss briefly about different biological databases.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss in detail about computer and techniques in thesis preparation.

17. Describe the various steps of slide preparation of a histological specimen.

18. Write an essay on NMR and its applications.

19. Explain the principles, types, methods and applications of electrophoresis.

20. Give a detailed account on role of biostatistics in research.

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R7816	Sub. Code
	548E09

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Nineth Semester

Integrated Marine Biology

MARICULTURE

(CBCS – 2018 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.
All questions carry equal marks.

1. Define coastal aquaculture.

2. Define natural stock.

3. What is sluice gate?

4. What is pen in fish forming?

5. Write short note on predators.

6. Define hatchery.

7. Write short note on Lobster.

8. What is eyestalk ablation?

9. Define seaweed.

10. What is aquaculture extension?

Part B (5 × 5 = 25)

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

11. (a) Describe the problems in coastal aquaculture.

Or

(b) Give an account on importance of mariculture.

12. (a) Brief note on raceway practice in aquaculture.

Or

(b) Draw general structure of aquaculture from and write a note.

13. (a) Brief note on disease control methods in aquaculture.

Or

(b) Write a detail note on farm management.

14. (a) How do you select species for mariculture?

Or

(b) Write detail note on lobster-mariculture.

15. (a) Write detail note on economic importance of seaweeds.

Or

(b) Write detail note on care and maintenance of open sea cage.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write an essay on structure, operation and maintenance of aquaculture farm.

17. Write an essay on open sea farming in aquaculture.

18. Write an essay on hatchery management and production.

19. Describe in detail about and biology and culture practice of sea bass.

20. Write detail note on recent and future perspective of open sea farming.

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R7351	Sub. Code
	548301

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Third Semester

Integrated Marine Biology

INVERTEBRATES

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Polymorphic

2. Coral reefs

3. Medusa

4. Particulate feeding

5. Veliger

6. Moulting

7. Zoea larva

8. Torsion

9. Tube feet

10. Coelom

Part B (5 × 5 = 25)

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

11. (a) Describe the morphological characteristics of protozoan.

Or

(b) Explain the reproduction in protozoan with suitable example.

12. (a) Explain the functional morphology of Nemertinea and Phoronida.

Or

(b) Discuss the anatomical and morphological characteristics of chaetognatha.

13. (a) Give short note on feeding mechanism in Polychaete.

Or

(b) Briefly explain the adaptive radiation in Polycheate.

14. (a) Write about the molluscan classification with suitable example.

Or

(b) Give an account on the general characters of Mollusca.

15. (a) Comment on the regeneration in Echinodermata with example.

Or

(b) Explain the water vascular system in Echinodermata.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss in detail about the theories on coral reefs with suitable examples.

17. Illustrate about the palaeontology and evolution of brachiopoda.

18. Describe the reproduction and larval development in polychaeta with example.

19. Elaborate on the phylogenetic relationship in phylum mollusca.

20. Describe the reproduction and larval forms of Echinodermata with example.

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R7352	Sub. Code
	548302

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Third Semester

Integrated Marine Biology

VERTEBRATES

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Acrania
2. Epoch
3. Acanthodia
4. Connecting link
5. Stem reptiles
6. Crocodile and alligator
7. Marsupium
8. Sudoriferous gland
9. Blastopore
10. Splanchnopleure

Part B (5 × 5 = 25)

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

11. (a) Elaborate the classification of Chordata with suitable examples.

Or

(b) Write a short account on the origin of Chordates.

12. (a) Explain the evolution and adaptive radiation of chondrichthyes and Osteichthyes.

Or

(b) Discuss in detail about the affinities of urodela and Apoda.

13. (a) Discuss the origin and evolution of Seymouria.

Or

(b) Write a note on marine lizards.

14. (a) Explain the general characteristics of mammals and write its outline classification.

Or

(b) Write an account on skin deviation in mammals.

15. (a) Describe the formation of germ layers in fishes.

Or

(b) What you understand about axis formation and explain its significance.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Elaborate the chordate features and discuss the origin of chordates through geological time scale.

17. Write a detailed account on special features and affinities of urodela and Apoda.

18. Write an essay on adaptive radiation of contemporary reptiles.

19. Discuss an evolution of man.

20. Describe the embryogenesis of fish.

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R7353	Sub. Code
	9MB3A1

M.Sc. (Integrated Marine Biology) DEGREE EXAMINATION, NOVEMBER – 2022

Third Semester

Allied III – BOTANY– I

(PLANT DIVERSITY, PLANT PATHOLOGY AND ANATOMY THALLOPHYTA)

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Hormorgonia

2. Floridean starch

3. Haircap moss

4. Seta

5. Small club moss

6. Glossopodium

7. Microsporophyll

8. Monoecious

9. Simple tissue

10. Sclerenchyma

Part B (5 × 5 = 25)

Answer **all** questions

11. (a) Explain about oscillatorial movement.

Or

(b) List out the main characters of Rhodophyceae.

12. (a) Briefly explain the general characters of Polytichum.

Or

(b) Discuss about the Life history of Moss.

13. (a) List out the general characters of *Selaginella*.

Or

(b) Discuss about the Life history of *Selaginella*.

14. (a) List out the general characters of *Pinus*.

Or

(b) Explain about the structures of *Pinus*.

15. (a) Write about the types of simple tissue.

Or

(b) Discuss about the secondary thickening in dicot stem.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write an essay on the life cycle pattern of *Polysiphonia*.

17. Describe in detail about the causes, symptoms and preventive measures of bunchy top of banana.

18. Give an account on the life cycle pattern in *Selaginella*.

19. Give a detailed account on the life cycle pattern in *Pinus*.

20. Write an essay on the complex tissue.

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R7813	Sub. Code
	548901

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Ninth Semester

Integrated Marine Biology

MARINE MICROBIOLOGY

(CBCS – 2018 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

All questions carry equal marks.

1. What is tropical rainforests of the sea?
2. Define meroplankton with example.
3. How do you use Niskin water sampler?
4. Note on Bongo net and its application.
5. What is PDA?
6. Define pure culture.
7. Mention the role of nitrosomonas.
8. Note on sulphur-reducing bacteria.
9. What is spirulina?
10. Define probiotics.

Part B (5 × 5 = 25)

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

11. (a) Give a short account on types of estuaries and their microbial diversity.

Or

(b) Discuss briefly about extremophiles and their role in marine environment.

12. (a) Explain the various methods of microbial sampling from sea water.

Or

(b) Explain the procedure adopted during sediment sampling from coastal environment.

13. (a) List out various methods of identification of Gram +ve bacteria.

Or

(b) Describe the various types of culture media for fungus and their preparation.

14. (a) Write a short account on carbon cycle.

Or

(b) Discuss the role of microbes on phosphorous cycle.

15. (a) Describe the procedure adopted in mushroom culture.

Or

(b) Write a short account on exopolysaccharides.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write a detailed account on microbial diversity in mangrove ecosystem.

17. Discuss in detail about the different types of plakton nets and their characteristics.

18. Write an elaborate account on use of molecular markers for genome analysis and bacterial identification.

19. Explain the role of microbes in nutrient cycle.

20. Give a detailed account on the role of microorganisms in fermentation technology.

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R7814	Sub. Code 548902

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Ninth Semester

Integrated Marine Biology

ENVIRONMENTAL IMPACT ASSESSMENT

(CBCS – 2018 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

All questions carry equal marks.

1. What is EIA?
2. What is CRZ and its importance?
3. Define Biotic community.
4. Note on spatial replication.
5. Define spring and neap tide.
6. Define benthos with example.
7. What are marine bioindicators?
8. Define taxonomic sufficiency.
9. Note on Bary – Curtis similarity.
10. What is ABC curves?

Part B (5 × 5 = 25)

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

11. (a) Explain the types of impact assessment.

Or

(b) Discuss the key elements of an EIA process.

12. (a) What is sample and sample design? Explain the methods of sample collection.

Or

(b) Give a brief account on air quality index.

13. (a) Explain the various physical factors of marine environment.

Or

(b) Describe the characteristics of fecal coliform and its impacts.

14. (a) Discuss benthic quality index and its applications.

Or

(b) Give an account on EIA monitoring and management.

15. (a) What are univariate measures? Explain its uses.

Or

(b) Explain multivariate dispersion indices with suitable example.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Give a detailed account on objectives, Laws, notifications and reforms of CRZ in India.

17. Discuss in detail about the spatial and temporal replication in biotic communities.

18. Write an essay on hydrodynamics, physical and chemical characteristics of marine environment.

19. Give a detailed account on biological indicators.

20. Write an essay on principal component analysis and its applications.

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R7815	Sub. Code
	548903

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Ninth Semester

Integrated Marine Biology

RESEARCH METHODS IN MARINE BIOLOGY

(CBCS – 2018 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

All questions carry equal marks.

1. What is a research abstract?
2. Define predictive data analysis.
3. Note on haematoxylin and its uses.
4. How do you estimate moisture content?
5. Define centripetal force.
6. Define pH.
7. Define Rf value.
8. Note on thermocycler.
9. Define Kurtosis with example.
10. Note on NCBI.

Part B (5 × 5 = 25)

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

11. (a) Describe the types of literature review methods.

Or

(b) Write an account on methods of presentation of results in research.

12. (a) Write a short account on staining techniques in histology.

Or

(b) Briefly discuss the principles and applications of histochemistry.

13. (a) Describe the principle, procedure and applications of atomic absorption spectrophotometer.

Or

(b) Write a short account on types and applications of centrifuge.

14. (a) Explain the principles and applications of different types of chromatography.

Or

(b) Write an account on cDNA library.

15. (a) Explain mean, median, mode and standard deviation with suitable data.

Or

(b) Discuss briefly about different biological databases.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss in detail about computer and techniques in thesis preparation.

17. Describe the various steps of slide preparation of a histological specimen.

18. Write an essay on NMR and its applications.

19. Explain the principles, types, methods and applications of electrophoresis.

20. Give a detailed account on role of biostatistics in research.

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R7816	Sub. Code
	548E09

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Nineth Semester

Integrated Marine Biology

MARICULTURE

(CBCS – 2018 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.
All questions carry equal marks.

1. Define coastal aquaculture.

2. Define natural stock.

3. What is sluice gate?

4. What is pen in fish forming?

5. Write short note on predators.

6. Define hatchery.

7. Write short note on Lobster.

8. What is eyestalk ablation?

9. Define seaweed.

10. What is aquaculture extension?

Part B (5 × 5 = 25)

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

11. (a) Describe the problems in coastal aquaculture.

Or

(b) Give an account on importance of mariculture.

12. (a) Brief note on raceway practice in aquaculture.

Or

(b) Draw general structure of aquaculture from and write a note.

13. (a) Brief note on disease control methods in aquaculture.

Or

(b) Write a detail note on farm management.

14. (a) How do you select species for mariculture?

Or

(b) Write detail note on lobster-mariculture.

15. (a) Write detail note on economic importance of seaweeds.

Or

(b) Write detail note on care and maintenance of open sea cage.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write an essay on structure, operation and maintenance of aquaculture farm.

17. Write an essay on open sea farming in aquaculture.

18. Write an essay on hatchery management and production.

19. Describe in detail about and biology and culture practice of sea bass.

20. Write detail note on recent and future perspective of open sea farming.

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R7354	Sub. Code
	548501

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022.

Fifth Semester

Integrated Marine Biology

BIOCHEMISTRY

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Thermodynamics

2. Acid base

3. Monosaccharides

4. Carbohydrates

5. Carboxyl groups

6. Amino acids

7. Lipids

8. HDL

9. HMP

10. Ribonucleic acid

Part B (5 × 5 = 25)

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

11. (a) Describe the principles of thermodynamics laws.

Or

(b) Write brief notes on the handerson and hasselbalch equation.

12. (a) How will you estimate the carbohydrate level in fish sample?

Or

(b) Briefly explain on the following:

(i) Monosaccharides

(ii) Disaccharides

(iii) Polysaccharides

13. (a) Elaborate the methods used for estimation of proteins.

Or

(b) Write short notes on classification of amino acids.

14. (a) Write notes on the properties of saturated and unsaturated fatty acids.

Or

(b) Explain about the HDL and LDL.

15. (a) Describe briefly on the glycolytic pathway.

Or

(b) Explain pentose phosphate pathway.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain in detail about micro and macromolecules.

17. Write an essay on the structure and function of carbohydrates.

18. Describe elaborately on the isoelectric point of proteins.

19. What are the general characteristics of fatty acids?

20. Explain the Good Laboratory Practices.

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R7355	Sub. Code 548502

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022.

Fifth Semester

Integrated Marine Biology

COASTAL AND BRACKISH WATER AQUACULTURE

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Mariculture

2. Topography

3. Raft culture

4. Dyke

5. Predators

6. Rhodophytes

7. *Penaeus monodon*

8. Brood stock

9. CAA

10. Expand FFDA and BFFDA

Part B (5 × 5 = 25)

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

11. (a) Briefly explain the remedial measures to overcome socio-economic problems of fish farmers.

Or

(b) Write short notes on importance of mariculture.

12. (a) Discuss briefly on the advantages and disadvantages of open sea farming.

Or

(b) What is eutrophication and their impact on shrimp farm?

13. (a) Give a brief account on economic importance of seaweeds.

Or

(b) Explain briefly the stocking and feeding schedules followed in shrimp farms.

14. (a) Write notes on Induced breeding techniques in fish hatchery.

Or

(b) Write briefly on the various filters used in shrimp hatcheries.

15. (a) Explain briefly the following.

(i) Alternate livelihood

(ii) Additional livelihood

Or

(b) Comment on fishing ban season.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write an essay on the overexploitation and sustainable fishing.

17. Write an essay on the selection of a suitable site for shrimp hatchery?

18. Give a detailed account on the water quality management in aquaculture pond.

19. Write an essay on the procedures involved in importing *Vannamei* brooders.

20. Write an essay on the role of CMFRI in fishery regulation.

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R7356	Sub. Code
	548E01

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Fifth Semester

Integrated Marine Biology

MARINE BIODIVERSITY AND CONSERVATION

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** the questions.

1. Define species diversity.

2. Write a short note on biological resources.

3. What is conservation?

4. Define ex-situ.

5. Write a short note on biosphere.

6. Define marine protected area.

7. Write a short note on sunderban mangrove forest.

8. Write a short note on marine national park?

9. Explain the role of national biodiversity authority.

10. Define ecotone.

Part B (5 × 5 = 25)

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

11. (a) Describe the ecological importance of biodiversity.

Or

(b) Discuss the cause of species extinction.

12. (a) What are the problems involved in small population?

Or

(b) Discuss the importance of population biology.

13. (a) Write a detailed note on marine protected areas.

Or

(b) Write a detailed note on restoration ecology.

14. (a) Explain why marine biodiversity is unique.

Or

(b) What are the obstacles in protecting marine environment?

15. (a) Discuss the National Biodiversity Act.

Or

(b) Write a detailed note global warming impact on biodiversity.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Write an essay on marine biodiversity and resources.

17. Discuss the conservation strategies.

18. Write a detailed note on Indian national marine biosphere reserve.

19. Write a note on biological and cultural diversity.

20. Write a detailed note on national and international approaches for marine conservation.

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R7357	Sub. Code
	548E02

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022.

Fifth Semester

Integrated Marine Biology

COASTAL ZONE MANAGEMENT

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Write a short note on estuaries.

2. Write a short note on IMO.

3. What is conservation?

4. Define biosphere reserve.

5. Write a short note on biosphere.

6. Define marine protected area.

7. Define global warming.

8. Write a short note on coastal erosion?

9. Write a short note on FAO.

10. Write a short note on role of MPEDA.

Part B (5 × 5 = 25)

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

11. (a) Describe the major threats to coastal ecosystem.

Or

(b) Write a detailed note on scientific expedition of World Ocean.

12. (a) What are the coastal resources?

Or

(b) Write a note on strict nature reserve.

13. (a) Describe the tropical cyclones.

Or

(b) Discuss the monitoring strategies of marine pollution.

14. (a) Write a detailed note on "Coastal Zone Management Issue, CRZ.

Or

(b) Discuss the interaction of wave with Groins.

15. (a) Discuss role of INCOIS in ocean management.

Or

(b) Describe the recent developments in ocean research.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write a detailed note on major coastal marine ecosystem.

17. Write an essay on Indian national marine biosphere reserve.

18. Write an essay on natural hazards.

19. Write a detailed note on coastal protection structure.

20. Write a detailed note on international agencies which involve in ocean management.

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R7358	Sub. Code
	548701

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Seventh Semester

Integrated Marine Biology

IMMUNOLOGY

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Interferon
2. Peyer's patches
3. Fab
4. Idiotype
5. Super antigen
6. Avidity
7. Negative selection
8. CD_8
9. Opsonization
10. Germinal centre

Part B (5 × 5 = 25)

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

11. (a) Give an account on difference between active and passive immunity with examples.

Or

(b) Critically discuss Bursa of Fabricius.

12. (a) Explain the structure and function of IgA antibody.

Or

(b) Describe the characteristics of IgM antibody.

13. (a) What is an autoimmune disease? Explain with suitable example.

Or

(b) How does immune system recognize tumour?

14. (a) Describe the different stages of lymphocyte maturation.

Or

(b) Explain the general features of immune responses.

15. (a) What is Macrophage? Add a note on its immunological functions.

Or

(b) Write an account on development of humoral immune responses.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Describe the structure and function of secondary lymphoid organs.

17. Give a detailed account on various types of immunoglobulins.

18. Write an essay on hypersensitivity and its types.

19. Elaborate the role of lymphocytes in immunity.

20. Discuss in detail on the primary and secondary immune responses against an antigen.

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R7359

Sub. Code
548702

M.Sc.DEGREE EXAMINATION, NOVEMBER – 2022

Seventh Semester

Integrated Marine Biology

GENETICS

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Test cross

2. Purity of gametes

3. Hypostasis

4. Pleiotrophism

5. HDN

6. D-antigen

7. Map unit distance

8. Hologenic character

9. PKU

10. Pedigree analysis

Part B (5 × 5 = 25)

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

11. (a) Explain the Law of Independent Assortment with suitable example.

Or

(b) Discuss the importance of Law Dominance.

12. (a) Give a brief account on complementary factors and duplicate factors.

Or

(b) Explain the characteristics of Monogenic and polygenic inheritance.

13. (a) Explain the origin of multiple alleles and add a note on allelomorphism

Or

(b) Describe the process of linkage and mention its significance.

14. (a) What is chromosome mapping and explain its procedure.

Or

(b) Write an account on colour blindness and its genetics.

15. (a) What are inborn errors of metabolism and explain its occurrence in Man.

Or

(b) Discuss the measures of Eugenics and Euthenics

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Write an essay on Mendelisms with suitable examples.

17. Genotype AABB is responsible for black skin colour and aabb is responsible for white skin colour in Man. What will be the skin colour of the offspring from a mating of black with white and what fraction of the F_2 would be expected to be like either parent?

18. Describe the phenomenon of multiple allelism with suitable examples.

19. Write an essay on sex determination and its genetic mechanisms.

20. Give a detailed account on anomalies of chromosomes.

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R7360	Sub. Code 548703

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Seventh Semester

Integrated Marine Biology

APPLICATION OF REMOTE SENSING AND GIS

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. Define remote sensing.
2. What is absorption?
3. What are the types of sensors?
4. Define aerial photography.
5. Define land use changes.
6. What is a wetland mapping?
7. Define NOAA.
8. Define spectrometry.
9. Define GIS.
10. What is the image classification?

Part B (5 × 5 = 25)

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

11. (a) Write a detailed note on fundamentals of electromagnetic radiation.

Or

(b) Write a detailed note on application of remote sensing on vegetation.

12. (a) Discuss about types of remote sensing platforms.

Or

(b) Write a detailed note on multispectral scanners.

13. (a) Describe the wetland mapping.

Or

(b) Write a detailed note on microwave sensing.

14. (a) Write a detailed note on sea sat and its applications.

Or

(b) Describe the Earth Observation System program.

15. (a) Explain about application of GIS.

Or

(b) Give a brief account on DEM.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Write an essay on principal and concepts of remote sensing.

17. Write a detailed note on sensors and platforms.

18. Write an essay on microwave sensing

19. Write an essay on GIS.

20. Write a detailed note on image classification.

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R7361	Sub. Code
	548E04

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022.

Seventh Semester

Integrated Marine Biology

MARINE POLLUTION

(CBCS – 2019 onwards)

Time : Three Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

All questions carry equal marks.

1. What is Pollutant?
2. Define sub lethal effect.
3. Name two pesticides and its composition.
4. Write a note on sewage sludge.
5. Define Bio- Magnification
6. What is High Sea?
7. Write a short note on mussel watch program.
8. Write a note on UNCLOS.
9. Define Biocides.
10. Write short note on ICP?

Part B (5 × 5 = 25)

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

11. (a) Write a note on sources of marine pollution.

Or

(b) Explain about transport path way of pollutants.

12. (a) Describe about sewage pollution.

Or

(b) Write a detailed note on micro plastic pollution.

13. (a) Give an account on sources of heavy metal pollution.

Or

(b) Describe the distribution of heavy metal in marine environment.

14. (a) What is ballast water and its role in marine pollution?

Or

(b) Write a detailed note on thermal pollution.

15. (a) Explain about critical pollutants.

Or

(b) What are the analytical instruments used in marine pollution studies?

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Write an essay on marine pollution.

17. Explain about detergents and its environmental impact.

18. Write about types of pesticide and its environmental impacts.

19. Give a detailed note on oil pollution.

20. Describe the biodegradation and bioremediation in detail.

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