DEPARTMENT OF MARINE BIOLOGY

VIKRAMA SIMHAPURI UNIVERSITY: NELLORE – 524 004

VSU-RECET 2010
(Ph.D. Entrance Examination)
Syllabus & Model Questions

Time: 2 hours Max. Marks: 120

(Each question carries 1 mark. The candidate has to answer 30 questions from Section A, carrying 30 marks and 90 questions from Section B, carrying 90 marks).

SECTION - A

GENERAL APTITUDE (COMMON FOR ALL PG COURSES)

Reasoning (includes mathematical): Number series; Letter series; Codes; Relationship; Classification. (5 Questions)

Logical Reasoning: Understanding the Structure of arguments; evaluating the distinguishing deductive and inductive reasoning; Verbal analogies: Word analogy – Applied analogy; Verbal Classification; Reasoning logical Diagrams: Simple Diagrammatic Relationship, Multi Diagrammatic Relationship; Venn diagram; Analytical Reasoning. (10 Questions)

Data Interpretation: Sources, acquisition and interpretation of data; Quantitative and qualitative data; Graphical representation and mapping of data. (5 Questions)

Information and Communication Technology (ICT): ICT: meaning, advantages, disadvantages and uses; General abbreviations and terminology; Basics of internet and e-mail. (5 Questions)

Research Aptitude: Research: Meaning, Characteristics and types; Steps of Research; Methods of Research; Research ethics. (5 Questions)

SECTION-B

Fundamentals of Marine Biology : Classification of marine environment; zonation of the seas; classification of marine planktonic organisms; role of physico-chemical properties in relation to plankton development in marine environment; ecological significance of plankton in seas and oceans; oceanic nekton; benthos; marine micro benthic communities; meiobenthos; classification of marine algae; biology of deep-sea organisms; adaptations of organisms to deep-sea environment; bioluminescence; marine bio-deterioration- fouling and boring organisms; **Oceanography** : Dimensions of Oceans; physical properties - light, temperature, salinity, density and pressure; thermal properties of sea water; ocean currents; tides; remote sensing techniques in oceanography; chemistry of sea water - composition of sea water; elements and dissolved gases, pH and carbon dioxide systems in sea water; distribution of nutrients in seas and oceans; The sea as biological environment; the main divisions of marine environment; populations of the sea; environmental conditions in relation to biotic divisions ; **Marine**

Ecology : Physico-chemical and biological factors of intertidal zone; coral reefs; mangroves; marine animal associations - commensalisms, symbiosis and parasitism; biogeochemical cycles (Nitrogen, Phosphorous, Carbon) in marine ecosystem; **Marine** Resources : Renewable resources of the oceans - seaweed, mangrove, shell and finfish: their occurrence, distribution and importance, Non-renewable resources of the oceans - salt, magnesium, glauconite, phosphorite, manganese nodules etc.. their exploitation; **Marine Pollution** : - Major pollutants -sources, transport pathways and dynamics; Sewage pollution - industrial agricultural and domestic - impact on marine environment, treatment methods; Heavy metal pollution - sources, distribution, fate and ecological impacts; Pesticide pollution - classification, sources, distribution, fate and ecological impacts; Oil pollution - composition, sources, fate and biological impacts. **Ocean Management and Remote** Sensing: EEZ and its significance; Role of national and International agencies and organizations in Ocean Management; Remote sensing and GIS technologies - Applications in resource assessment, satellites and airborne remote sensing. Coastal **Zone Management:** Coastal zone - definition and importance - Coastal Zone activities -mariculture, tourism, shorefront constructions and their impacts; Integrated coastal zone management.

Marine Invertebrates and Vertebrates: Major phyla - General Principles; taxonomy and Classification- Protozoa, Porifera, Coelenterata, Annelida, Arthropoda with special reference to Crustacea, Mollusca and Echinodermata; Minor phyla - Nemertinea. Endoprocta, Ectoprocta, Phoronida and Pogonophora: Brachiopoda, Chaetognatha; Origin of chordates; Prochordata -classification and comparative morphology; General characters and classification of elasmobranchs and bony fishes; Importance of marine birds; Marine Mammals - Cetacea and Sirenia; aquatic mammals.

Coastal Aquaculture : Importance of coastal aquaculture; global scenario and present status in India; Culture practices - traditional, extensive, semi - intensive and intensive systems; monoculture and polyculture, raceways, cages, pens, raft and racks; construction of coastal aquafarms- site selection, soil conditions, layout, farm design, structure and construction; Criteria for choosing cultivable species, natural seed resources; induced breeding technique of fish, packing and transportation of fish and shrimp seed; shrimp culture and hatchery management - Water quality management, Control of predators, parasites and diseases; sea weed **culture;** pearl culture; Production of live feed - artemia, micro algae, rotifers, copepods; **Marine Fisheries:** Marine fisheries of India: methods of surveying the fishery resources. Principal methods of exploitation of sea fishes - indigenous and modern craft and gears; Principal methods offish preservation and processing in India; Fish byproducts; **Fish Biology:** General morphology and outlines of classification of fishes; identification of marine fishes in South Andhra coast; Basic anatomy of fish - digestive, circulatory, respiratory, nervous and reproductive systems of fish.

Biochemistry and Physiology : Major biomoleculs - carbohydrates, proteins, amino acids, lipids and fatty acids - their structure and function. Nucleic acids - structure and function; Metabolism of carbohydrates, amino acids and Fatty acids Physiology of osmoregulation - ions in body fluids, mechanism of ionic regulation, responses to osmotic conditions, types of osmoregulatory adaptations; Endocrine system - hormones, neurohormones. hormones of reproduction in finfishes and shell fishes, hormone induced colour change in crustaceans; Moulting in crustaceans. **Cell Biology and Genetics** :

Ultra-structure of cell; Structure and function of cell organelles - nucleus, chloroplasts, mitochondria, endoplasmic reticulum, golgi apparatus, lysosomes and peroxisomes; - Cell division- theories of cell division; Mitosis and Meiosis; Principles of genetics, practical applications of genetics - hybridization of fishes, recent trends and techniques in hybridization, selective breeding, cross breeding, development of disease resistance and high quality new strains; **Marine Microbiology** : Morphology and fine structure of bacteria and viruses; Methods of studying marine microorganisms - collection of water, sediment and seafood samples, isolation, identification and culture of bacteria, enumeration, total and viable counts. **Marine** Biotechnology : Definition and types of vectors. Recombinant DNA technology, restriction endonucleases. Nucleotide probes, mapping and gene sequencing: RAPD, RFLP . DNA fingerprinting. Electrophoresis - Paper, agarose, PAGE, Chromatography: Principles of paper, thin layer, gas-liquid chromatography and HPLC; **Immunology** : Immune system in marine invertebrates and vertebrates (specific and nonspecific); mechanisms of immune responses (specific and non-specific); ELISA, PCR, blotting techniques; **Pharmacology** : Biomedical potential of marine bioactive compounds- isolation and mode of action; Eicosanoids and related compounds from marine algae; Antitumour and cytotoxic compounds from marine organisms.

MODEL QUESTIONS

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SECTION – A
GENERAL APTITUDE

1) 196, 256, 324, 400, 484,_____
   A) 576 B) 441 C) 529 D) 625
2) 1/9, 2/27, 8/81, _____, 1024/729
   A) 32/243 B) 128/243 C) 256/243 D) 64/243
3) A man walks 30m towards south. Then Turning to his right, he walks 30m. Then turning to his left, he walks 20m. Again, he turns to his left and walks 30m. How far is the from his initial position?
   A) 20m B) 30m C) 60m D) 50m
4) 64:16::70: _____
   A) 17.5 B) 18.5 C) 21.5 D) 20.5
5) Solve the given equation
   $X^{2+}Y^2=34$; $X^2-Y^2=544$
   The value of X and Y are
   A) ±4, ±3 B) ±5,±3 C) ±3, ±5 D) ±3,±4
6) Mathematical standard deviation is represented by
   A) $\sigma = \sqrt{\frac{\sum Xi - \overline{X}}{N}}$ B) $\sigma = \frac{\sum Xi - \overline{X}}{N}$ C) $\sigma = \sqrt{\frac{(\sum Xi - \overline{X})^2}{N}}$
   D) $\sigma = \sqrt{\frac{(\sum Xi + \overline{X})^2}{N^2}}$
7) Which of the following is not an Internet Browser?
   A) Internet Explorer B) Netscape C) Opera D) AQL
8) Data transfer rate in Modems is measured in
   A) Bits per minute B) Bits per Second
   C) Band Width D) None of the Above
9) Basic steps of research process includes
   A) Problem definition B) Research Design C) Data Collection D) All
10) Which of the following comes under quantitative objective of Research?

A) A study of estimate the demand of product

B) A study of testing the effect of level of education

C) A Study on the impulse buying behavior of customers

D) None

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30)

SECTION – B

31. Whales belongs to

(A) Cetacea (B) Serenia (C) Carnivora (D) Pisivora

32. Indian White shrimp

(A) *Penaeus monodon*

(B) *Penaeus indicus*

(C) *Penaeus vennamei*

(D) *Penaeus chinensis*

33. First larval stage of *Penaeus monodon*

(A) Zoea (B) Mysis (C) Nauplius (D) Protozoea

34. Immune system in shrimp

(A) Specific immune system

(B) Non- specific immune system

(C) Specific & Non- specific

(D) None of these

35. Sinus gland in crustaceans is

(A) Lymphoid organ (B) Reproductive organ (C) Neurohemal organ (D)Sensory organ

36.Mitochondria is absent in

(A) Bacteria (B) Protozoa (C) Bryozoans (D) Virus

37. Biggest chromosomes

(A) Polytene (B) Lampbrush (C) Autosomes (D) None

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120).