

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2012.

Ph.D. (MARINE BIOLOGY)

COURSE CODE : 119

Register Number :

*Signature of the Invigilator
(with date)*

COURSE CODE : 119

Time : 2 Hours

Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each of the question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you -1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. The flow of solvent through a semi-permeable membrane towards the solution side is the phenomenon of
 (A) absorption (B) diffusion (C) osmosis (D) transfusion
2. Enzymes are
 (A) fatty acids (B) vitamins (C) proteins (D) none of these
3. Ethers are isomeric with
 (A) carboxylic acids (B) aldehydes (C) alcohols (D) ketones
4. The function of the salt bridge is to
 (A) allow ions to move from anode to cathode
 (B) allow solutions from one-half cell to the other half cell
 (C) allow the current to flow through the cell and keep the solution electrically neutral
 (D) keep the level of solution same
5. Nucleon is a common name for
 (A) Proton and electron (B) Electron and neutron
 (C) Neutron only (D) Neutron and proton
6. What is the basic difference between ultraviolet, visible, and infrared radiation?
 (A) Half-life (B) Temperature
 (C) Wavelength (D) Wave velocity
7. Fishes are characterized by
 (A) two chamber heart (B) venous heart
 (C) branchial heart (D) all the above
8. Ocean zone confined to the ocean trenches, which are deeper than 6,000 meters called
 (A) neritic (B) hadal (C) bathyal (D) intertidal
9. The velocity of light in vacuum can be changed by changing
 (A) frequency (B) amplitude (C) wavelength (D) none of these
10. The reason for double helical structure of DNA is operation of
 (A) electrostatic attractions (B) van der Waal's forces
 (C) dipole-dipole interaction (D) hydrogen bonding
11. During the process of breaking down glucose and other carbohydrates to release energy, animals make water as a waste product.
 (A) True (B) False
 (C) None of the above answers are correct (D) Both are correct

12. What is most likely concerning Okazaki fragments?
(A) Pieces of DNA made during replication
(B) Pieces of RNA which will join to form messenger RNA
(C) Pieces of histone molecules released during transcription
(D) Discovered by Linus Pauling as parts of the hemoglobin molecule
13. The apparent daily path of the Sun changes with the seasons because
(A) Earth's axis is tilted
(B) Earth's distance from the Sun changes
(C) the Sun revolves
(D) the Sun rotates
14. Which of the following is used in the preparation of chlorine?
(A) only MnO_2 (B) only $KMnO_4$
(C) both MnO_2 and $KMnO_4$ (D) either MnO_2 or $KMnO_4$
15. Which of the following is a lyophobic colloid?
(A) Gelatin (B) Sulphur (C) Starch (D) Gum Arabic
16. Euryhaline
(A) low salinity tolerance
(B) high salinity tolerance
(C) tolerance of wide variations of salinity
(D) none of the above
17. The helical structure of protein is stabilized by
(A) peptide bonds (B) dipeptide bonds
(C) hydrogen bonds (D) van der Waals forces
18. The plasma membrane does all of these except
(A) contains the hereditary material
(B) acts as a boundary or border for the cytoplasm;
(C) regulates passage of material in and out of the cell;
(D) functions in the recognition of self
19. Euplankton
(A) short lived planktonic life (B) only planktonic life
(C) both (D) none of the above
20. What is the process that extracts fresh water from salt water?
(A) Desalination (B) Rinsing
(C) Saltation (D) Tritation

21. Salinity can be determined by measuring:
 (A) specific gravity (B) pH
 (C) turbidity (D) none
22. Dissolution of SO_2 in water produces.
 (A) H_2SO_4 (B) $\text{H}_2\text{S}_2\text{O}_7$ (C) $\text{H}_2\text{S}_2\text{O}_8$ (D) H_2SO_3
23. The light reactions of photosynthesis supply the Calvin cycle with
 (A) light energy (B) CO_2 and ATP
 (C) H_2O AND NADPH (D) ATP and NADPH
24. Standing crop
 (A) biomass of a population present at any given moment
 (B) biomass of a population over a period of time
 (C) biomass of an area
 (D) all the above
25. The chloroplast functions in
 (A) lipid storage (B) protein synthesis
 (C) photosynthesis (D) DNA replication
26. Which theory explain the possible origin of chloroplasts and mitochondria?
 (A) Evolution (B) Endosymbiosis (C) Endocytosis (D) Cells
27. Which of the following best describes the very early atmosphere of the Earth, before the first cells appeared and while there were still reducing conditions?
 (A) High amounts of hydrogen and methane gases
 (B) High amounts of oxygen gas
 (C) High amounts of carbon dioxide gas
 (D) High amounts of oxygen and low amounts of carbon dioxide gasses
28. Tsunami
 (A) high waves in the ocean generated due to earth quake
 (B) high waves during full moon new moon days
 (C) sudden waves due to high wind velocity
 (D) none of the above
29. Marsh
 (A) area of soft, flat wet land periodically flooded by salt water
 (B) area of soft, flat wet land not flooded by water
 (C) area adjacent to a large water body
 (D) all the above

30. Stanley Miller synthesized
 (A) vitamins (B) carbohydrates (C) amino acids (D) proteins
31. Standard visibility measurements of the sea water by the marine scientists made with the
 (A) secchi disc (B) fathometer
 (C) lux meter (D) none of the above
32. The measure of water clarity is known as:
 (A) salinity (B) turbidity (C) pH (D) none
33. Energy is transferred from the Sun to Earth mainly by
 (A) molecular collisions (B) density currents
 (C) electromagnetic waves (D) red shifts
34. Bathymetry
 (A) is the measurement of water depth from surface to underwater features
 (B) study of sea bottom
 (C) study of land elevations
 (D) none of these
35. Which of these materials is not a major component of the plasma membrane?
 (A) Phospholipids (B) Glycoproteins (C) Proteins (D) DNA
36. What is break water?
 (A) natural structures which protect a coastal region from the force of ocean waves
 (B) an artificial structure constructed to protect a coastal region from the force of ocean waves
 (C) both of the above
 (D) none of the above
37. First phase of embryonic development is
 (A) cleavage (B) gastrulation
 (C) fertilization (D) gametogenesis
38. The term gene was coined by
 (A) McClintock (B) Morgan (C) Johannsen (D) DeDur
39. Taking samples of ocean water can be accomplished by all of the following except
 (A) Van Dorn Bottle (B) Nansen Bottle
 (C) Ekman Grab (D) Surface Sample Bottle

40. What is the most common salt in the sea?
(A) NaCO (B) NaCl (C) KCO_3 (D) ClNa
41. Locomotion in starfish occurs by
(A) tentacles (B) flagella (C) tube feet (D) pseudopodia
42. Which of the following is a remarkable similarity between the chemical composition of the oceans and that of our blood?
(A) Both have naturally concentrations of potassium and boron
(B) Both have naturally concentrations of sodium and potassium
(C) Both have naturally concentrations of chromium
(D) Both have naturally concentrations of fluoride
43. Which is most accurate concerning plankton?
(A) A community of autotrophic microorganisms that live in the ocean
(B) These are the stacks of disks inside chloroplasts
(C) Found the plants in the sea
(D) A community of autotrophic microorganisms that live in the ocean
44. Which is most accurate concerning thylakoids?
(A) A community of microorganisms that live in the ocean and contain cyanobacteria as a major component
(B) These are the stacks of disks inside chloroplasts
(C) Found inside the mitochondria
(D) Is the structure contains chemical substance for the digestion of cellulose in grass
45. Which is most accurate concerning fermentation?
(A) Produces lactic acid in our muscles
(B) Produces ethanol in our muscles
(C) Part of the synthesis of carbohydrates by photosynthesis
(D) Part of the breakdown process of cellulose in the human intestine
46. You are given a piece of a molecule and told that it can be described in a shorthand notation as 3' CGGUUCCCGGG 5'. Which of the following is most likely concerning this molecule?
(A) It is a piece of DNA which gives enough information to add 12 amino acids to a growing protein chain
(B) It is a piece of either DNA or RNA
(C) It is a piece of RNA which gives enough information to add 12 amino acids to a growing protein chain
(D) It is a piece of RNA which gives enough information to add 4 amino acids to a growing protein chain

47. Where would you find the "Calvin cycle"?
- (A) The Calvin cycle is the cycle of nitrogen fixation and is found in the soil and roots of plants
 - (B) The Calvin cycle only occurs in mitochondria
 - (C) The Calvin cycle only occurs in autotrophs
 - (D) None of the above
48. Which of the following is most accurate concerning "crossing over"?
- (A) Crossing over forms Okazaki fragments
 - (B) Crossing over produces genetic variability during meiosis
 - (C) Crossing over occurs only while a new strand of messenger RNA is being made
 - (D) None of the above
49. Which of the following is most accurate concerning "exons"?
- (A) Regions of tRNA which contain information used to make proteins
 - (B) Regions of DNA which are NOT used to make protein
 - (C) Exons are regions found on the post transcriptional mRNA that codes for polypeptides
 - (D) None
50. How many molecules of CO₂ are generated for each molecule of acetyl CoA introduced into the Krebs cycle?
- (A) One
 - (B) Two
 - (C) Three
 - (D) Four
51. A difference between chemiosmosis in photosynthesis and respiration is that in photophosphorylation.
- (A) NADPH rather than NADH passes electrons to the electron transport chain
 - (B) ATP synthase releases ATP into the stroma rather than into the cytosol
 - (C) Light provides the energy to push electrons to the top of the electron chain, rather than energy from the oxidation of foods
 - (D) both (A) and (C) are correct
52. Molten NaCl conducts electricity due to presence of
- (A) free electron
 - (B) free molecules
 - (C) free ions
 - (D) atoms of Na and Cl
53. Which of the following compound is most soluble in water?
- (A) MgSO₄
 - (B) CaSO₄
 - (C) SrSO₄
 - (D) BaSO₄
54. Which of the following is most abundant in earths crust?
- (A) C
 - (B) Si
 - (C) Ge
 - (D) Sn
55. What is the most common kind of crustacean zooplankton in the oceans?
- (A) Decapod
 - (B) Cyprid
 - (C) Copepods
 - (D) Zoea

56. Which is the first man made element?
 (A) Sc (B) Os (C) Te (D) Zr
57. To which part of the atom is radioactivity associated?
 (A) Protons only (B) Neutrons only
 (C) Nucleus (D) Extra nuclear part
58. Carboic acid is
 (A) phenol (B) benzene (C) phenyl acetate (D) salol
59. Formaldehyde and KOH are heated, then we get
 (A) acetylene (B) methane (C) methyl alcohol (D) ethyl formate
60. Lower amines are soluble in water due to
 (A) low molecular mass
 (B) formation of complexes
 (C) formation of hydrogen bonds with water
 (D) affinity with water
61. The reagents used in Hoffmann's Mustard oil reaction are
 (A) Mustard oil and 1° amine (B) CS₂ and aniline in HgCl₂
 (C) Nitrobenzene and CS₂ (D) S and RNC
62. Nylon threads are made up of
 (A) polyvinyl polymer (B) polyester polymer
 (C) polyamide polymer (D) polyethylene polymer
63. Which of the following is the simplest carbohydrate?
 (A) Glucose (B) Maltose
 (C) Sucrose (D) Glyceraldehyde
64. The main structural feature of protein is
 (A) ether linkage (B) ester linkage (C) peptide linkage (D) all the above
65. In anaerobic reaction, there is net gain of
 (A) 38 ATP (B) 50 ATP (C) 2 ATP (D) 10 ATP
66. A plant or animal that naturally occurs in only one area is known as
 (A) invasive (B) native
 (C) endemic (D) none of the above

67. Which of the following statement is true?
- (A) Velocity of light is constant in all media
 - (B) Velocity of light in vacuum is maximum
 - (C) Velocity of light is same in all reference frames
 - (D) Laws of nature has identical form in all reference frames
68. Rocky intertidal species exposed to air cope with potential dessication by
- (A) avoiding the hot sun by moving or growing in damp crevices
 - (B) sealing of shells and other coverings to prevent water loss
 - (C) having a tolerance for loosing up to 90% of the body water
 - (D) all the above
69. Which of the following pieces of oceanographic equipment is the most accurate when measuring seawater salinity?
- (A) Hydrometer Set
 - (B) Chemical Test Kit (Knudsen Titration)
 - (C) Salinometer
 - (D) None of the above
70. Which of the following pieces of equipment would be most helpful to a marine scientists who wanted to describe the exact location of a sample?
- (A) Electron Microscope
 - (B) Telescope
 - (C) Satellite
 - (D) GPS unit
71. During which era did the initial opening of the present-day Atlantic Ocean most likely occur?
- (A) Cenozoic
 - (B) Mesozoic
 - (C) Paleozoic
 - (D) Late Proterozoic
72. Dinoflagellates
- (A) reproduce by simple cell division
 - (B) produce blooms known as red tide
 - (C) produce bioluminescence
 - (D) none of the above
73. Anadromous fishes follow what type of migration pattern?
- (A) They migrate up and down the water column
 - (B) Spend most time in sea but migrate to freshwater for breeding
 - (C) Spend most time in freshwater but migrate to sea for breeding
 - (D) None of the above
74. Which polysaccharide is a major component of plan cell walls?
- (A) Chitin
 - (B) Peptidoglycan
 - (C) Cellulose
 - (D) Mannitol

75. Ribosomes are constructed in the
 (A) endoplasmic reticulum (B) nucleoid
 (C) nucleolus (D) nuclear pore
76. The mitochondrion functions in
 (A) Protein synthesis (B) Photosynthesis
 (C) DNA replication (D) ATP synthesis
77. Which of these cellular organelles have their own DNA?
 (A) Chloroplast (B) Nucleus (C) Mitochondrion (D) All of these
78. Long, whiplike microfibrils that facilitate movement by cells are known as
 (A) cilia (B) flagella (C) leather (D) pseudopodia
79. Diatoms are
 (A) microscopic floating forms of plankton
 (B) microscopic forms of nekton
 (C) microscopic zooplanktons
 (D) none of the above
80. The Challenger expedition for oceanographic studies were conducted
 (A) 1832 – 1836 (B) 1872 – 1876 (C) 1885 – 1892 (D) 1896 – 1900
81. Corals
 (A) are invertebrates belonging to Phylum Cnidaria
 (B) are invertebrates belonging to Phylum Echinodermata
 (C) are invertebrates belonging to Phylum Arthropoda
 (D) are plants
82. Sonar in the ocean water is used to
 (A) depth of water
 (B) measure the movement of sound in water
 (C) to determine the position and distance of objects in the water
 (D) all of these
83. The average velocity of sound in the ocean is
 (A) 100 m/s (B) 1200 m/s (C) 1450 m/s (D) 334 m/s
84. The average salinity of ocean water
 (A) 44 ‰ (B) 40 ‰ (C) 35 ‰ (D) 25 ‰

85. Estuaries
- (A) a water body where fresh water and seawater joins
 - (B) coastal body of water in which sea water significantly diluted by fresh water from land runoff
 - (C) both of the above
 - (D) none of the above
86. Lagoons
- (A) landward shallow water bodies with narrow connection with the sea
 - (B) water bodies along the sea coast
 - (C) large water bodies having it own current circulation pattern
 - (D) none of the above
87. Which of the following is mainly responsible for the depletion of Ozone layer in the atmosphere?
- (A) CO
 - (B) CO₂
 - (C) CFC
 - (D) None of the above
88. What is known as Antarctic circle?
- (A) The latitude of 50° south
 - (B) The latitude of 35° south
 - (C) The latitude of 66.5° south
 - (D) None of the above
89. Great barrier reef is found in
- (A) Australia
 - (B) Newzealand
 - (C) India
 - (D) Mediterranean sea
90. What is most correct about Bay?
- (A) A coastal body of water enclosed by land on three sides and open to the water on one side
 - (B) A coastal body of water enclosed by land on one side and open to the water on three sides
 - (C) An enclosed coastal body of water
 - (D) All the above
91. Catadromous
- (A) migration pattern of a fish to the ocean for breeding
 - (B) migration pattern of a fish from the ocean to freshwater for breeding
 - (C) migration pattern of a fish which spawns at sea and returns to freshwater for growth and maturity
 - (D) both (A) and (C)

92. What is epifauna?
(A) Animals live on ocean bottom
(B) Animals live on water surface
(C) Animals live by attaching on other organisms
(D) All the above
93. Minamata disease was caused due to
(A) Lead (B) Mercury (C) TBT (D) DDT
94. What is standing stock?
(A) The biomass of a population present at any given time
(B) Biomass in an area
(C) Both the above
(D) None of the above
95. Upwelling
(A) a process by which nutrient rich water is brought to the surface by pipe lines
(B) a process by which nutrient rich water is brought to the surface by natural oceanic processes
(C) both the above are correct
(D) none of the above are correct
96. How many high tides and low tides do most locations in the ocean have daily?
(A) Four (B) Three (C) Two (D) One
97. Most valuable mineral resources taken from beneath the sea floor
(A) petroleum (B) radiolarian (C) manganese (D) calcium
98. Which of the following features are found among mangroves?
(A) Salt gland on leaves (B) Pneumatophores
(C) Prop roots (D) All the above
99. Fusion in two gametic nuclei is called
(A) karyogami (B) syngamy (C) amphimixis (D) fertilization
100. Which of the following is associated with genetic engineering?
(A) Plastid (B) Plasmid (C) Chloroplast (D) Mitochondria