國立臺灣大學九十四學年度碩士班招生考試試題

科目：普通海洋學

題號：116

Part A: 選擇題(Single/Multiple Choice) 40pts

(1) As the first to have marine science as its primary objective and led by Wyville Thomson, What is the name of the research vessel made the round-the-world voyage between 1872 and 1876? (a) Clipper, (b) H.M.S. Challenger, (c) Glomar Challenger, (d) Joides Resolution, (e) Red October (2 pts)

(2) What is the average depth of the oceans ? (a) ~4000 m (b) ~3000 m, (c) ~5000 m, (d) ~6000 m, (e) ~1000 m, (2 pts)

(3) What is the Redfield number ? Given as C:N:P by Redfield, 1934. (a)1:16:106, (b) 16:1:106, (c) 106:1:16, (d) 106:16:1 (e) 116:1:16, (2 pts)

(4) Please select seas that are not within Pacific Ocean ? (a) Bering Sea, (b) Coral Sea, (c) Red Sea, (d) Yellow Sea, (e) Barents Sea (2 pts)

(5) Please select the methods that can be used for salinity measurement ? (a) Density, (b) Refractivity, (c) Conductivity, (d) Transmittance, (e) Colormetric (2 pts)

(6) What is the deepest deep-sea trenches in the Pacific ? (a) Tonga, (b) Aleutian, (c) Mariana, (d) Philippine, (e) Japan (2 pts)

(7) What is the temperature for water reach the maximum density ? (a) 3.00℃, (b) 3.98℃, (c) 3.50℃, (d) 4.30℃, (e) 2.05℃ (2 pts)

(8) Residence time is defined as the average length of time that an ion remains in solution in the oceans, that is, the mean time between a substance's introduction and removal from the sea. Residence time is calculated by solving the simple equation, $T = (A/R)$, where T is the residence time in years, A is the total amount of the ion, and R is the supply rate of the ion. What is the residence time of Sodium in seawater ? (a) 2.6×10^8 years, (b) 2.6×10^5 years, (c) 1.5×10^2 years, (d) 1.5×10^6 years, (2 pts)

(9) What are those major processes that supply oxygen to the oceans ? (a) Gas diffusion, (b) Photosynthesis, (c) Respiration, (d) Southern Oscillation, (e) Early Diagenesis, (2 pts)

(10) Pure freshwater freezes at 0℃, what is the freezing temperature for seawater with a salinity of 35 ‰ ? (a) -1.91℃, (b) -1.50℃, (c) -2.50℃, (d) -3.05℃, (e) -3.98℃ (2 pts)

(11) What are those forces normally drive the sea-surface currents ? (a) Wind Stress, (b) Seismic, (c) Precipitation, (d) Pressure-Gradient, (e) Coriolis deflection, (2 pts)

(12) What are those major ions in the ocean ? (a) Sodium, (b) Chloride, (c) Sulfate, (d) Carbonate, (e) Potassium, (2 pts)

(13) Which gas have the highest average concentration found in the surface oceans ? (a) Helium (b) Oxygen, (c) Nitrogen, (d) Carbon Dioxide, (e) Argon, (2 pts)

(14) The biosphere appears to counteract naturally the artificial increase in atmospheric CO_2 by acting as a sink for it, and so buffering the greenhouse effect. The principal cause of the progressive fall in the ratio $[CO_2]/[O_2]$ is biological activity, removing CO_2 and releasing O_2 during photosynthesis. According to James Lovelock's concept of what "Hypothesis", which first propose in 1970s "*....without life's interference, CO_2 would accumulate in the air until dangerous levels might be reached*", (a) Iron Hypothesis, (b) Big Bang Hypothesis, (c) Gaia Hypothesis, (d) LORECS Hypothesis, (e) Lagrangian Hypothesis (2 pts)

(15) What are the reagents/chemicals used for nitrite analysis by standard pink azo dye colormetric method ? (a) Ammonium Chloride, (b) Copper Nitrate, (c) Cadmium, (d) Sulphanilamide, (e) Hydrochloric acid , (2 pts)

(16) What are the methods can be used for measurement of primary productivity ? (a) Iron Assimilation, (b) Biomass increase, (c) Carbon Assimilation, (d) Oxygen Production, (e) Carbon Production (2 pts)

(17) According to the idealized vertical profiles, what are the general types can be used to describe or represent behavior of elements in the ocean ? (a) scavenged type, (b) recycled type, (c) conservative type, (d) nutrient type, (e) boundary type , (2 pts)

(18) What is the term or name for long-wavelength shallow-water progressive waves which caused by the rapid displacement of ocean water (i.e., seismic sea waves) ? (a) Tugami, (b) Tsumami, (c) Tsugami, (d) Tsunami, (e) Tsunogai, (2 pts)

(19) At a certain depth, the production of carbohydrates and oxygen by photosynthesis through a day's time will exactly equal the consumption of carbohydrates and oxygen by respiration. What is this "break-even" depth is called ? (a) Thermocline, (b) Residence Depth, (c) Compensation Depth, (d) Mixing depth, (e) Equilibrium Depth, (2 pts)

(20) In 1842, Charles Darwin classified tropical reef structures into three types, what are those ? (a) Fringing Reefs, (b) Barrier Reefs, (c) Calcite Reefs, (d) Atolls, (e) Ekman Reefs. (2 pts)

Part B: 簡答題(Short Essays) 60pts

(1) Please draw a typical representation of the circulation of deep water in the major ocean (i.e., the conveyer belt) (10 pts)

(2) Please briefly describe why the ocean is "blue" !.(10 pts)

(3) What are those limiting factors controlled phytoplankton growth in the ocean ?.(10 pts)

(4) Please draw typical vertical profile for major nutrients in the Pacific Ocean (please include concentration and depth range)(10 pts)

(5) What are those major phytoplankton classes typically found in the ocean ? (10 pts)

(6) Please give five of the name of instruments or techniques used for marine explorations on research vessel. (10 pts)

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