

※ 注意：請於答案卷上依序作答，並應註明作答之題號。

計分方式：

請同學閱讀試題後，圈選或簡答。每題計分列於題後，總分爲一百分。

單/複選考題：

- 1) Which gas have the highest average concentration found in the surface ocean ? (2 分)
(a) Hydrogen (b) Oxygen, (c) Nitrogen, (d) Carbon Dioxide, (e) Argon
- 2) Please select the methods that can be used for salinity measurement ? (2 分)
(a) Density, (b) Refractivity, (c) Conductivity, (d) Transmittance, (e) Titration
- 3) The dissolved nitrate in a seawater sample in six replicate analysis were found to be as follows; 5.3, 4.9, 5.1, 5.5, 4.7, and 5.9 $\mu\text{mol/L}$, what is the standard deviation of the results ? (2 分)
(a) 0.33 $\mu\text{mol/L}$, (b) 0.29 $\mu\text{mol/L}$, (c) 0.25 $\mu\text{mol/L}$, (d) 0.27 $\mu\text{mol/L}$, (e) 0.32 $\mu\text{mol/L}$
- 4) What is the relative standard deviation (RSD) of previous question's results ? (2 分)
(a) 3.4 %, (b) 2.4%, (c) 5.4%, (d) 5.6%, (e) 4.6%
- 5) What is the Redfield number ? Given as C:N:P by Redfield, 1934. (2 分)
(a) 1:16:106, (b) 16:1:106, (c) 106:1:16, (d) 106:16:1 (e) 116:1:16

問答考題：

- 1). What is the definition for "Salinity" and "Chlorinity" ? (10 分)
- 2). Please list the major ions in the ocean and their average concentration (as in mg/kg) in seawater ? (10 分)
- 3). What is "Alkalinity" ? (10 分)
- 4). What are the major nutrients in the oceans ? Please draw a typical vertical profile for each nutrients in Pacific Ocean (please include their concentration range in $\mu\text{mol/L}$) . (10 分)
- 5). What are the limiting factors controlling phytoplankton growth in the ocean ? (10 分)
- 6). What are the sources of Suspended Particulate Matter (or Total Suspended Matter) in the marine environments ? (10 分)
- 7). What are the major organic compounds found in marine dissolved organic matter (DOM) ? (10 分)
- 8). Please describe 『Iron Hypothesis;鐵假說』。(10 分)
- 9). Please describe 『Biological Pump;生物幫浦』。(10 分)