RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B. Sc. (General) Degree
Third Year - Semester I Examination – February / March 2013

PHY 3203 – PHYSICAL OCEANOGRAPHY

Answer _four_ questions only   **Time: 2 hours**

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1. (a) List the special properties of pure water.   [05 points]

    (b) Briefly discuss the composition of seawater.   [05 points]

    (c) What are the processes which control the composition of seawater?
                                                                       [05 points]

    (d) Distinguish between the conservative and non-conservative elements of
         seawater.   [10 points]

2. (a) By way of a clear diagram show how the earth's wind energy (Trade
         winds and Westerlies) is concentrated in each hemisphere.   [05 points]

    (b) What are "surface currents" and why the direction of water movement in
         surface currents is different from that of the wind? What would be the
         direction of water movement in the northern hemisphere and that in the
         southern hemisphere?   [15 points]

    (c) What is a "gyre"? Explain why the Antarctic Circumpolar Current is not
         technically referred to as a gyre?   [05 points]

3. (a) What is "Principle of Constant Proportions"?   [05 points]

    (b) What is the "salinity of seawater" and explain how you determine the
         salinity of seawater using the "chlorinity of seawater"   [10 points]

    (c) What is acid-base balance in seawater? Explain how it prevents broad
         swings of pH in seawater?   [10 points]

4. (a)   What are tides? How do they form?   [05 points]

    (b)   Write down the equation used to calculate the tide generating force, felt by the earth, identifying the quantities involved.   [05 points]

    (c)   What is "moon's recession from earth"? How does it occur?   [10 points]

    (d)   Four billion years ago, the distance between the moon and the earth was thought to be only half that of today. How much larger was the moon's tide generating force then, compared to now?   [05 points]

5. Write short notes on the following.

    (a)   Thermohaline circulation   [06 points]

    (b)   Global oceanic heat budget   [06 points]

    (c)   Continental margins   [06 points]

    (d) N_2 solubility in seawater   [07 points]

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