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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

Bachelor of Science in Applied Sciences
Third Year - Semester I Examination – July / August 2023

PHY 3203 – PHYSICAL OCEANOGRAPHY

Time: Two (02) hours

Answer all questions

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1. a) Explain why the surface currents are moving clockwise in the northern hemisphere and anti-clockwise in the southern hemisphere. (15 marks)

   b) What are western boundary currents and eastern boundary currents? (05 marks)

   c) Discuss why the western boundary currents are narrow whereas the eastern boundary currents are broad. (10 marks)

   d) By way of a clear diagram, explain the "Ekman spiral model" and "Ekman transport". (20 marks)

2. a) What are upwelling and downwelling of ocean water and how do they affect the ecosystem of the ocean? (10 marks)

   b) Compare and contrast the equatorial and coastal upwelling and downwelling of ocean water. (10 marks)

   c) What is El-Nino and how does it impact the countries in the "trade wind belt"? (15 marks)

   d) Discuss the equatorial upwelling and downwelling processes in El-Nino and non El-Nino conditions. (15 marks)

3. a) What are the six major ions that contribute to the salinity of seawater? (06 marks)

b) Briefly explain the Forchhammer's principle of constant proportions. (14 marks)

c) What is chlorinity and briefly explain a laboratory method to determine the chlorinity of a given water sample. (15 marks)

d) Explain how the salinity of a given seawater sample is determined using its chlorinity. (15 marks)

4. Write short notes on the following

a) Thermohaline circulation. (12 marks)

b) Acid-Base balance of the ocean. (12 marks)

c) Pycnocline. (12 marks)

d) Deep, shallow and transitional water waves. (14 marks)

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