
UNIVERSITI SAINS MALAYSIA

First Semester Examination
Academic Session 2008/2009

November 2008

ZGT 272/3 – Introduction to Oceanography
[Pengantar Oseanografi]

Duration: 3 hours
[Masa : 3 jam]

Please ensure that this examination paper contains **FOUR** printed pages before you begin the examination.

*[Sila pastikan bahawa kertas peperiksaan ini mengandungi **EMPAT** muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]*

Instruction: Answer all **FOUR** questions. Students are allowed to answer all questions in Bahasa Malaysia or in English.

Arahan: *Jawab semua **EMPAT** soalan. Pelajar dibenarkan menjawab semua soalan sama ada dalam Bahasa Malaysia atau Bahasa Inggeris.]*

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1. (a) Discuss briefly how the ocean floor is mapped, starting from the earliest method to the more advance technology.
[Bincangkan secara ringkas bagaimana dasar lautan dipetakan, bermula daripada kaedah yang terawal sehingga kepada teknologi yang lebih terkini.]
(30/100)
- (b) Sediments originate from the weathering and erosion of rocks, from the activity of living organisms, from volcanic eruptions, from chemical processes within the water itself, and even from space. Discuss four classifications of sediment by their origin.
[Sediment berasal daripada luluhawa dan hakisan batuan, aktiviti organisma hidup, letusan gunung berapi, proses kimia di dalam air dan juga daripada angkasa. Bincangkan empat pengelasan sedimen berdasarkan asalan mereka.]
(40/100)
- (c) Why the study of sediments is important in the context of oceanography?
[Kenapakah kajian tentang sedimen penting dalam konteks oseanografi?]
(30/100)
2. (a) Density of water is mainly a function of its temperature and salinity. Discuss how the ocean is stratified into three distinct density zones by temperature and salinity.
[Ketumpatan air adalah berfungsikan suhu dan saliniti. Bincangkan bagaimana lautan menjadi terstrata kepada tiga zon ketumpatan disebabkan suhu dan saliniti.]
(30/100)
- (b) Explain with the help of sketches how circulation in the Earth's atmosphere relates to the ocean surface currents.
[Jelaskan dengan bantuan lakaran bagaimana kitaran/edaran pada atmosfera Bumi berkait dengan arus permukaan lautan.]
(40/100)

- (c) About 10% of the water in the world ocean is surface currents. The primary force responsible for moving surface currents is wind. Discuss the Ekman spiral phenomenon known to occur at the surface of the ocean.
[Lebih kurang 10% air di lautan dunia merupakan arus permukaan. Daya utama yang bertanggungjawab menggerakkan arus permukaan ialah angin. Bincangkan fenomena lingkaran Ekman yang diketahui berlaku pada permukaan lautan.]
 (30/100)
3. (a) El Nino-Southern Oscillation (ENSO) is a result of ocean-atmosphere system interactions which is believed to occur periodically.
[El Nino-Ayunan Selatan merupakan hasil interaksi sistem laut-atmosfera yang dipercayai berlaku secara berkala.]
- (i) Explain the condition of ENSO during a non-El Nino year.
[Jelaskan keadaan bagi ENSO semasa tahun bukan El Nino.]
 (30/100)
- (ii) Explain the condition of ENSO during an El Nino year.
[Jelaskan keadaan bagi ENSO semasa tahun El Nino.]
 (30/100)
- (b) The behaviour of ocean waves is influenced by the depth of water through which they propagate. Discuss.
[Kelakuan gelombang lautan dipengaruhi oleh kedalaman air di mana mereka bergerak. Bincangkan.]
 (40/100)
4. (a) Tides are one of the most obvious phenomena that can be observed by an observer standing at the beach. Explain:
[Pasang surut adalah satu fenomena yang boleh dicerap apabila seorang pemerhati berdiri dekat dengan pantai. Jelaskan:]
- (i) Why maximum tidal ranges (spring tide) occur during new phase and full phase of lunar?
[Kenapakah julat pasang surut maksimum (pasang perbani) berlaku semasa fasa baru dan fasa penuh bagi bulan?]
 (15/100)

- (ii) Why minimum tidal ranges (neap tide) occur during first quarter phase and third quarter phase of lunar?
[Kenapakah julat pasang surut minimum (pasang anak) berlaku semasa fasa pertama dan fasa ketiga bagi bulan?]
(15/100)
- (b) Estuaries can be categorized based on the mixing patterns between fresh water and sea water. Discuss four (4) categories of such estuaries.
[Estuari boleh dikategorikan menurut corak percampuran yang berlaku antara air tawar dan air laut. Bincangkan empat (4) jenis estuari tersebut.]
(30/100)
- (c) Discuss three (3) systems that are being utilised to produce energy from the ocean.
[Bincangkan tiga (3) sistem yang digunakan untuk menghasilkan tenaga daripada lautan.]
(40/100)