UNIVERSITI SAINS MALAYSIA

First Semester Examination
Academic Session 2008/2009

November 2008

ZGT 161/3 – Geology I
[Geologi I]

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.]*

...2/-

1. (a) Write an essay about geological structures related with tectonic divergence boundary, convergence boundary, transform boundary and hot spots.
[Tuliskan karangan tentang struktur-struktur geologi yang berkaitan dengan kawasan sempadan tektonik mencapah, sempadan menumpu, sempadan transformasi dan titik panas.]

(70/100)

(b) For the following places, determine the type of boundaries or tectonic structures involved. Give the reasons for your answer.
[Bagi kawasan yang berikut, tentukan jenis sempadan atau struktur tektonik yang didapati. Beri sebab-sebab jawapan anda.]

(i) Himalaya Area
[Kawasan Himalaya]

(10/100)

(ii) San Andreas Fault, California
[Sesar San Andreas, California]

(10/100)

(iii) Sumatra Island, Indonesia
[Pulau Sumatra, Indonesia]

(10/100)

2. (a) Write an essay about Principle of Uniformitarianism. Your explanation must consist of definition, problem and example.
[Tuliskan karangan tentang Prinsip Keseragaman. Penjelasan anda mesti meliputi definisi, masalah dan contoh.]

(20/100)

(b) Discuss about earth interior based on
[Bincangkan struktur dalaman bumi berdasarkan]

(i) Chemical composition
[Komposisi kimia]

(30/100)

(ii) Physical Properties
[Sifat fizikal]

(50/100)

...3/-

3. (a) The SiO_4 anion is the basic unit of structure of all silicate minerals. What shape is the SiO_4 anion and why?
[Anion SiO_4 merupakan unit asas bagi semua mineral silikat. Apakah bentuk anion SiO_4 dan mengapa?]

(20/100)

(b) Describe, with the aid of sketches, the various ways in which the SiO_4 anions are arranged within the major groups of silicate minerals. Include in your answer examples of at least one mineral from each group.
[Dengan bantuan lakaran, jelaskan tentang kepelbagaian cara anion SiO_4 di susun dalam kumpulan utama mineral silikat. Jawapan anda mestilah mengandungi sekurang-kurangnya satu contoh bagi setiap mineral dari setiap kumpulan.]

(20/100)

(c) Based on their particular structure, explain the origin of cleavage in any two of the silicate minerals group discussed in part (b).
[Jelaskan tentang asalan ira bagi mana-mana dua kumpulan mineral silikat yang dibincangkan di bahagian (b), berdasarkan strukturnya.]

(20/100)

(d) Explain, with the aid of sketches, the particular tectonic settings where major occurrences each of basalt, andesite and granite are found.
[Jelaskan, dengan menggunakan lakaran yang jelas dan berlabel tentang pengerasan tektonik di mana kehadiran utama bagi basalt, andesit dan granit boleh dijumpai.]

(20/100)

(e) Referring to such features as origins, appearance, mineralogy, chemistry, and/or occurrence, list three distinguishing features each of gabbro, rhyolite, diorite and dunite.
[Nyatakan tiga ciri yang boleh dikesani bagi setiap gabro, riolit, diorit dan dunit, dengan merujuk kepada asalan, penampakan, mineralogi, kimia dan/atau kewujudannya.]

(20/100)

4. (a) Comment on all of the following in brief note supported by labeled diagrams:
[Komen secara ringkas dalam bentuk nota dengan bantuan diagram berlabel bagi:]

(i) How does the rock cycle relates to sedimentary rocks?
[Bagaimanakah kitaran batuan berkaitan dengan batuan sedimentari?]

(10/100)

(ii) Difference between porosity and permeability.
[Perbezaan antara keporosan dan keterlapan.]

(10/100)

(iii) The relation between the sediment grain size and distance from the shoreline.
[Hubungan antara saiz butir sedimen dan jarak dari pesisir pantai.]

(10/100)

(b) What is diagenesis? Discuss with examples.
[Apakah diagenisis? Bincangkan berserta dengan contoh.]

(25/100)

(c) Explain what is meant by the terms "metamorphic grade" and "metamorphic facies".
[Jelaskan apakah yang dimaksudkan dengan istilah "gred metamorf" dan "fasies metamorf".]

(15/100)

(d) Describe the two types of metamorphic texture, and discuss how they are produced.
[Jelaskan dua jenis tekstur metamorf, dan bincangkan bagaimana ia dihasilkan.]

(15/100)

(e) Discuss the role each of the THREE major agents of metamorphism plays in transforming any rock into a metamorphic rock.
[Bincangkan tentang peranan yang dimainkan oleh TIGA agen utama metamorfisme dalam mengubah sebarang batuan menjadi batuan metamof.]

(15/100)

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