
UNIVERSITI SAINS MALAYSIA

Second Semester Examination
2014/2015 Academic Session

June 2015

EBS 242/3 – Petrography and Ore Microscopy *[Petrografi dan Mikroskopi Bijih]*

Duration : 3 hours
[Masa : 3 jam]

Please ensure that this examination paper contains SIXTEEN printed pages and TWO pages APPENDIX before you begin the examination.

[Sila pastikan bahawa kertas peperiksaan ini mengandungi ENAM BELAS muka surat dan DUA muka surat LAMPIRAN yang bercetak sebelum anda memulakan peperiksaan ini.]

This paper consists of SEVEN questions. TWO questions in PART A and FIVE questions in PART B.

[Kertas soalan ini mengandungi TUJUH soalan. DUA soalan di BAHAGIAN A dan LIMA soalan di BAHAGIAN B.]

Instruction: Answer FIVE questions. Answer ALL questions from PART A and THREE questions from PART B. If a candidate answers more than five questions only the first five questions answered in the answer script would be examined.

[Arahan: Jawab LIMA soalan. Jawab SEMUA soalan dari BAHAGIAN A dan TIGA soalan dari BAHAGIAN B. Jika calon menjawab lebih daripada lima soalan hanya lima soalan pertama mengikut susunan dalam skrip jawapan akan diberi markah.]

The answers to all questions must start on a new page.

[Mulakan jawapan anda untuk semua soalan pada muka surat yang baru.]

You may answer a question either in Bahasa Malaysia or in English.

[Anda dibenarkan menjawab soalan sama ada dalam Bahasa Malaysia atau Bahasa Inggeris.]

In the event of any discrepancies in the examination questions, the English version shall be used.

[Sekiranya terdapat sebarang percanggahan pada soalan peperiksaan, versi Bahasa Inggeris hendaklah digunapakai.]

PART A / BAHAGIAN A

1. Please define or describe the following:
- [a] Based on the QAPF classification system (Appendix 1), determine the class/type and the name of these igneous rocks according to their respective composition and textures as given in Table A.

Berdasarkan sistem pengelasan QAPF (Lampiran 1), tentukan kelas/jenis serta nama batuan-batuan igneous yang mempunyai tekstur dan komposisi seperti yang diberikan dalam Jadual A.

Table A

Jadual A

Features <i>Fetur</i>	Igneous A <i>Igneus A</i>	Igneous B <i>Igneus B</i>	Igneous C <i>Igneus C</i>
Composition <i>Komposisi</i>	Q: > 23% AP: < 9% Plg: > 66% Acc: Muscovite (< 2%)	Q: 45% AP: 40% Plg: 10% Acc: Biotite	Q: 6% AP: < 24% Plg: > 65% Acc: Olivine (> 5%)
Texture <i>Tekstur</i>	Medium to coarse <i>Berbutir sederhana hingga kasar</i>	Coarse grained <i>Berbutir kasar</i>	Aphanetic <i>Afanetik</i>
Distinguished features <i>Sifat-sifat khas</i>	Granular <i>Berbutir</i>	Euhedral <i>Fenokris feldspar</i> Pink feldspar Phenocryst <i>berwarna merah jambu</i> Porphyritic <i>Porfiritik</i>	Lava flow <i>Aliran lava</i> Mafic <i>Mafik</i> Plagioclase lath <i>Bilah-bilah plagioklas</i>

Notes: Q: Quartz; AP: Alkaline feldspar; Plg: Plagioclase and Acc: Accessory mineral

Nota: K: Kuarza; AF: Alkali felspar; Plg: Plagioklas and Acc: Mineral aksesori

(50 marks/markah)

...3/-

[b] Briefly discuss the differences between the properties of the following rocks (composition, texture, grain size and other distinguished features).

- (i) Shale and Gneiss
- (ii) Conglomerate and Hornfels
- (iii) Limestone and tuff

Secara ringkas, bincangkan sifat-sifat perbezaan-persamaan utama di antara pasangan batuan berikut (komposisi, tekstur, saiz butiran dan fetur-fetur unggul lain)

- (i) Syal dan Gneis*
- (ii) Konglomerat dan Honfels*
- (iii) Batu kapur dan tuf*

(50 marks/markah)

2. Answer the following question

Sila jawab semua soalan berikut

[a] What is meant by the term "lithification"?

Apakah yang dimaksudkan dengan istilah "lithification"?

(10 marks/markah)

[b] Of the common elements that compose the minerals (that in turn compose the rocks) of the earth's crust, name 4 **elements** that in the weathering process tend to be carried away in **solution**. Where these elements do generally deposited?

Daripada elemen-elemen biasa yang membentuk mineral (juga membentuk batuan) dari kerak bumi, namakan empat elemen di dalam proses luluhawa yang cenderung untuk di bawa dalam larutan. Di mana elemen-elemen ini biasanya terenap?

(10 marks/markah)

[c] What is (in general) the origin of the **clay** that is such a large constituent of most "shales"?

Apakah (secara umum) asal-usul tanah liat yang menjadikannya konstituen yang paling besar dalam "syal"?

(10 marks/markah)

[d] What is (in general) the origin of the quartz that is so abundant in common sand deposits?

Apakah (secara umum) asal-usul kuarza yang begitu banyak terdapat dalam deposit pasir biasa?

(10 marks/markah)

- [e] Rank the following minerals in order of increasing **resistance** to chemical weathering (place the least resistant on the left to most resistant to weathering on the right):

- Muscovite, calcic plagioclase, hornblende, biotite, quartz

Susun mineral berikut dalam arah peningkatan daya tahan terhadap luluhawa kimia (letakkan yang paling kurang tahan di sebelah kiri kepada paling tahan cuaca di sebelah kanan):

- *Muscovite, calcic plagioclase, hornblende, biotite, kuarza*

(10 marks/markah)

- [f] Rank listed minerals in the order of the most **easily weathered** to the least easily weathered:

- Sodic plagioclase, alkali feldspar, clinopyroxene, olivine, hornblende

Letakkan senarai mineral dalam susunan yang paling mudah terluluhawa kepada kurangnya mudah terluluhawa:

- *Sodic plagioclase, alkali feldspar, clinopyroxene, olivine, hornblende*

(10 marks/markah)

- [g] Sandstone A is said to be “well sorted”, while sandstone B is said to be “poorly sorted”. How would you **describe** the difference between sandstone A and B?

Batu pasir A dikatakan "terisih baik", manakala batu pasir B dikatakan "terisih buruk". Bagaimana anda gambarkan perbezaan di antara batu pasir A dan B?

(20 marks/markah)

