
UNIVERSITI SAINS MALAYSIA

First Semester Examination
2015/2016 Academic Session

December 2015 / January 2016

EBS 201/3 – Mineral Deposits *[Mendapan Mineral]*

Duration : 3 hours
[Masa : 3 jam]

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

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

This paper consists of SEVEN questions.

[Kertas soalan ini mengandungi TUJUH soalan.]

Instruction: Answer FIVE questions. Answer QUESTION ONE and FOUR other questions. 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 SOALAN SATU dan EMPAT soalan lain. 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.]

1. Write short notes on the following items:

[a] Ore

Bijih

[b] Gangue minerals

mineral reja

[c] Ore minerals

mineral bijih

[d] Grade

Gred

[e] Cut-off grades

gred penggalan

[f] Tonnage

berat tan

[g] Recovery factor

faktor perolehan

[h] Concentration factor

faktor pemekatan

[i] Stratabound orebody

jasad bijih stratabound

[j] Stratiform orebody

jasad bijih stratiform

[k] Protore

Protbijih

[l] Secondary enrichment
Pengayaan sekunder

[m] Expansive clays
lempung ampul

[n] Nonexpansive clays
lempung tak ampul

(100 marks/markah)

2. Iron ores formed in many ways.

- [a] List down five minerals that normally contain iron.
- [b] Sketch and describe how iron ores were deposited using Lake Superior model and Hamersley Basin as examples
- [c] States five main uses of iron
- [d] Knowing the current supply and demand of iron, please describe the future of iron-related industries locally and internationally

Bijih besi terjadi dengan pelbagai cara.

- [a] *Senaraikan lima mineral yang sering mengandungi ferum*
- [b] *Lakar dan perihalkan bagaimana bijih besi terjadi menggunakan Model Tasik Superior dan Lembangan Hamersley*
- [c] *Nyatakan lima kegunaan besi*
- [d] *Dengan penawaran dan permintaan bijih besi sekarang, bincangkan masa depan industri tempatan dan antarabangsa yang berkaitan dengan bijih besi.*

(100 marks/markah)

3. State the general theories of ore genesis. Relate them to the five factors that are controlling their formations. Discuss the driving forces (chemistry!) that lead to their formation and deposition.

Nyatakan teori umum mengenai genesis bijih. Kaitkan dengan lima faktor yang mempengaruhi pembentukan mendapan bijih. Bincangkan pengaruh prinsip kimia di dalam pembentukan mendapan bijih.

(100 marks/markah)

4. Clays are very important industrial minerals.
- [a] Define clays from (a) the particle size, and (b) as a rock term
 - [b] List five main uses of clays
 - [c] Distinguish clearly what is meant by ball clays, refractory clays, and expansive clays.
 - [d] Describe five main characteristics of clays that make them useful to us.
 - [e] Describe how clays formed

Lempung adalah mineral perindustrian yang penting.

- [a] *Beri takrif lempung dari sudut (a) saiz partikel dan (b) sebagai istilah batuan*
- [b] *Senaraikan lima kegunaan mineral lempung yang utama*
- [c] *Bezajelaskan lempung bebola daripada lempung refraktori dan lempung ampul*
- [d] *Nyata dan bincangkan lima sifat lempung yang sangat penting kepada kita*
- [e] *Perihalkan bagaimana lempung terjadi*

(100 marks/markah)

5. [a] Briefly describe what is meant by placer deposits
- (i) State five ore minerals that are commonly associated with placer deposits
 - (ii) Describe how placer deposits formed
 - (iii) Can placer deposits be described as secondary enrichment deposits? Give your opinions and evidence to support your position

Perihalkan dengan ringkas apa yang dikatakan dengan mendapan plaser

- (i) *Nyatakan lima mineral bijih yang sering dikaitkan dengan mendapan plaser*
- (ii) *Huraikan bagaimana mendapan plaser terjadi*
- (iii) *Bolehkah mendapan plaser diperihalkan sebagai mendapan pengayaan sekunder? Beri pandangan dan bahan bukti untuk menyokong pandangan anda.*

(100 marks/markah)

6. Wallrock alterations occur pervasively in the copper and molybdenum ore deposits. With the help of a diagram, indicate the alteration zones that are commonly found in a typical porphyry copper deposits. Also indicate the ore shells and the occurrence of veinlets and disseminated features on the diagram.

Perubahan batuan dinding berlaku dengan hebat di dalam mendapan bijih kuprum dan molibdenum. Dengan melakarkan gambar rajah, tunjuk dengan jelas zon perubahan yang sering terdapat di dalam mendapan bijih kuprum. Tunjukkan juga kelongsong bijih dan kejadian telerang halus dan taburan rawak butiran kuprum.

(100 marks/markah)

7. [a] With the aid of a diagram, show and describe how evaporites form.

Dengan menggunakan gambarajah, perihalkan bagaimana mendapan evaparit terjadi.

(50 marks/markah)

- [b] Ore mineralization occurs all along the geological time. Annotate on the geological time frame where iron, coal, gold, copper, lead, zinc are likely to form.

Penuneralan mineral terjadi sepanjang masa geologi. Tulis catatan di atas kolom masa geologi bila mendapan besi, batu arang, emas, kuprum, plumbum, zink sering terjadi.

(50 marks/markah)