UNIVERSITI SAINS MALAYSIA

Second Semester Examination
2014/2015 Academic Session

June 2015

EBS 328/3 – Prospecting Geochemistry
[Geokimia Carigali]

Duration : 3 hours
[Masa : 3 jam]

Please ensure that this examination paper contains SEVEN printed pages before you begin the examination.
[Sila pastikan bahawa kertas peperiksaan ini mengandungi TUJUH muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]

This paper consists of SEVEN questions.
[Kertas soalan ini mengandungi TUJUH soalan.]

Instruction: 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 **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.]

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1. Sketch and discuss the FIVE field conditions that warrant the use of geochemical exploration.

Lakar dan bincangkan LIMA keadaan lapangan yang menuntut kaedah geokimia carigali digunakan.

(100 marks/*markah*)

2. Briefly describe the following items:

[a] Pathfinder elements

[b] Path indicator elements

[c] Regional background

[d] Local background

[e] Ion mobility

[f] Leakage anomaly

[g] Significant anomaly

[h] Non-significant anomaly

[i] Accuracy

[j] Precision

Perihalkan perkara berikut:

[a] (unsur perisik)

[b] (unsur penunjuk)

[c] (nilai latar kawasan)

[d] (nilai latar tempatan)

[e] (kelincahan ion)

[f] (anomali tiris)

[g] (anamali penting)

[h] (anomaly tak penting)

[i] (kejituan)

[j] (kepersisan)

(100 marks/*markah*)

3. Describe what is meant by primary and secondary dispersion? How primary and secondary dispersion developed and discuss how they are important to mineral exploration? (Use diagram or sketches to illustrate your answer).

Huraikan apa yang dimaksudkan dengan serakan primer dan sekunder? Huraikan bagaimana serakan primer dan sekunder terjadi dan bincangkan bagaimana ia penting di dalam carigali mineral? (Gunakan rajah atau lakaran untuk mengilustrasikan jawapan anda).

(100 marks/*markah*)

4. There are three types of survey normally being carried in the geochemical exploration program: Reconnaisance, Orientatation, and Detailed. Draw three columns on your answer script, and discuss using the following items:

[a] objectives
[b] what samping media would you recommend
[c] the sampling grid
[d] sampling density
[e] duration
[f] cost/expenditures.

Terdapat tiga jenis tinjauan yang lazim digunakan di dalam cari gali geokimia: tinjauan awal, orientasi dan terperinci. Lakarkan tiga kolum pada kertas jawapan anda dan bincangkan item berikut;

[a] matlamat/tujuan
[b] media pensampelan yang disarankan
[c] grid pensampelan,
[d] ketumpatan sampel
[e] tempoh
[f] kos/perbelanjaan

(100 marks/*markah*)

5. Given the following table: content of selected elements in granites associated with tin mineralization in Tasmania, Australia. Observe the data carefully and write your comments and conclusions based on your observations. You may want to consider other options of presenting your data that may have important bearing on your conclusions.

Jadual berikut diberikan: kandungan unsur tertentu di dalam batuan granit yang terjadi dengan pemineralan timah di Tasmania, Australia. Perhatikan data dengan teliti and tulis komen dan kesimpulan anda berdasarkan pemerhatian anda tadi. Anda mungkin perlu mempertimbangkan opsyen lain dalam mempersembahkan data yang mungkin mempunyai kaitan penting dengan kesimpulan anda.

Sample No	K (%)	Mg (%)	F (%)	Li (ppm)	Rb (ppm)	Sr (ppm)	Sn (ppm)
1	4.1	0.24	0.11	46	360	95	6
2	4.0	0.23	0.15	46	355	85	5
3	4.1	0.24	0.14	46	355	105	6
4	4.0	0.19	0.10	23	385	30	5
5	3.4	0.21	0.21	70	425	65	16
6	3.9	0.22	0.40	46	365	75	9
Average barren granite (Sample 1-6)	**3.9**	**0.22**	**0.14**	**46**	**365**	**75**	**9**
7	3.9	0.04	1.4	235	1105	4	1820
8	4.2	0.03	1.4	232	1115	4	740
9	3.9	0.03	0.11	46	840	6	66
10	4.2	0.03	1.3	209	1225	4	61
11	3.1	0.03	0.78	164	935	7	52
12	3.6	0.04	1.1	164	980	6	28
Average mineralized granite (Sample 7-12)	**3.8**	**0.04**	**1.02**	**186**	**1035**	**5**	**49**

(100 marks/*markah*)

6. The following table shows the distribution of selected elements in common rock forming minerals.

Jadual berikut menunjukkan taburan beberapa unsur terpilih yang biasa ditemui di dalam mineral pembentuk batuan.

MINERAL	% in earth's crust	Copper (ppm)	Copper (mean ppm)	Zinc (ppm)	Zinc (mean ppm)	Lead (ppm)	Lead (mean ppm))
Olivine	1	6-960	115	50-82	63	0.2-7.2	2
Pyroxene	4	4-1000	120	16-200	97	0.3-20	6
Amphibole	5	1-300	78	34-690	196	1-70	11
Biotite	4	1-480	86	34-	527	7-95	21
Muscovite	2	5-152	36	4000	59	6-70	20
Plagioclase	42	8-700	62	24-200	17	1-70	20
AlkaliFeldspar	22	1-20	4	1-50	15	2-700	53
Quartz	18		2	10-24	7	0.1-3	1
				4-11			

Observe the table carefully. Write your comments regarding salient points that are important in geochemical exploration point of view.

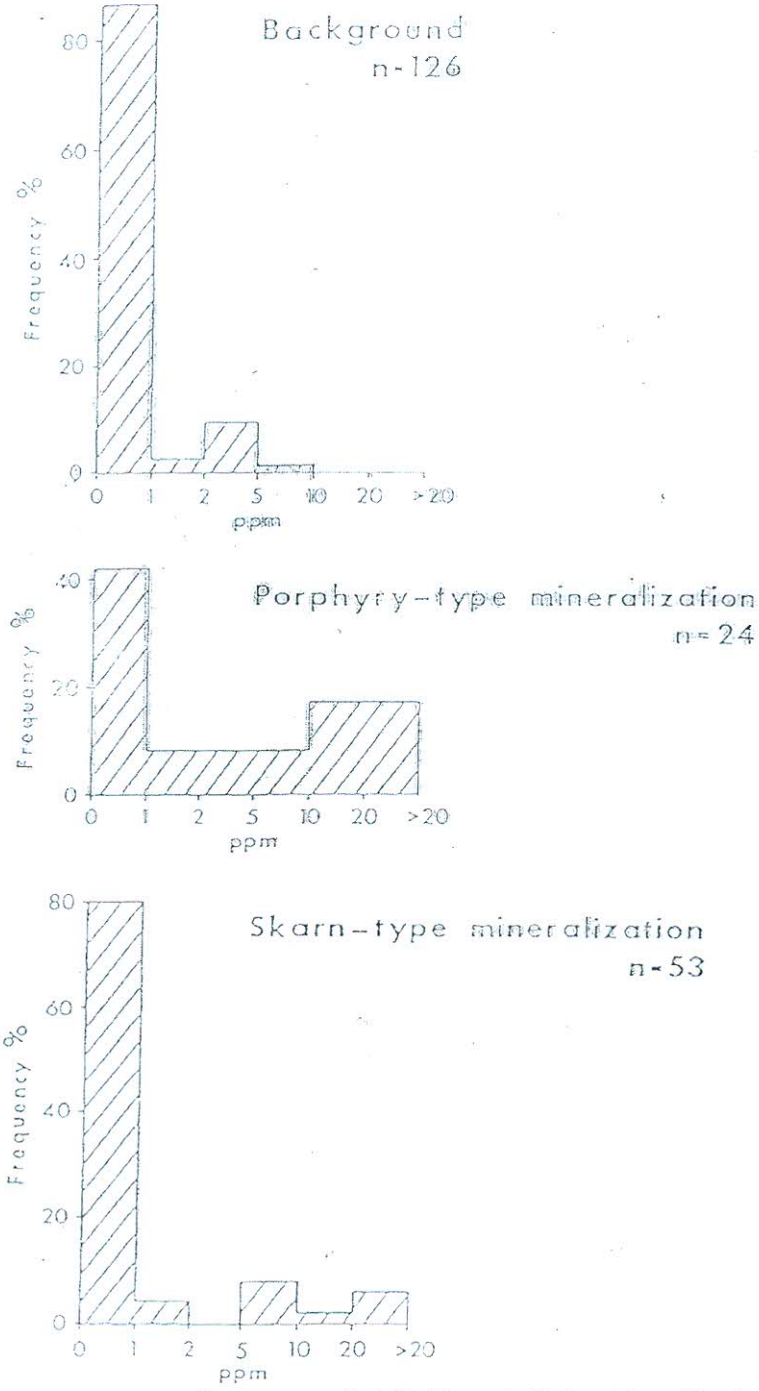
Perhatikan dengan teliti jadual di atas. Tulis komen anda tentang beberapa perkara penting yang boleh diekstrakkan yang mempunyai hubungan dengan carigali geokimia.

(100 marks/*markah*)

7. You are given the following frequency distribution of W in mineralized and barren granite intrusions in Northern Canadian Cordillera as per Figure 1. Observe the frequency distribution carefully. Compare and contrast between the two types of mineralization: porphyry-type mineralization and skarn-type mineralization. Write your observations as regards to its relations in geochemical exploration.

Anda diberikan rajah taburan frekuensi W yang wujud di dalam batuan granit terobosan dan termineral di Cordillera Utara Kanada seperti pada Rajah 1. Perhatikan rajah tersebut. Buat perbandingan di antara dua jenis pemineralan yang berlaku: pemineralan jenis porfiri dan pemineralan jenis skarn. Tulis cerapan anda tentang hubungkaitnya di dalam carigali geokimia.

(100 marks/*markah*)



Frequency distribution of W in mineralized and barren granitic intrusions, Northern Canadian Cordillera (data from Garrett, 1971).

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