UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 2006/2007

April 2007

ZGT 269/3 - Exploration Geophysics II
[Ilmu Geofizik Pencarigalian II]

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 any **FOUR** questions. Students are allowed to answer all questions in Bahasa Malaysia or in English.

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

1. (a) Discuss data reduction in the gravity method.
[Huraikan dengan ringkas pembetulan data dalam kaedah graviti.]

(40/100)

(b) What is the difference between regional and residual anomalies in the gravity method. Explain briefly the methods to measure both anomalies.
[Bezakan di antara anomali kawasan dan anomali baki dalam kaedah graviti dan terangkan secara ringkas kaedah-kaedah yang diperlukan untuk mengukur kedua-dua anomali ini.]

(30/100)

(c) Bouguer gravity anomaly values across a gravity anomaly are listed in Table 1. Plot the graph based on the data below. The anomaly is caused by an air filled cavity in a rock with density of 2600 kg'm^{-3}. Assuming that the anomaly is a (i) sphere and (ii) cylinder, calculate the depth and radius.
[Jadual 1 memberi nilai-nilai anomali graviti Bouguer yang melintasi anomali graviti. Lakarkan data dalam bentuk graf. Katakan anomali itu disebabkan oleh suatu lohong udara (air filled cavity) dalam batuan berketumpatan 2600 kg'm^{-3}. Dengan menganggap anomali itu sebagai (i) sfera dan (ii) silinder, hitungkan kedalaman anomali dan jejari masing-masing.]

Table 1 Bouguer anomaly gravity data
[Jadual 1. Data anomali graviti Bouguer]

x	g(x)	x	g(x)
-4	-0.10	1	-0.40
-3	-0.25	2	-0.35
-2	-0.35	3	-0.25
-1	-0.40	4	-0.10
0	-0.45		

x is distance in kilometer, g(x) is gravity anomaly in g.u.
[x ialah jarak dalam kilometer, g(x) ialah anomali graviti dalam g.u.]

(30/100)

2. (a) Discuss the approach to run a total ground magnetic survey for mineral exploration. Discuss also the data reduction and subsequently how to interpret the data.
[Huraikan bagaimana anda akan melaksanakan suatu tinjauan darat keamatan magnetik seluruh di kawasan usahacari mineral. Bagaimana anda akan membetulkan dan mentafsirkan data yang diperolehi.]

(50/100)

(b) Discuss the magnetization of rocks.
[Bincangkan tentang pemagnetan batu-batan.]

(25/100)

(c) Explain the half-width method to determine the depth qualitatively from the magnetic anomalies acquired from a field survey.
[Terangkan bagaimana anda menggunakan kaedah setengah-lebar (half-width) untuk menentukan secara kualitatif anomli-anomali magnet yang anda dapat daripada survei.]

(25/100)

3. (a) Write an essay on Vertical Electrical Sounding (VES).
Explain the difference with Constant Separation Traversing (CST).
[Tuliskan karangan mengenai pendugadalaman tegak elektrik (VES). Bandingkan dengan pemprofilan elektrik mendatar.]

(60/100)

(b) What is resistivity? What is the difference between resistivity and apparent resistivity? Discuss the factors that influence the resistivity of rocks. State Archie's Law and explain all its parameters.
[Apakah kerintangan? Bezakan dengan kerintangan ketara. Bincangkan faktor-faktor yang mempengaruhi kerintangan batu-batan. Berikan Hukum Archie dan jelaskan semua parameternya?]

(40/100)

4. (a) Write an essay on the 2D resistivity method. Explain the difference with the 1D method. What are the advantages of the 2D resistivity method?
[Tuliskan karangan tentang kaedah resistiviti 2D. Terangkan perbezaannya dengan kaedah 1D. Apakah kelebihan kaedah resistiviti 2D.]

(40/100)

(b) Explain the principles of equivalence and suppression in the electrical method.
[Terangkan tentang prinsip kesetaraan dan prinsip penindasan dalam kaedah elektrik.]

(30/100)

(c) Describe remnant and induced magnetization.
[Terangkan tentang pemagnetan baki dan pemagnetan teraruh.]

(30/100)

5. Write essays on the following
[Tuliskan karangan tentang]

(a) Ambiguity in interpretation of gravity method
[Ketaksaan dalam penafsiran kaedah graviti.]

(25/100)

(b) Proton precession magnetometer.
[Magnetometer liukan proton.]

(25/100)

(c) The relationship between amplitude and phase in primary and secondary fields in the EM method.
[Hubungan-hubungan amplitud dan fasa di antara medan-medan primer dan sekunder dalam kaedah EM.]

(25/100)

(d) Electrode and membrane polarization.
[Pengkutuban elektrod dan selaput.]

(25/100)

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