

UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 2006/2007

April 2007

ZGT 267/3 - Solid Earth Geophysics II
[Geofizik Bumi Pepejal II]

Duration: 3 hours
[Masa : 3 jam]

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

[Sila pastikan bahawa kertas peperiksaan ini mengandungi TIGA 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) Write the equation for Clairaut's Theorem, stating g_0 as a function of g_e , m , f and ϕ . Discuss the physical meaning of each of these parameters. Explain how Clairaut's Theorem is used in geophysical surveys.
[Tulis persamaan bagi Teorem Clairaut dengan menyatakan g_0 sebagai fungsi g_e , m , f dan ϕ . Bincangkan maksud fizikal setiap parameter tersebut. Jelaskan bagaimana Teorem Clairaut digunakan dalam tinjauan geofizik.]
 (60/100)
- (b) Discuss the Chandler wobble and its effect.
[Bincangkan goyangan Chandler dan kesannya.]
 (30/100)
- (c) Discuss the slow decrease in the angular velocity of rotation of the earth and its effect.
[Bincangkan pengurangan perlahan-perlahan halaju sudut putaran bumi serta kesannya.]
 (10/100)
2. (a) Describe the sunspot activity cycle. Discuss the Babcock theory for the formation of sunspots.
[Perihalkan kitaran aktiviti bintik matahari. Bincangkan teori Babcock untuk pembentukan bintik-bintik matahari.]
 (70/100)
- (b) Explain the Titius-Bode Rule and the Modified Bode's Law.
[Jelaskan Petua Titius-Bode dan Hukum Bode Terubahsuai.]
 (30/100)
3. (a) What is the meaning of "isostasy"? Discuss its main hypotheses with the aid of appropriate sketches. Explain "isostatic anomaly".
[Apakah maksudnya "isostasi"? Bincangkan hipotesis-hipotesis utamanya dengan bantuan lakaran-lakaran sesuai. Jelaskan "anomali isostatik".]
 (60/100)
- (b) Explain the upward and downward continuation of potential fields. What are their physical meanings? Discuss their applications in geophysical surveys.
[Jelaskan perselantaran medan keupayaan ke atas dan ke bawah. Apakah maksud fizikalnya? Bincangkan penggunaan-penggunaannya dalam tinjauan geofizik.]
 (40/100)

4. (a) Discuss secular variations and westward drift.
[Bincangkan variasi sekular dan hanyutan ke barat.] (50/100)
- (b) Describe the five main types of rock magnetism.
[Huraikan lima jenis utama kemagnetan batuan.] (50/100)
5. (a) Discuss the history of reversals of the earth's magnetic field.
[Bincangkan sejarah songsangan medan magnet bumi.] (50/100)
- (b) State and explain Laplace's equation, Poisson's equation and Gauss' theorem. Discuss the application of Gauss' theorem in gravity surveys.
[Nyatakan dan jelaskan persamaan Laplace, persamaan Poisson dan teorem Gauss. Bincangkan penggunaan teorem Gauss dalam tinjauan graviti.] (50/100)