
UNIVERSITI SAINS MALAYSIA

Second Semester Examination
Academic Session 2012/2013

June 2013

RET 533 – Construction Geotechnology
[Geoteknologi Pembinaan]

Duration: 3 hours
[Masa: 3 jam]

Please check that this examination paper consists of SIXTEEN printed pages before you begin the examination.

Sila pastikan bahawa kertas peperiksaan ini mengandungi ENAMBELAS muka surat yang tercetak sebelum anda memulakan peperiksaan ini.

Students are allowed to answer all questions either in English OR in Bahasa Malaysia only.

Pelajar dibenarkan menjawab semua soalan dalam Bahasa Inggeris ATAU Bahasa Malaysia sahaja.

Answer **FIVE** questions only.

*Jawab **LIMA** soalan sahaja.*

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

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

5. (a) Strip and Raft foundations depend very much on the safe bearing capacity of the underlying soil beneath of them. Describe **two (2)** types of shallow foundation and explain how the loads of superstructure are being transmitted to the ground.

*Asas jalur dan asas rakit bergantung sepenuhnya pada keupayaan galas tanah selamat yang menyokong asas tersebut. Terangkan **dua (2)** jenis asas cetek dan huraikan bagaimanakah bebanan dari superstruktur dipindahkan ke tanah.*

(10 marks/markah)

- (b) A gravity retaining wall of height 5.5 meter is to be constructed on a hillside with soil bearing capacity of exceeding 200 kN/m². Design a foundation structure that would support the wall of design load of 65 kN/m length of the wall. If the minimum depth of foundation, Z is 1.5 m below ground level and angle of shearing resistance of the soil, ϕ is 2.5° (degrees), determine the size of the foundation that would carry the load from the retaining wall. What is the safe bearing capacity of the soil if the bearing capacity is given by:

Sebuah tembok penahan graviti setinggi 5.5 meter akan dibina di atas tanah bukit yang mempunyai keupayaan galas tanah melebihi 200 kN/m². Cadangkan rekabentuk sebuah asas struktur yang boleh menyokong bebanan tembok berjumlah 65 kN/m panjang tembok. Jika kedalaman minimum bagi asas tersebut, Z terletak 1.5m di bawah aras bumi dan sudut ricihan tanah, ϕ bernilai 2.5° (darjah), tentukan saiz asas yang dapat menyokong tembok tersebut. Apakah keupayaan galas selamat bagi tanah tersebut jika keupayaan galas tanah diberikan oleh persamaan berikut:

$$q_{ult} = C N_c + \gamma Z (N_q - 1) + 0.5 \gamma B N_\gamma$$

where,

- C soil cohesion
kejeleketan tanah
- B width of foundation
lebar tapak asas
- γ soil bulk density
ketumpatan pukal tanah

- N_c, N_q, N_γ bearing capacity factors
faktor keupayaan galas tanah