UNIVERSITI TUN HUSSEIN ONN MALAYSIA

PEPERIKSAAN AKHIR
SEMESTER I
SESI 2009/2010

NAMA MATA PELAJARAN	:	MEKANIK TANAH
KOD MATA PELAJARAN	:	BBT 3432
KURSUS	:	SARJANA MUDA PENDIDIKAN TEKNIK DAN VOKASIONAL
TARIKH PEPERIKSAAN	:	NOVEMBER 2009
JANGKA MASA	:	2 JAM
ARAHAN	:	JAWAB EMPAT SOALAN SAHAJA

KERTAS SOALAN INI MENGANDUNGI SEMBILAN MUKA SURAT

S1 Satu ujikaji makmal dilakukan terhadap contoh tanah tidak terganggu seberat 1.90kg dengan isipadu 1/1000 m^3. Diberi graviti tentu zarah ialah 2.68 dan ketumpatan kering tanah ialah 1500 kg/m^3. Tentukan:

(a) kandungan lembapan
(b) nisbah liang
(c) keliangan
(d) cerun hidraul kritikal
(e) ketumpatan tepu
(f) ketepuan tenggelam
(g) darjah ketepuan tanah

(25 markah)

A laboratory test carried out on an undisturbed sample of soil weighing 1.90kg and having a volume 1/1000 m^3, the specific gravity of the solids 2.68 and dry density of the soil to be 1500 kg/m^3. Determine:

(a) moisture content
(b) void ratio
(c) porosity
(d) critical hydraulic gradient
(e) saturated density
(f) submerged density
(g) degree of soil saturation

(25 marks)

S2 (a) Keputusan analisis ayakan terhadap satu contoh tanah ditunjukkan dalam Jadual S2(a). Jumlah jisim bagi contoh tanah tersebut ialah 150 g.

(i) Lukiskan graf taburan saiz zarah.

(6 markah)

(ii) Nyatakan saiz berkesan zarah

(3 markah)

(iii) Kirakan pekali Keseragaman

(3 markah)

(iv) Kirakan Pekali Kelengkungan

(3 markah)

(a) The results of a sieving analysis of a soil sample are shown in Jadual S2(a).The total weight of the sample was 150 g.

(i) Plot the particle size distribution graph

(6 marks)

(ii) State the effective grain size..

(3 marks)

(iii) Find the coefficient of uniformity

(3 marks)

(iv) Find the coefficient of curvature

(3 marks)

Jadual S2(a)

Saiz Ayak (mm) *Sieve Size (mm)*	20	15	10	6	4.5	3	2	1.5	1	0.35	0.15	0.033
JisimTertahan (g) *Weight Retained (g)*	0	5	1.8	8.2	9	9.7	6.3	2	1	8.7	29.3	54

(b) Analisis ayakan bagi satu sampel menunjukkan 100% partikel lulus saiz ayak no 10, 80% lulus ayak no 40, dan 58% lulus ayak no 200. Keputusan ujikaji had Atterberg menunjukkan nilai had cecair adalah 30% dan nilai had plastic adalah 10%. Kelaskan tanah dengan menggunakan sistem pengkelasan USCS.

(10 markah)

(b) Sieve analysis on a sample resulted in 100% of the particle passing sieve no 10, 80% pass sieve no 40, and 58% pass sieve no 200. Results of Atterberg limit test show that liquid limit is 30% and plastic limit 10%. Determine the classification of the soil according to USCS..

(10 marks)

S3 Satu siri ujikaji terkukuh tak tersalir dengan pengukuran tekanan air liang ke atas satu sampel tanah liat tepu memberikan keputusan seperti dalam Jadual S3. Cari nilai-nilai bagi kejelekitan ketara, c dan sudut rintangan ricih, ø ;

(a) dalam bentuk tegasan jumlah
(b) dalam bentuk tegasan berkesan

(25 markah)

A series of consolidated undrained tests with pore water pressure measurement on a sample of saturated clay gave the results as in Jadual S3. Find the values of the apparent cohesion, c and the angle of shearing resistance, ø ;

(a) with respect to total stress.
(b) with respect to effective stress

(25 marks)

Jadual S3

All-round pressure (kN/m^2)	Principal stress difference, (kN/m^2)	Pore water pressure, (kN/m^2)
150	192	80
300	341	154
450	504	222

S4 (a) Apakah perbezaan antara kebolehtelapan dan resapan.

(3 markah)

(b) Satu jangkatelap berdiameter 82.5mm terdiri daripada pasir halus yang panjangnya 460mm. Apabila air mengalir di bawah tekanan tetap pada kadar 191 ml/min, kehilangan turus antara dua titik yang berjarak 250mm ialah 380mm. Kirakan pekali kebolehtelapan dalam sebutan mm/s.

(10 markah)

(c) Jika ujikaji jangkatelap turus menurun dilakukan pada sampel yang sama dengan diameter paip pugak 30mm. Berapa lamakah masa yang diperlukan untuk aras air dalam paip pugak akan turun dari 1560mm ke 1060mm di atas aras alirluar .

(12 markah)

(a) What are the different of permeability and seepage.

(3 marks)

(b) A permeameter of diameter 82.5mm contains in a column of fine sand 460mm long. When water flow through under constant head at the rate of 191 ml/min, the lost of head between two points 250mm apart is 380mm. Calculate the coefficient of permeability in mm/s.

(10 marks)

(c) If a falling-head test is made on the same sample using a standpipe of diameter 30 mm, in what time will the water level in the standpipe fall from 1560 to 1060mm above the outflow level

(12 marks)

S5 (a) Nyatakan empat jenis dinding penahan.

(4 markah)

(b) Terangkan bagaimana Geosintetik boleh mempengaruhi kestabilan cerun

(3 markah)

(b) Berbantukan lakaran, jelaskan dengan ringkas bagaimana geliciran berlaku pada cerun.

(6 markah)

(c) Satu projek jalanraya akan dibina di kawasan tanah tinggi yang melibatkan kerja-kerja pemotongan dan penambakan tanah. Dengan berbantukan rajah huraikan bagaimana dua kaedah penstabilan cerun dapat memberi kesan kepada kestabilan struktur tanah.

(12 markah)

(a) State four types of retaining wall.

(4 marks)

(b) Explain how Geosynthetic will effect the slope stability.

(3 marks)

(b) With a suitable sketches, explain how the slip failure occur?

(6 marks)

(c) A highway project will be constructed at highland area involving the cutting and filling work. With a suitable diagrams, explain two types of slope stability used for soil structure stability.

(12 marks)

S6 Ujian piawai pemadatan Proktor ke atas sejenis tanah memberikan keputusan-keputusan seperti dalam Jadual S6.

(a) Plot graf ketumpatan kering melawan lembapan.
(10 markah)

(b) Dapatkan nilai-nilai ketumpatan kering maksimum dan kandungan lembapan optimum.
(3 markah)

(c) Adakah tanah tepu sepenuhnya ketika pemadatan maksimum?, tunjukkan dengan pengiraan.
(6 markah)

(d) Berapakah peratus pemadatan untuk kandungan lembapan 15%.
(6 markah)

Standard Proctor compaction test carried out on a sample of soil yielded the results as shown in Jadual S6.

(a) Plot the curve of dry density against moisture content.
(10 marks)

(b) Find the values of maximum dry density and the optimum moisture content.
(3 marks)

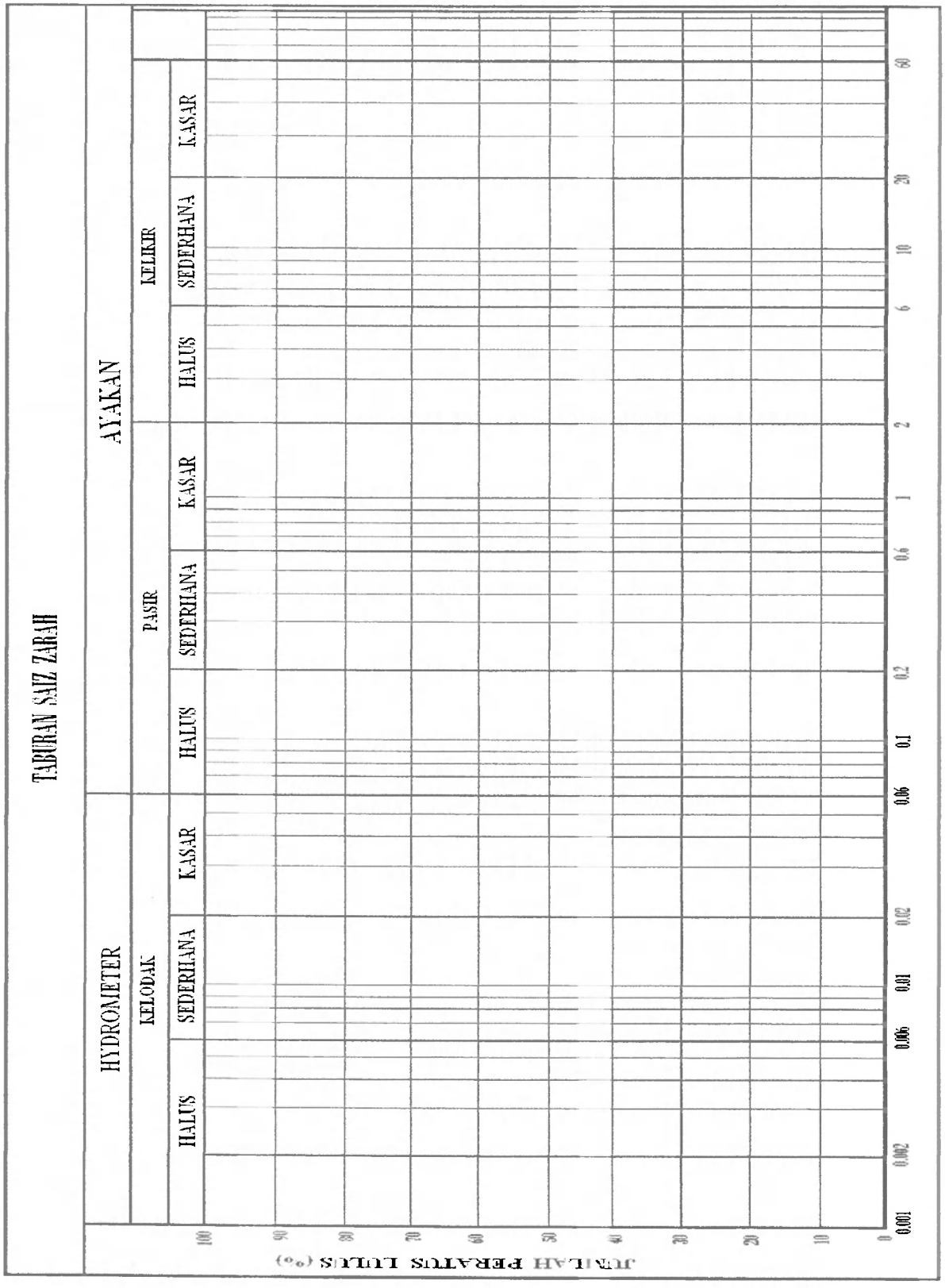
(c) Is the soil fully saturated at the maximum dry density? Show by calculation.
(6 marks)

(d) What is the percentage of compaction at moisture content 15%?
(6 marks)

Jadual S6

Soil Samples	Weight of samples + mould (soil fill up the mould) - kg	To get moisture content	
		Weight of soil samples (g)	Weight of dry samples (g)
1	6.37	16.2	14.9
2	6.47	18.0	16.0
3	6.43	21.5	18.5
4	6.15	21.0	17.7
Volume of mould = 9.433×10^{-4} m^3 Weight of mould = 4.38 kg Specific gravity, G_s = 2.68			

Nama..... No. Matrik :.....



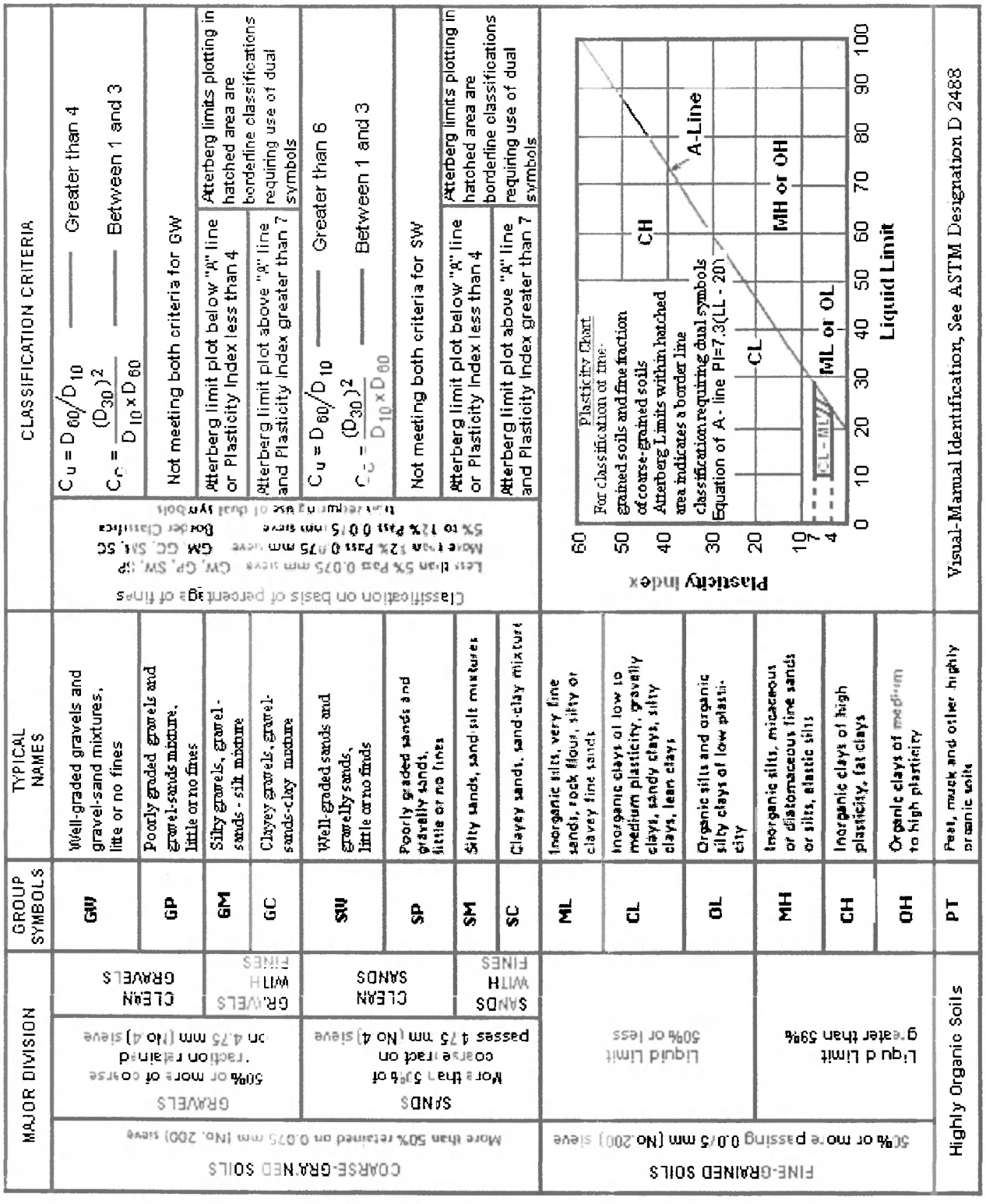


Figure S2(b): Unified Soil Classification System (USCS)

(Sistem Pengkelasan Tanah Berseka tu)