KOLEJ UNIVERSITI TEKNOLOGI TUN HUSSEIN ONN

PEPERIKSAAN AKHIR
SEMESTER I
SESI 2006/2007

NAMA MATA PELAJARAN	:	MEKANIK TANAH
KOD MATA PELAJARAN	:	BBT 3432
KURSUS	:	SARJANA MUDA PENDIDIKAN TEKNIK DAN VOKASIONAL
TARIKH PEPERIKSAAN	:	NOVEMBER 2006
JANGKA MASA	:	2 JAM
ARAHAN	:	JAWAB EMPAT SOALAN SAHAJA DARI LIMA SOALAN

KERTAS SOALAN INI MENGANDUNGI TUJUH MUKA SURAT

S1 The results in Table S1 were obtained from a sand replacement method of determining the insitu density of a soil sample.

Weight of soil extracted from hole	4.0 kg
Moisture content of soil	20 %
Weight of sand to fill hole	3.0 kg
Weight of sand to fill container of volume 4.2 liters	6.0 kg

Table S1

(a) Calculate of the:

i. density of the soil.

(7 marks)

ii. dry unit weight of the soil sample.

(6 marks)

iii. bulk unit weight of the soil sample.

(6 marks)

(b) If the specific gravity of the particle is 2.70, find the degree of saturation of the soil.

(6 marks)

S2 Standard Proctor compaction test carried out on a sample of sandy clay soil yielded the result as shown in Table S2.

Bulk density (kg/m^3)	1900	2060	2125	2160	2140	1850
Moisture content	11.5	13	14.5	17	18	22

Table S2

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

(6 marks)

(b) Find the maximum dry density and the optimum moisture content.

(6 marks)

(c) If the compaction to be done at 90%, what is the range of moisture content required?

(6 marks)

(d) Calculate the degree of saturation at the optimum moisture content if the specific gravity of the soil is 2.80.

(7 marks)

S3 Test done towards a sample of given soil result as shown in Table S3

(a) Plot the particle-size distribution curve. (*Use graph provided for S3)*

(4 marks)

Determine the value of:

i. Coefficient of Uniformity, C_u.
ii. Coefficient of Curvature, C_c.

(6 marks)

(b) Classify the soil using method of:

i. United States Department of Agriculture (USDA).
ii. American Association of State Highway and Traffic Official (AASHTO).
iii. Unified Soil Classification System (USCS).

(15 marks)

Sieve size (mm)	6.0	2.0	1.0	0.6	0.425	0.2	0.1	0.075	0.03	0.001
Percentage Passed (%)	100	88	70	55	47	33	25	21	10	00
Plasticity Index, PI = 17% Plasticity Limit, PL = 5%										

Table S3

S4 Result in Table S4 was obtained from undrained shear box tests on samples of silty clay.

Normal Pressure (kN/m^2)	210	315	420
Shear Strength (kN/m^2)	115	143	170

Table S4

(a) Find the apparent cohesion and angle of shearing resistance.

(8 marks)

(b) Find also the value of apparent cohesion which would expected from an unconfined test on sample of same soil.

(7 marks)

(c) If another specimen of this soil is subjected to an undrained tri-axial test with lateral pressure 280 kN/m^2, find the total axial pressure at which failure would be expected.

(10 marks)

S5 (a) What are the components of earth? Explain clearly with the help of diagrams.

(5 marks)

(b) Explain clearly the formation and classification of sedimentary rocks.

(5 marks)

(c) Referring to Figure S5(c), by using Mohr's Circle Method, determine the values of;

i. maximum shear stress,

(5 marks)

ii. stresses on the planes B-B and

(5 marks)

iii. angles and orientation of plane B-B to the principal planes.

(5 marks)

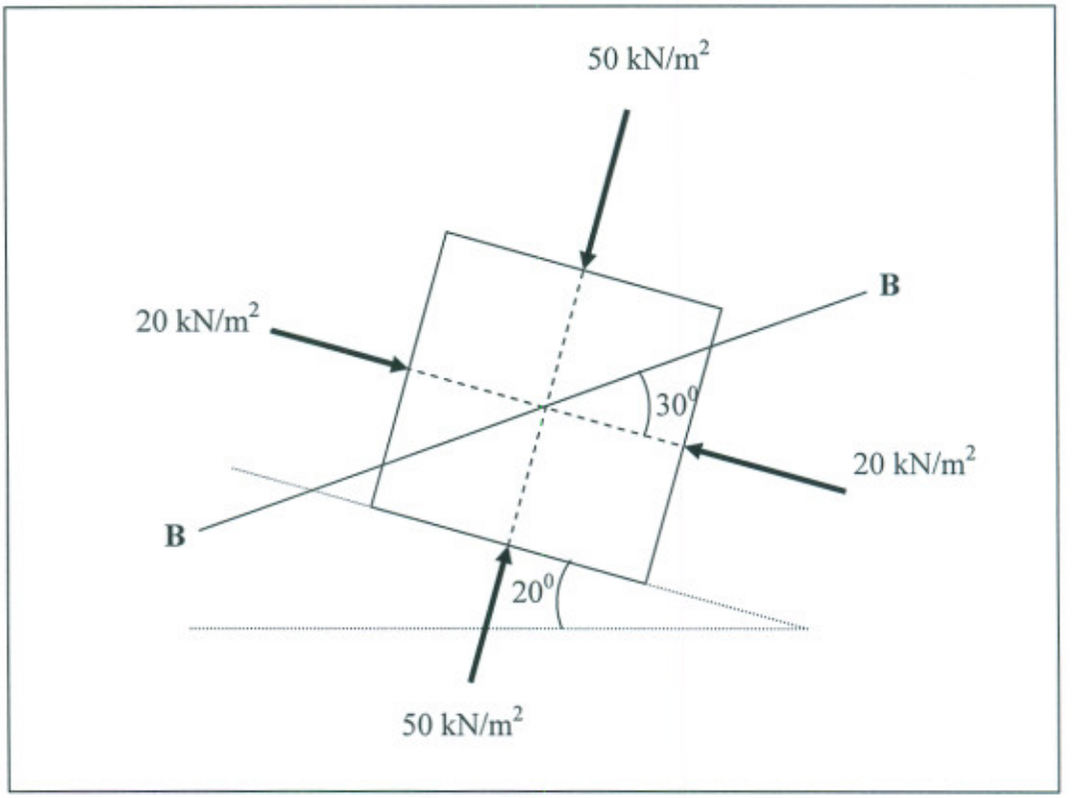

Figure S5(c)

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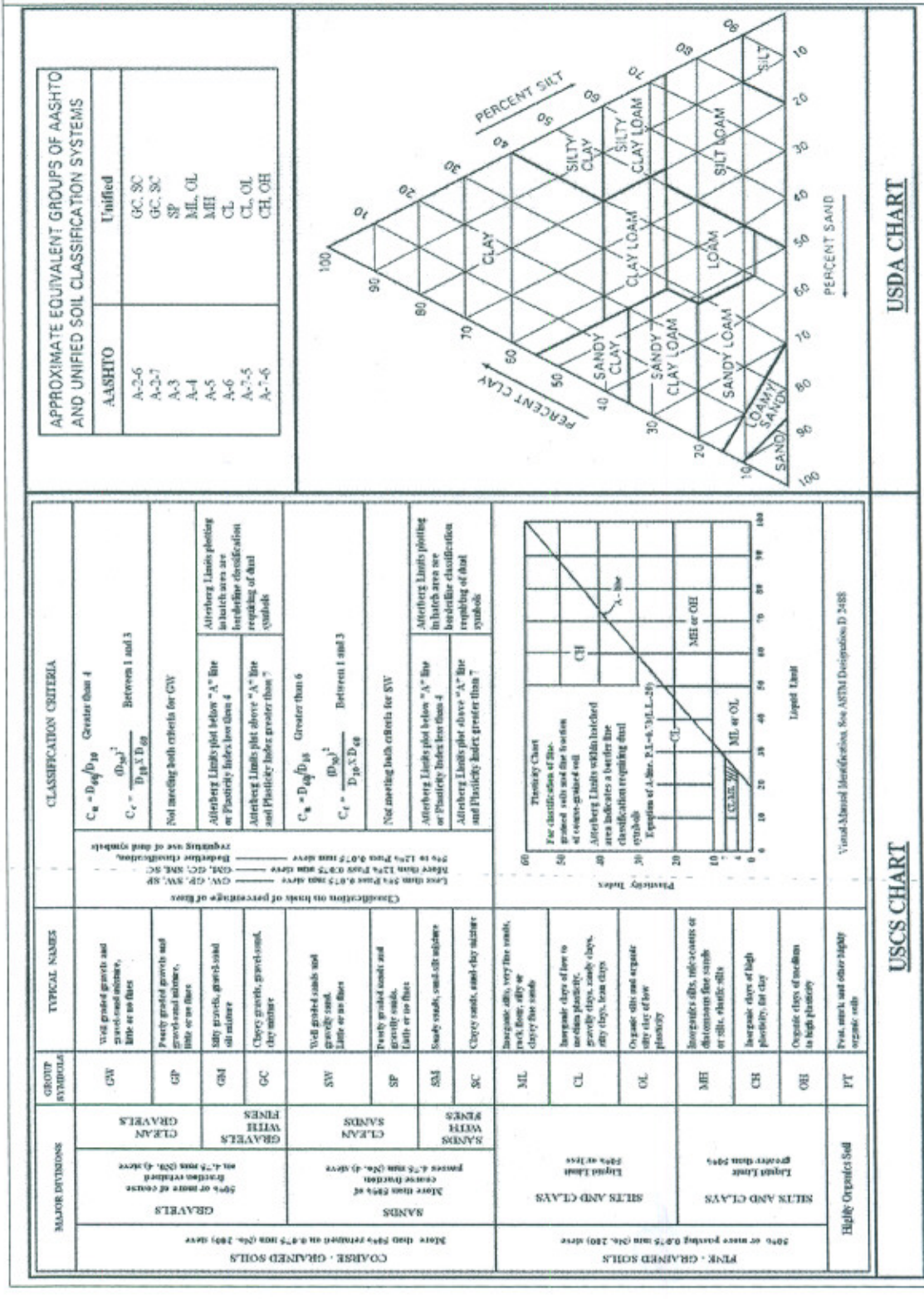
MATA PELAJARAN : MEKANIK TANAH KOD MATA PELAJARAN :BBT 3472



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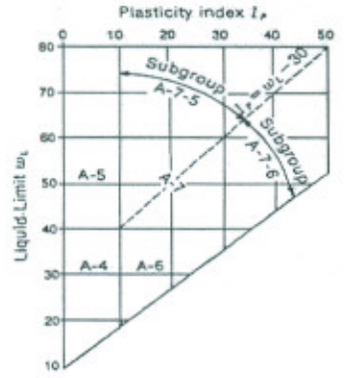
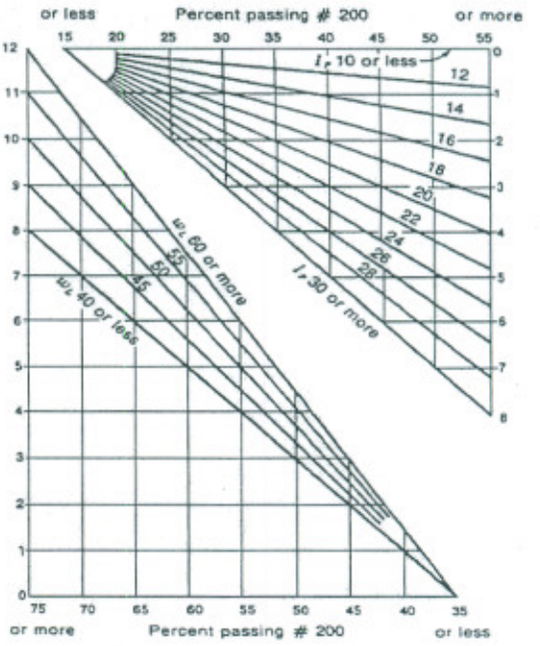
General classification	Granular materials (35 percent or less of total sample passing no. 200)							Silt-clay Materials (More than 35 percent of total sample passing no. 200)			
Group classification	A-1		A-3	A-2				A-4	A-5	A-6	A-7
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5* A-7-6
Sieve analysis percent passing											
# 10	50 max										
# 40	30 max	50 max	51 min								
# 200	15 max	25 max	10 max	35 max	35 max	35 max	35 max	36 min	36 min	36 min	36 min
Characteristics of fraction passing # 40											
Liquid limit, w_L				40 max	41 min	40 max	41 min	40 max	41 min	40 max	41 min
Plastic Index, I_p	6 max		NP	10 max	10 max	11 min	11 min	10 max	10 max	11 min	11 min
Group Index	0		0	0		4 max		8 max	12 max	16 max	20 max

Group index = GI = $0.2a + 0.005ac + 0.01bd$

(a) AASHO soil classification system.



(b) Liquid limit and plasticity index ranges for A-4, A-5, A-6, and A-7 soil groups



(c) Chart to obtain group index of a soil

AASTHO CHART

Figure S3

Name:.....

Matrik No:.....

(This sheet is to be submitted together with your booklet if you answer S2)

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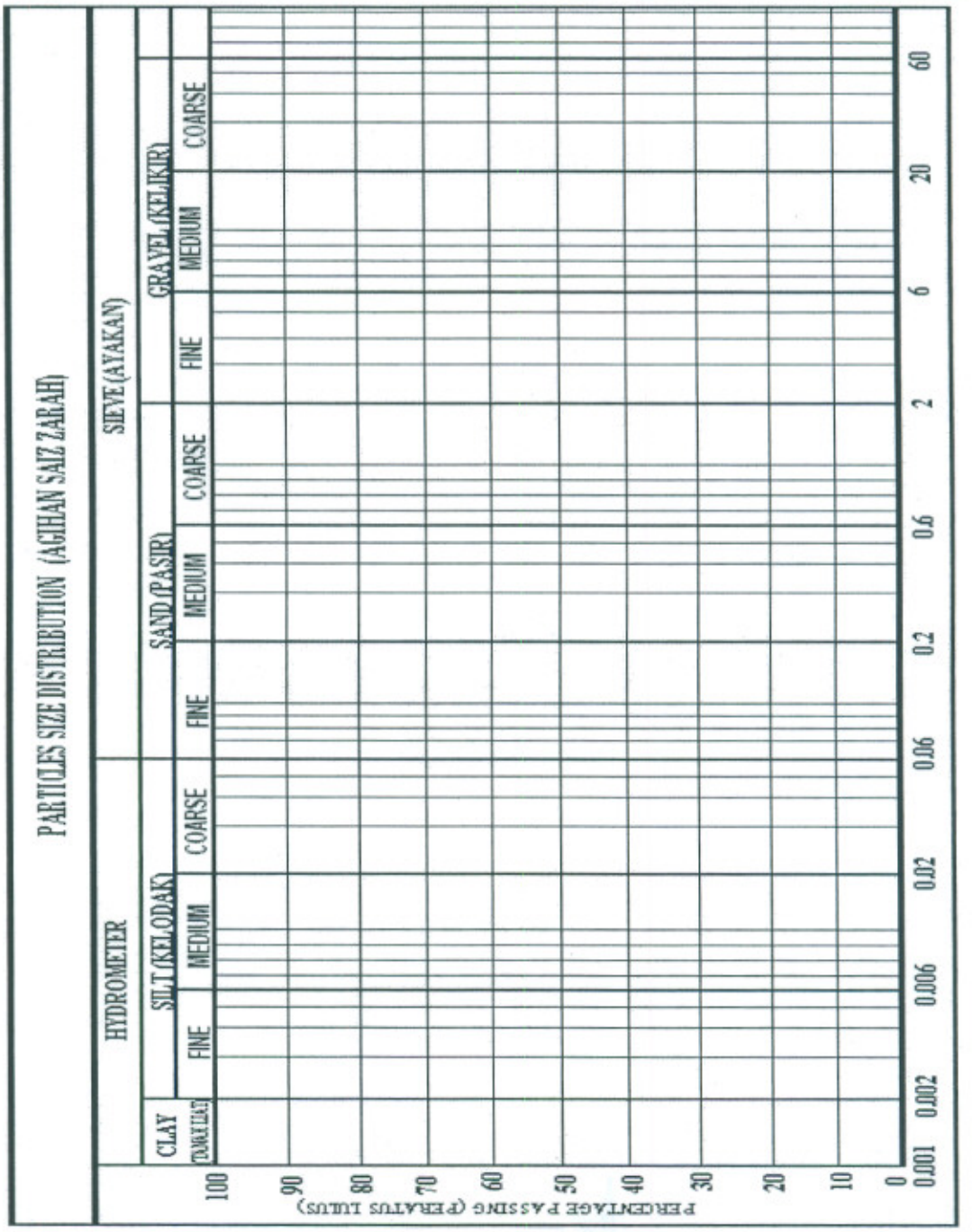

Graph S3