Department of Civil Engineering, MIST

Geotechnical Engineering Laboratory

CONSTANT HEAD PERMEABILITY TEST OF SOIL

Name of Student:				Student ID:	
Level/Term:		Section:		Group No:	
Course No:		Date of Test:		Test standard:	

BASIC DATA

Name of Project:			
Location:		Boring ID:	
Sample ID:		Sp. gravity of soil solids, G_s:	
Visual classification of soil:		Room temperature, T (°C):	
Inside dia. of permeameter (mm):		Area of permeameter, A (cm^2):	

DETERMINATION OF MOISTURE CONTENT OF INSITU/ AIR DRY SOIL SAMPLE						
Soil condition	Insitu Wet			Air Dry		
Observation No:	1	2	3	1	2	3
Container No:						
Wt. of container, (gm):						
Wt. of container + wet/air dry soil (gm):						
Wt. of container + oven dry soil (gm):						
Wt. of wet/ air dry soil (gm):						
Wt. of oven dry soil (gm):						
Wt. of water (gm):						
Water content (%):						
Average water content, w (%):						

DETERMINATION OF PERMEABILITY OF SOIL SAMPLE						
Soil condition	Insitu Wet			Air Dry		
Specimen No.	1	2	3	1	2	3
Container No:						
Wt. of permeameter/ container (gm):						
Wt. of permeameter/ container + wet/ air dry soil before filling the permeameter, W (gm):						
Wt. of oven dry soil in the permeameter, $W_d = W/(1+w)$, (gm):						
Quantity of water collected, Q (cc)						
Time to collect water, t (s)						
Ht. of soil in permeameter from point 1 to 3, L (mm):						
Water head in stand pipe 1 (top), h_1 (mm):						
Water head in stand pipe 3 (Intermediate), h_3 (mm):						
Permeability of soil at T °C , $k_T = QL/[(h_1 - h_3)At]$ (cm/s)						
Viscosity ratio correction factor w.r.t 20°C, $K_T = \frac{\eta_T}{\eta_{20}}$						
Permeability of soil at 20 °C , $k_{20} = K_T k_T$ (cm/s)						

DENSITY AND VOID RATIO FUNCTIONS OF SOIL SAMPLE						
Soil condition	Insitu Wet			Air Dry		
Specimen No.	1	2	3	1	2	3
Permeability of soil at 20 °C , k_{20} (cm/s)						
Dry density of soil, $\gamma_d = \frac{W_d}{(AL)}$, (g/cc)						
Unit weight of water, γ_w , (g/cc)						
Void ratio, $e = \frac{G_s \gamma_w}{\gamma_d} - 1$						
e^2						
$e^2/(1+e)$						
$e^3/(1+e)$						

Table: Viscosity Correction Factor of Water, $K_T = \eta_T/\eta_{20}$

°C	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
10	1.3012	1.2976	1.2940	1.2903	1.2867	1.2831	1.2795	1.2759	1.2722	1.2686
11	1.2650	1.2615	1.2580	1.2545	1.2510	1.2476	1.2441	1.2406	1.2371	1.2336
12	1.2301	1.2268	1.2234	1.2201	1.2168	1.2135	1.2101	1.2068	1.2035	1.2001
13	1.1968	1.1936	1.1905	1.1873	1.1841	1.1810	1.1777	1.1746	1.1714	1.1683
14	1.1651	1.1621	1.1590	1.1560	1.1529	1.1499	1.1469	1.1438	1.1408	1.1377
15	1.1347	1.1318	1.1289	1.1260	1.1231	1.1202	1.1172	1.1143	1.1114	1.1085
16	1.1056	1.1028	1.0999	1.0971	1.0943	1.0915	1.0887	1.0859	1.0803	1.0802
17	1.0774	1.0747	1.0720	1.0693	1.0667	1.0640	1.0613	1.0586	1.0560	1.0533
18	1.0507	1.0480	1.0454	1.0429	1.0403	1.0377	1.0351	1.0325	1.0300	1.0274
19	1.0248	1.0223	1.0198	1.0174	1.0149	1.0124	1.0099	1.0074	1.0050	1.0025
20	1.0000	0.9976	0.9952	0.9928	0.9904	0.9881	0.9857	0.9833	0.9809	0.9785
21	0.9761	0.9738	0.9715	0.9692	0.9669	0.9646	0.9623	0.9600	0.9577	0.9554
22	0.9531	0.9509	0.9487	0.9465	0.9443	0.9421	0.9399	0.9377	0.9355	0.9333
23	0.9311	0.9290	0.9268	0.9247	0.9225	0.9204	0.9183	0.9161	0.9140	0.9118
24	0.9097	0.9077	0.9056	0.9036	0.9015	0.8995	0.8975	0.8954	0.8934	0.8913
25	0.8893	0.8873	0.8853	0.8833	0.8813	0.8794	0.8774	0.8754	0.8734	0.8714
26	0.8694	0.8675	0.8656	0.8636	0.8617	0.8598	0.8579	0.8560	0.8540	0.8521
27	0.8502	0.8484	0.8465	0.8447	0.8428	0.8410	0.8392	0.8373	0.8355	0.8336
28	0.8318	0.8300	0.8282	0.8264	0.8246	0.8229	0.8211	0.8193	0.8175	0.8157
29	0.8139	0.8122	0.8105	0.8087	0.8070	0.8053	0.8036	0.8019	0.8001	0.7984
30	0.7967	0.7950	0.7934	0.7917	0.7901	0.7884	0.7867	0.7851	0.7834	0.7818
31	0.7801	0.7785	0.7769	0.7753	0.7737	0.7721	0.7705	0.7689	0.7673	0.7657
32	0.7641	0.7626	0.7610	0.7595	0.7579	0.7564	0.7548	0.7533	0.7517	0.7502
33	0.7486	0.7471	0.7456	0.7440	0.7425	0.7410	0.7395	0.7380	0.7364	0.7349
34	0.7334	0.7320	0.7305	0.7291	0.7276	0.7262	0.7247	0.7233	0.7218	0.7204
35	0.7189	0.7175	0.7161	0.7147	0.7133	0.7120	0.7106	0.7092	0.7078	0.7064

