CE 344 LABORATORY 2: TESTS ON AGGREGATES

Assume that you have an aggregate sample (Aggregate A) and you have conducted sieve analysis to your specimen. The mass retained for each sieve is shown in below:

Sieve	Sieve Opening (mm)	Mass Retained (g)
#4	4.75	0
#8	2.36	4
#16	1.18	19
#25	0.71	29
#30	0.600	25
#50	0.300	28
#100	0.150	6
#200	0.075	3
Pan	-	2

You should write a report about **only** the sieve analysis of aggregates (ASTM C 136 – 14). In all parts, except 'Discussion of Results' part, you should consider about **Aggregate A**, **only**. Do not forget to show your calculations in 'Calculations' part, fill the cells highlighted with grey color and draw the gradation curve in 'Results' part.

Sieve	Sieve Opening (mm)	Mass Retained (g)	Cumulative Percent Retained (%)	Percent Passing (%)
#4	4.75	0		
#8	2.36	4		
#16	1.18	19		
#25	0.71	29		
#30	0.600	25		
#50	0.300	28		
#100	0.150	6		
#200	0.075	3		
Pan	-	2		
Fineness Modulus				

In 'Discussion of results' part,

There are two aggregate samples whose sieve analyses according to ASTM C 136 – 14 are shown below:

	Mass Retained (%)	
Laboratory Sieve (mm)	Aggregate X	Aggregate Y
100	0	0
90	0	0
75	0	0
63	0	0
50	7	0
37.5	38	0
25	41	8
19	8	61
12.5	5	25
9.5	1	4
4.75	0	2
2.36	0	0
1.18	0	0
0.3	0	0

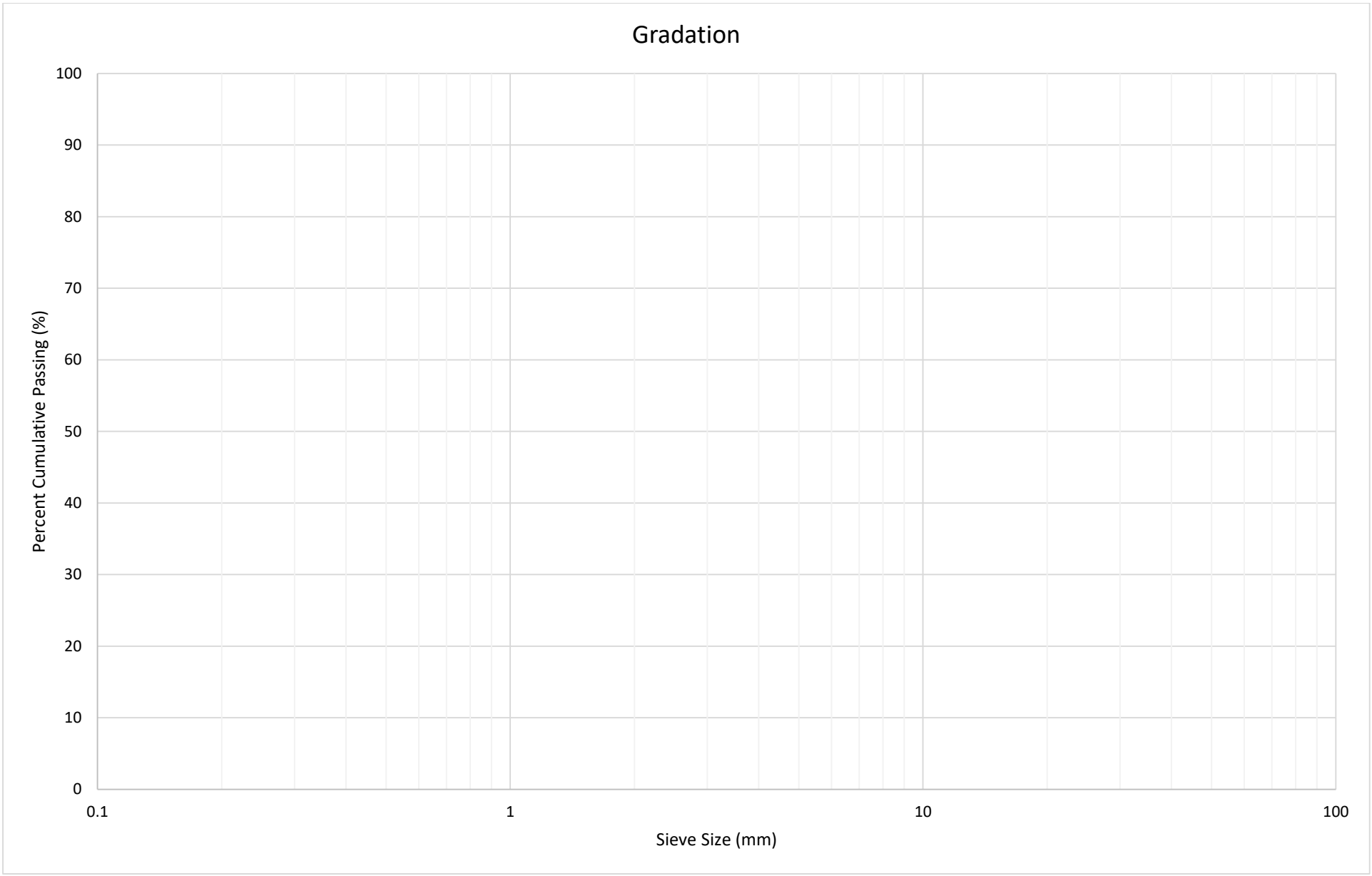
a. What are the types of Aggregate X and Y according to their sizes? Why?
b. Indicate the size numbers of Aggregate X and Aggregate Y according to ASTM C 33 – 18.
c. Can the combined aggregate (Aggregate Z) consisting of the 75 % of Aggregate X and 25 % of Aggregate Y satisfy the grading requirements for the aggregate with size number 4 according to ASTM C 33 – 18? Fill the table below and if it does not satisfy, what should be done to satisfy the requirements?

	Percent passing (%)		
Laboratory Sieve (mm)	Minimum limits for Size Number 4	Aggregate Z	Maximum limits for Size Number 4
100			
90			
75			
63			
50			
37.5			
25			
19			
12.5			
9.5			
4.75			
2.36			
1.18			
0.3			

d. Calculate the fineness moduli for Aggregates X, Y, Z according to ASTM C 136 – 14.
e. Draw the gradation curves of Aggregates X, Y, Z **by hand using the graph paper provided to you in the next page.**

In 'Conclusion' part,

Indicate whether Aggregate A satisfies the grading requirements given in ASTM C 33 standard or not.


Gradation
100
90
80
70
60
50
40
30
20
10
0
Percent Cumulative Passing (%)
0.1
1
10
100
Sieve Size (mm)

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- Below, the most widely conducted ASTM standard tests on Aggregates are listed.
- The tests shown with an asterisk (*) are the tests covered within this lab session.
- For detailed information on these tests, access www.astm.org within METU campus to download these standards.

*ASTM C29: Standard Test Method for Bulk Density (Unit Weight) and Voids in Aggregate

ASTM C 33: Standard Specification for Concrete Aggregates

ASTM C88: Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate

*ASTM C117: Standard Test Method for Materials Finer than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing

ASTM C123: Standard Test Method for Lightweight Particles in Aggregate

*ASTM C127: Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate

*ASTM C128: Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate

*ASTM C131: Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

*ASTM C136: Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

ASTM C142: Standard Test Method for Clay Lumps and Friable Particles in Aggregates

*ASTM C1260: Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)

Note: ASTM standards can be downloaded from METU Library web page>e-resources>Databases>ASTM Standards (IHS Standard Expert)