

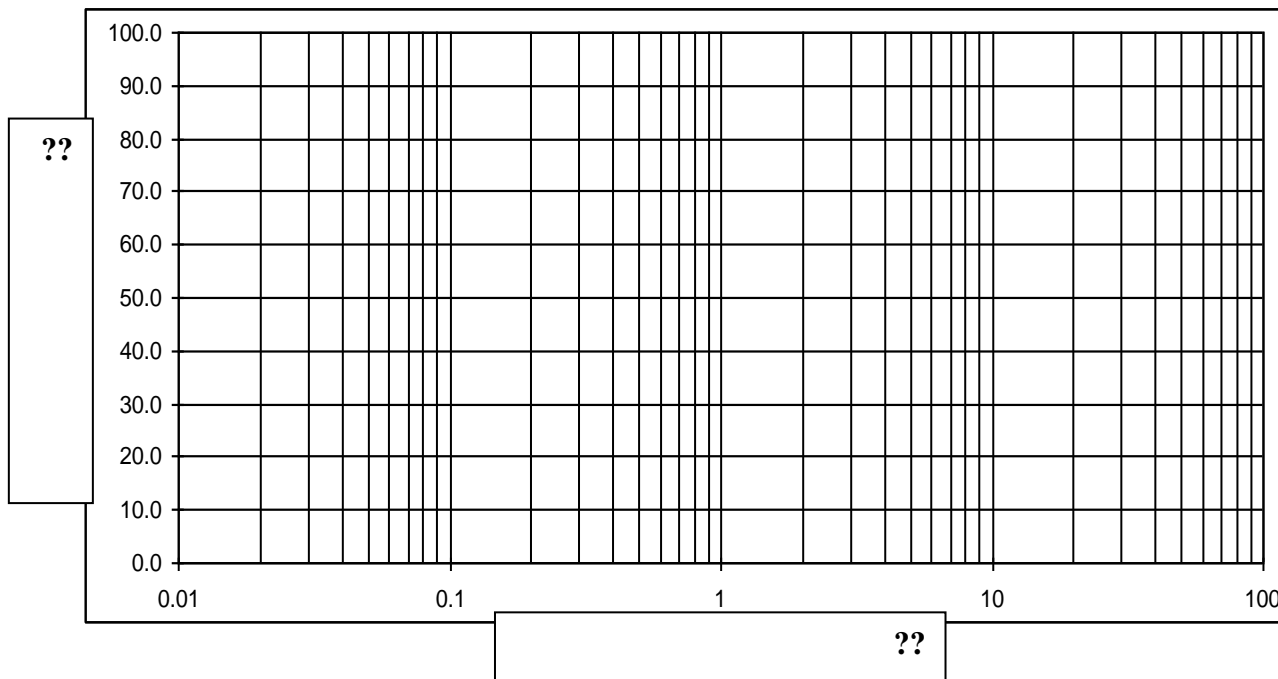
Answer all of the questions. Use the dedicated space for answer. No extra-sheet is allowed

Question One:

Consider the following results of the sieve analysis of an aggregate sample. Weight of the sample was 322.0 g before sieving.

Sieve Size (mm)	Retained (g)				
9.5 mm	0				
4.75 mm	120				
2.36 mm	150				
1.18 mm	50				
600 μm	0				
150 μm	0				

a. Plot the size gradation curve on the following chart. Make sure to add the labels of the axes:



b. Calculate the fineness modulus.

Can the soil specimen be classified as a fine aggregate? Explain.

Standard Sieves (75.0, 37.5, 19.0, 9.5 mm, 4.75 mm, 2.36 mm, 1.18 mm, 600 μm, 300 μm, and 150 μm).

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c. Is the specimen well graded? Explain.

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Question Two: Choose the best answer for the following:

- 1. The cement paste that once it has set, does not undergo a large change in volume is described as
A. Strong B. Sound C. Pure D. Consistent
- 2. The residue water from the hydration process fills spaces in the fresh paste called
A. Gel pores B. Capillary pores C. Interlayer spaces D. None of the previous
- 3. which of the following concrete properties are affected by aggregate size
A. Water demand B. cement content C. micro-cracking D. All of the previous
- 4. The water/cement ratio for cement paste tests is determined by:
A. Setting Time B. Standard Consistency Test C. Heat of hydration D. Soundness Test
- 5. Segregation is more likely to happen when the aggregate is:
A. Gap graded B. Well graded C. Uniformly graded D. None of the previous

Question Three: Please state whether the following statements are true (T) or false (F):

1. Hardening in concrete is the change from a fluid to a rigid stage.	
2. The manufactured aggregate is normally rounded with smooth surfaces.	
3. Le Chatelier test is used to measure the cement paste soundness.	
4. About 60-75% of the volume of concrete is occupied by fine aggregate.	
5. Aggregate is an inert material so the composition of parent rock does not matter.	

Question Four:

A cement paste was added mixing 25g of water and 46g of cement. What is the theoretical hydration percentage of the dry cement. Given that: specific gravity of dry cement is 3.15. Porosity of the gel is 0.28. The non-evaporable water is 23% of the mass of cement.
Volume of hydrated cement = volume of dry cement + bound water – 0.254 (bound water)

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