



King Mongkut's University of Technology Thonburi
Midterm Examination

Semester 1 Academic Year ~~2017~~ 2018

CVE 335 Cement and Concrete Materials
Date of Examination: October 4th, 2018

3rd Year Undergraduate Student
Time 9.00-12.00 PM.

Instruction:

1. There are 5 parts, 11 pages (including this page). Answer all questions.
 2. Write your name at all pages and answer in the examination paper. If the provided space is not enough, use the back side of the paper.
 3. Books, notes, and calculators are allowed in the examination room
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Examiners : Dr. Raktipong Sahamitmongkol
Tel. 02-470-9312

This examination paper has been approved by the Department of Civil Engineering

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Assoc. Prof. Dr. Sutat Leelataviwat
Head of the Civil Engineering Department

Student Name: _____ **I.D. Number** _____

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Part II: Please indicate whether the following statements are “True” or “False” (20 Marks)

For each statement, the score is “+1” if the answer is correct, “-1” if the answer is incorrect, and “0” if no answer is provided. The maximum score is thus “+20” and the minimum is “-20”.

- _____ 1. The flow value of mortar indicates ability of fresh mortar to deform under vibration. Higher value means better ability to flow.

- _____ 2. According to ASTM C109, the cylinder sample with diameter and height of 50 and 100 mm should be used for a determination of compressive strength.

- _____ 3. In the test for compressive strength of mortar, the load should be applied as fast as possible in order to obtain reliable test result.

- _____ 4. In the test for tensile strength of mortar, the smallest cross-sectional area at the middle of briquet sample should be used to determine the tensile strength of the mortar sample.

- _____ 5. Portland cement was named for the island of Portland, a peninsula in the English channel where its was first produced in the 1800’s.

- _____ 6. Workability is the property that determines the ease with which freshly mixed concrete can be placed and finished without segregation.

- _____ 7. Hydraulic cement is a group of cement which can get hardened under water.

- _____ 8. In order to manufacture the Portland cement (dry process), the suitable mixture of “limestone or chalk” and “clay or shale” must be burned at approximately 1450 °C.

- _____ 9. The masonry cement used in mortar or brick work is made by intergrinding Portland cement with limestone and mixed with air-entraining admixture.

- _____ 10. In comparison to Portland cement type I with same water-to-cement ratio, masonry cement is more plastic in its fresh state but give lower compressive strength in its hardened state.

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- _____ 11. The “wet process” type of cement production requires less energy when compared with the “dry process”. Therefore, the “wet process” is more popular in the current cement production industry.
- _____ 12. The rate of reaction between cement and water depends on the fineness of the cement particle. The smaller cement particles give faster reaction.
- _____ 13. When the fineness of cement is measured as “Blaine’s fineness”, the specific surface area in the unit of m^2/kg is used to express the fineness. Higher specific surface area indicates smaller size of the particle.
- _____ 14. Glassy and smooth surface of aggregate is ideal to develop a concrete with very high compressive strength.
- _____ 15. Apparent specific gravity is the ratio of the weight of the aggregate dried at $100-110^\circ\text{C}$ to the weight of water occupying a volume equal to that of the solid including the impermeable voids.
- _____ 16. Retarding chemical admixture does not alter the composition of the products of reaction between cement and water. It just retards the reaction by coating the surface of cement particles and temporarily protect it from full exposure with water.
- _____ 17. Concrete may not get hardened and not become solid if too much retarding admixture is added.
- _____ 18. When the setting is delayed by the suitable use of retarder, a denser hydrated cement gel may develop and the long-term strength can be improved.
- _____ 19. Accelerating chemical admixture is very useful for concreting in cold climate when the setting time is prolonged by the low temperature.
- _____ 20. When a superplasticizer is used in a production of concrete, the addition of accelerator to that concrete is prohibited.

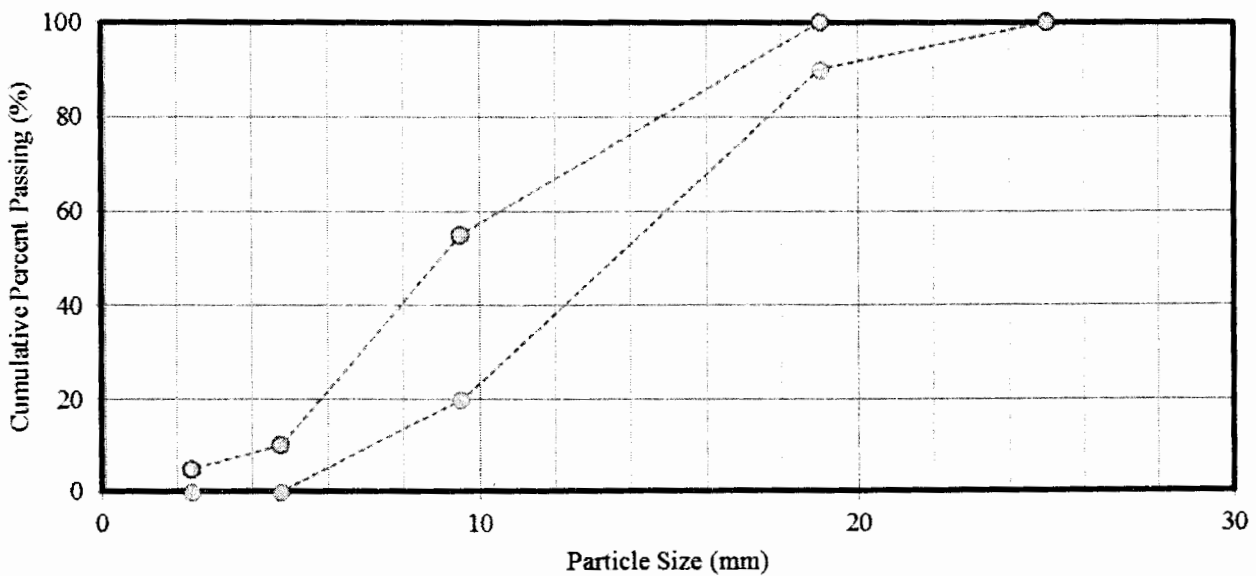
Student Name: _____ I.D. Number _____

Part IV: Sieve Analysis (totally 10 marks)

The sample (6 kg) of coarse aggregate was tested according to ASTM C136 (Sieve Analysis). The experimental data is given below.

- 1) Calculate the “cumulative percent retained” and “percent passing” in the table (5 marks).
- 2) Determine the fineness modulus of the aggregate (2 marks).
- 3) Compare the gradation with the requirements by plotting the gradation curve in the graph (3 marks)

Sieve No.	Sieve Opening (mm)	Weight of Sieve (g)	Weight of Sieve and Aggregate. (g)	Weight of Retained Aggregate. (g)	Percent Retained (%)	Cumulative Percent Retained (%)	Percent Passing (%)
1"	25.000	210	210				
3/4"	19.000	210	660				
3/8"	9.500	210	3155				
#4	4.750	213	2567				
#8	2.360	215	458				
#16	1.180	220	220				
#30	0.600	215	215				
#50	0.300	220	220				
#100	0.150	236	236				
Pan	-	249	249				
Weight Summation of Retained Aggregate (g):							
Original Weight of Aggregate Sample (g):				6000	Fineness Modulus =		



Student Name: _____ **I.D. Number** _____

Part V: Describe the meaning of the following technical terms (totally 30 marks)

1) Grading of aggregate & why is it important? (5 marks)

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2) Water content of aggregate & its relationship to absorption (5 marks)

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3) Organic impurities in aggregate & its influence on properties of concrete? (5 marks)

4) Superplaticizer & its difference from the water-reducing admixture? (5 marks)

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5) Type-G chemical admixture & its applications (5 marks)

6) Cold joint in concrete construction (5 marks)
