

Course No: CIVL 2310
 Course Title: Concrete Technology
 Date: 15/3/2017
 No. of Questions: (3)
 Time: 60 minutes
 Using Calculator (Yes)

University of Palestine

 First Midterm Exam
 2016/2017
 Total Grade: 15

Instructor Name: Dr. Osama Dawoud
 Dr. Tahreer Fayyad
 Student No.: _____
 Student Name: _____
 College Name: _____
 Dep. / Specialist: _____
 Using Dictionary (No)

Question One: 8

The following table includes the results of the chemical analysis of two cement samples for their composing chemical oxides:

Oxide	Sample A (%)	Sample B (%)
SiO ₂	23.1	23.1
Al ₂ O ₃	2.1	3.8
Fe ₂ O ₃	1.3	1.3
CaO	66.4	64.4
SO ₃	1.4	1.4

$$C_3S = 4.07C - 7.60S - 6.72A - 1.43F - 2.85S$$

$$C_2S = 2.87S - 0.75C_3S$$

$$C_3A = 2.65A - 1.69F$$

$$C_4AF = 3.04F$$

The engineers have no option but to use one of the cement types that were sampled by A and B. You were asked for your professional advice regarding the following:

1. Engineers would like to use cement to conduct urgent maintenance filling holes formed in paved roads by concrete (as a temporary solution). **Which type of cement would you recommend to be used? Explain your answer. (5 Marks)**

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2. Engineers noticed that one of the two samples produce greater heat at the early stages of hydration. **Which sample would produce greater heat? And why? (1.5 Marks)**

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3. If the engineers would like to construct an off-shore structure (in the sea), which type would you recommend? explain your answer. **(1.5 Marks)**

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Question Two: Choose the best answer for the following: 4.5

Question	1	2	3	4	5	6	7	8	9
Answer									

- Which of the following can be used as the main source for the calcium oxide (CaO) during the manufacturing of the Ordinary Portland Cement?
 A. Clay B. Limestone C. Hematite D. All of the previous
- Which of the following products of cement hydration is soluble in water?
 A. CH B. C-S-H gel C. $C_6A\hat{S}_3H_{32}$ D. Mono-sulfoaluminate
- The process that usually follows the dehydration of the slurry in the kiln is:
 A. Formation of C_3S B. Formation of CaO C. Clay Decomposition D. Formation of Clinker
- At which of the following stages of cement manufacturing the composition of the cement is controlled?
 A. Preheating B. Proportioning C. Clinker grinding D. Crushing
- In order to produce a low-heat cement, it has to be characterized by:
 A. high C_2S B. Low C_2S C. high C_3S D. high C_3A
- Which of following has a shape of crystals as hexagonal plates?
 A. CH B. AFm C. Monosulfoaluminate D. All of the previous
- Ettringite results from the hydration of:
 A. C_3S B. C_2S C. Gypsum D. None of the previous
- Which of the following is an undesirable product that could form in the cement paste?
 A. CH B. C-S-H gel C. Ettringite D. $CaCO_3$
- Which of the following is the binding material in the cement paste?
 A. CH B. C-S-H gel C. Ettringite D. $CaCO_3$

Question Three: 2.5

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

1. Concrete has a low compressive strength comparing to its tensile strength.	
2. The term 'Mortar' refers to the mixture of sand, cement, and water.	
3. Concrete exhibits a failure that is neither brittle nor ductile.	
4. Clay is an argillaceous material.	
5. Cement acquires the dark color due to the presence of dark minerals such as ettringite.	