



University Of Technology  
Building and Construction Eng. Dept.  
Final Exam – First Attempt – 2010/2011



Subject : concrete technology  
Branch : All Branches  
Examiner : concrete committee

Class: 2<sup>nd</sup>  
Time : 3 Hours  
Date : 9/ 6 / 2011

**Note: answer only five questions.**

Q1- Explain in details the followings:

- a- Segregation of concrete, and how could be minimize its effects.
- b- Bulking of sand and what is the factors affecting it.

Q2- Justify the followings:

- a- Using accelerated curing for precast concrete curing.
- b- The percentage of clay and other fine materials should be not more than the values limited in specifications.
- c- The specification limited maximum limit for loss on ignition of ordinary Portland cement.
- d- With the same cement content and consistency, concrete mix containing larger aggregate particles have lower strength than those containing smaller aggregate.
- e- Rise air temperature during mixing, placing and setting concrete increase the early strength but it have adverse effects at the later ages.

Q3- Discuss two of the followings:

- a- Alkali- aggregate reaction.
- b- Bond between concrete and reinforcement.
- c- Effect of air entraining admixtures on the properties of concrete.

Q4- Differentiates between the followings:

- a- Ordinary Portland cement and pozzolanic cement (chemical composition, properties, uses).
- b- Flash setting and false setting.
- c- Natural aggregate and artificial aggregate.

Q5- A- Define four of the followings:

Gap graded aggregate, clincker, roundness of aggregate, gel pores, external vibrator.

B- If the weight of sample of sand in sieve analysis test was (500 gm) and the weight retained on sieves are shown in table below.

- a- Is the sand satisfying the specifications.
- b- Calculate the fineness modulus of sand and what is the average size?

Sieve size (mm)	Wt. retained (gm)	Specification			
		Zone (1)	Zone (2)	Zone (3)	Zone (4)
10	0	100	100	100	100
5	5	90- 100	90- 100	90- 100	95- 100
2.36	20	60-95	75-100	85- 100	95-100
1.18	15	30- 70	55-90	75- 100	90- 100
0.6	35	15- 34	35- 59	60- 79	80- 100
0.3	315	5- 20	8- 30	12- 40	15- 50
0.15	90	0 – 10	0 – 10	0 – 10	0 – 15
< 0.15	20	-	-	-	-

Q6- A-calculate the quantities of materials to prepare 1 m<sup>3</sup> from air- entrained concrete and that to be design to satisfy the following requirements using British method (BRE):

- 1- Characteristic compressive strength (32 N/mm<sup>2</sup>) at 28 days, defective rate (5%) (K=1.64).
- 2- Standard deviation (8 N/mm<sup>2</sup>).
- 3- Ordinary Portland cement.
- 4- Slump required (30- 60 mm).
- 5- Maximum aggregate size (20 mm).
- 6- Maximum free- water/cement ratio (0.5).
- 7- Minimum cement content (340 Kg/m<sup>3</sup>).
- 8- Air content (3.8%).
- 9- Aggregate type- coarse – crushed, fine- uncrushed.
- 10-The percentage of fine aggregate passing sieve 600 μm, (50%).

B- USED American method to design concrete mix for casting piles cap in site exposed to sulfate attack.

- 1- The mean 28 days strength is (40 N/mm<sup>2</sup>)
- 2- The specific gravity of ordinary Portland cement is 3.15.
- 3- Minimum cement content is (290 Kg/m<sup>3</sup>).
- 4- The slump required is (8- 10 cm).
- 5- the properties of aggregate are shown in table below:

Fine aggregate	Coarse aggregate
Sp. Gravity (2.55)	Sp. Gravity ( 2.65)
Fineness modulus ( 2.4)	Maximum size (25 mm)
	Bulking density (1680 Kg/m <sup>3</sup> )