



Important
remarks

- Assume any data not given
- No. of pages:1- No. of questions: 3

Marks: max. 70

Question No. (1):

Discuss briefly and in neat sketches as possible:

- (a) Classification of engineering materials? (b) Type of aggregate w.r.t. grading?
(c) Mention two types of Cements and their scope (مجال) of uses?
(d) Explain briefly the different main tests (الإختبارات الأساسية) should be carried out on the fine aggregate (Sand) to study its applicability to the Standard Specification, and then Explain one of these tests?

Question No. (2):

A sieve analysis test was carried out on two samples of sand and gravel, the percentage (%) of passing at the different sieves was as follows:

Sieve size (mm)	40	20	10	5	2.5	1.25	0.63	0.31	0.16
(%) of passing (Sand)	---	---	---	98	90	70	45	10	1
(%) of passing (Gravel)	99	55	25	1	---	---	---	---	---

It is required to determine:-

- 1- The fineness modulus and the average size for both samples.
- 2- The maximum nominal size of gravel. 3- The type of sand w.r.t. the fineness .
- 4- The ideal mix. ratio between sand and gravel if the specific surface area for both sand and gravel were 58.0 and 3.0 cm²/gm respectively.
- 5- The fineness modulus for the obtained combined aggregate.

Question No. (3):

- (a) What is meant by workability of fresh concrete? and how to determine it experimentally?
(b) What is meant by segregation of fresh concrete, and how to avoid تتجنب this phenomena (الظاهرة).
(c) Discuss in sketches: the effect of Water-Cement ratio (w/C) on the properties of both fresh concrete and hardened concrete?
(d) A compacting factor test was carried out for concrete mix of proportions [1 : 2 : 3.5 : 0.55] by weight. If the weight of concrete filling the standard cylinder (15.24 x 30.48 cm) under free falling (partial compacted, W_p) equals 12.525 kg, it is required to calculate the expected degree of workability of this concrete mix.

Given data: $\gamma_s = \gamma_g = 2.65$, $\gamma_c = 3.15$

Good Luck
(Dr. Omar A. Farghal)