



- Answer all the following questions
- Illustrate your answers with sketches when necessary.
- The exam. consists of one page
- No. of Questions 3
- Total Mark: 30 Marks

Question No. 1 (50 %)

In construction site, the contractor produces concrete of characteristic strength equal to 35 N/mm^2 at the age of 28 days. After 40 compression tests, the standard deviation of the results is found to be 3.5 N/mm^2 .

It is required to re-design the mix knowing that;

Characteristic strength= 35 N/mm^2 , Slump= 30-60 mm, Crushed Coarse aggregate, maximum aggregate size is 20 mm, Fine aggregate between Zone 2&3, Aggregate relative density = 2.65, OPC cement (CEM I 42.5 R).

Note: **No durability limitations for this mix.**

Question No. 2 (25 %)

The increase in concrete workability affects the fine aggregate content in concrete mix. Demonstrate and comment on this fact using BRE Design charts for maximum aggregate size of 10 mm.

Question No. 3 (25 %)

From the BRE Mix Design tables and charts; Discuss the effect of the following factors on concrete mix proportions, and Give example.

- Maximum aggregate size.
- Coarse aggregate surface texture.
- Increase in the standard deviation of concrete strength.