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Date: ___/___/20___

NAME: UMAR FAROOQ

I-D: 16207

Subject: Concrete Technology

Section: "B" Department: "Civil"

Ques: Which step is taken to prevent flash

setting of cement? Also write steps to prevent

false setting.

Ans: Crypocum are intentionally added to

portland cement to regulate early hydration

reactions to prevent flash setting. Improve

strength development and reduce drying

shrinkage. Sulfate & aluminate are also

present in supplementary cementitious materials.

False Setting - False setting is a form

of premature stiffening of the paste or

(12)

Date: ___/___/20___

Concrete which occurs within 1 to 5 minutes after mixing. False Set can be eliminated by continuous mixing or by reworking & may not be noticed on jobs supplied by trucks mixer or with center mixed concrete that is spilted during delivering to the site.

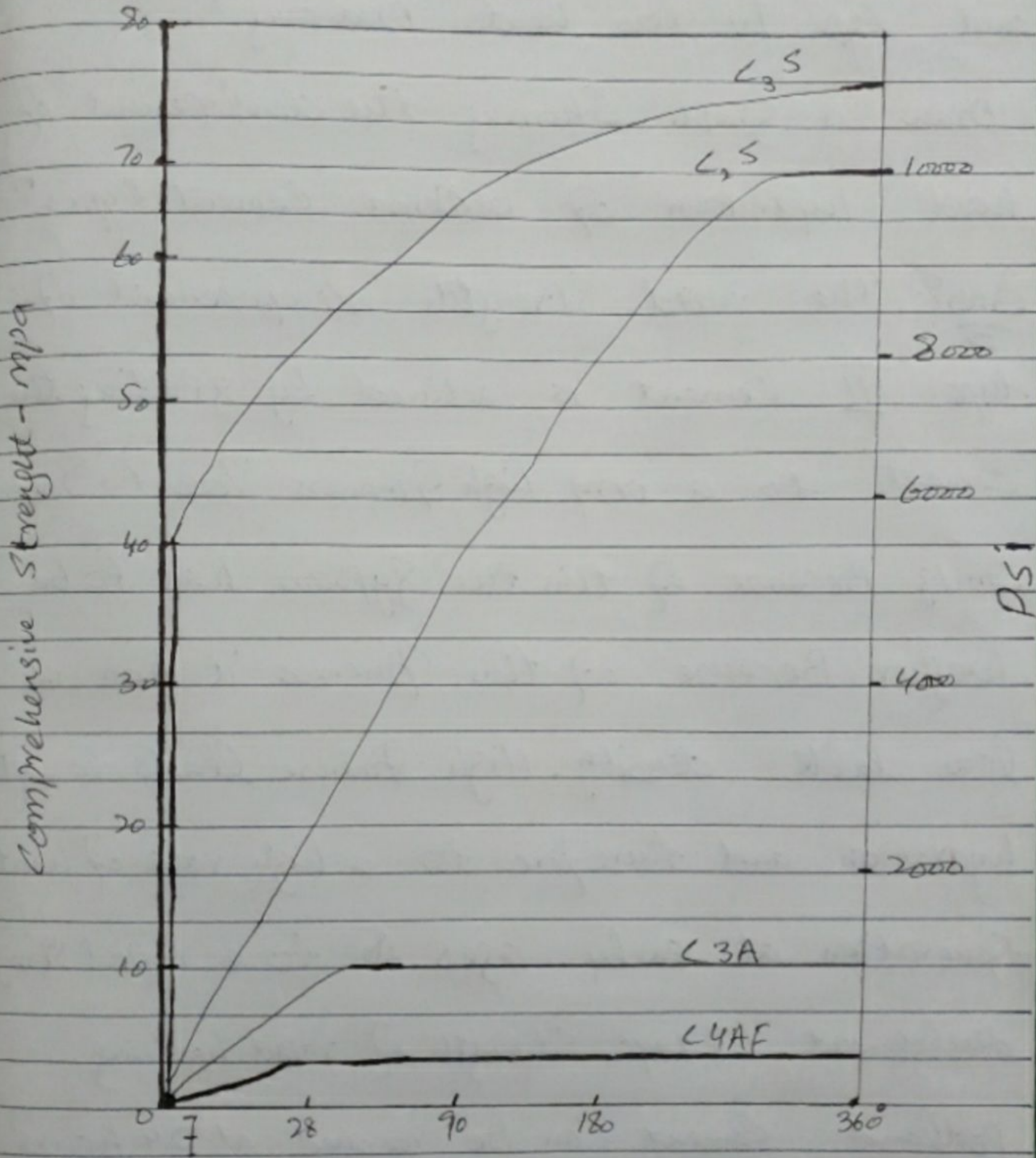
Ques Draw a graph showing the strength development of pure compound of cement?

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3

Date: ___/___/20__

Amo^o Graph^o



(2)

Date: / / 20

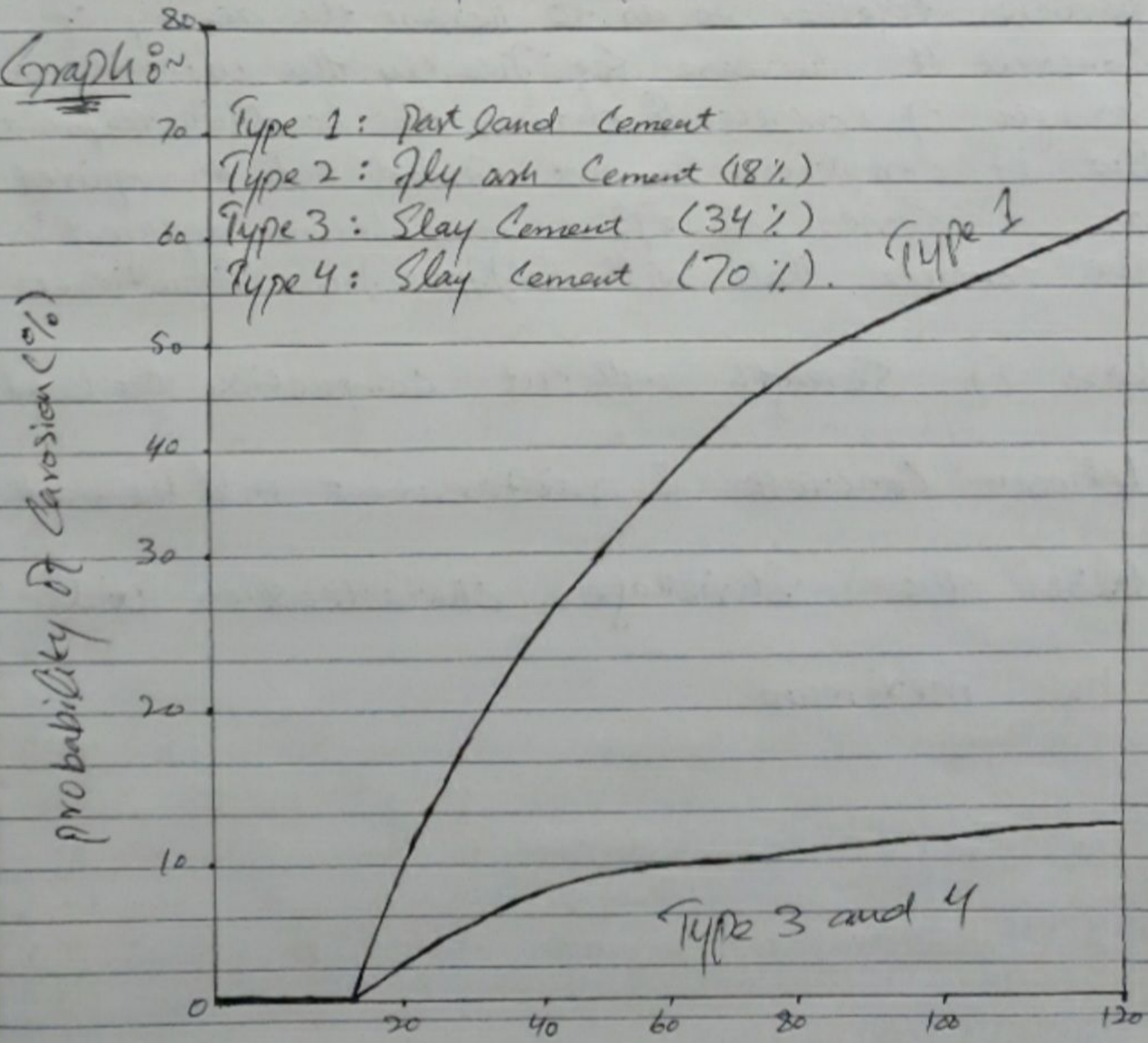
Ques ³⁰ why type III Cement is rapid hardening and type IV low heat producing?

Draw a graph showing the development of heat hydration of different cement types?

Ans ³⁰ The rapid strength development of type III cement is achieved by grinding the cement to a very high fineness 7000 to 8000 cm²/g. Because of this the gypsum has to be higher. Because of this fineness it has a low bulk density. High fineness leads to rapid hydration and therefore to a high rate of heat generation at early ages & to a rapid strength development (7 days strength of rapid hardening portland cement can be reached at 24 hours when using this type of cement).

And type IV cement is low heat producing

Cement because it is manufactured from the ingredients of specially selected cement clinker gypsum & ground granulated blast-finance slay which result in significantly lower heat generation during the process of hydration than in a typical portland cement.



(6)

Date: ___/___/20___

Ques What is the effect of compaction on entrapped air of cement? What will be the effect on strength if concrete is not compacted sufficiently. Explain with graphs.

Ans Compaction of concrete is an operation in which fresh concrete is compacted in forms & make it encircle reinforcements & other embedded objects such as tubes in mald. It is the process which expels entrapped air from concrete & packs the aggregate particles together so as to increase the density of concrete. It increases significantly the ultimate strength of concrete & enhances the bond with reinforcement. But if compaction is not carried out as required as a series of effects may become apparent & the concrete slab will suffer from significant

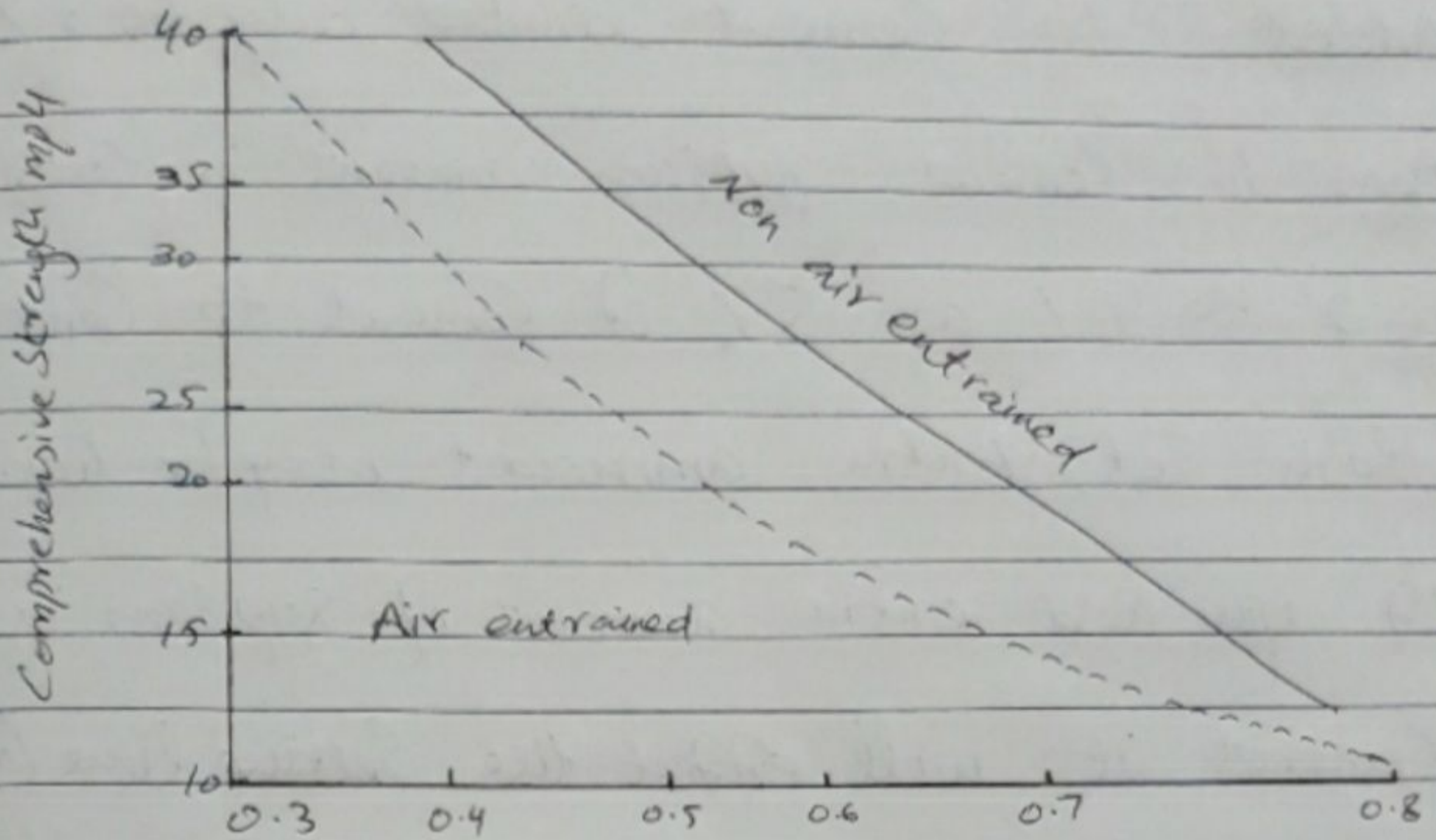
loss of strength without compaction the bond between concrete & reinforcement will be weak.

Also the shrinkage characteristics will be maximum.

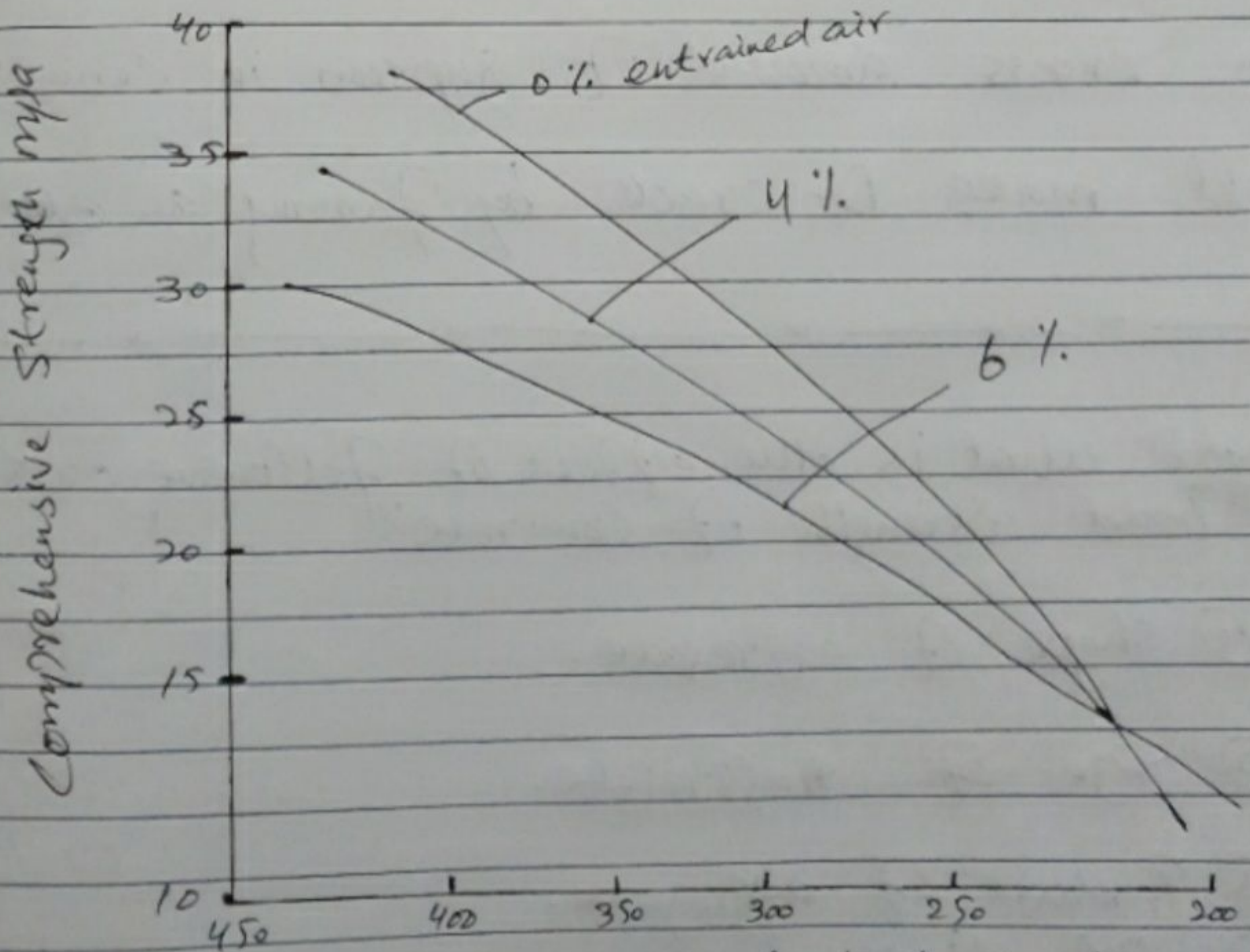
(7)

Date: ___/___/20___

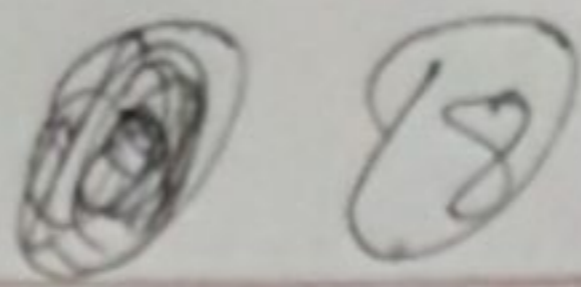
Graph 02



(a) water content reaction



(b) Cement Content reaction



Ques why is the percentage of Gypsum added to Cement limited only to 5%?

Ans In Cement Gypsum amount is controlled to 2 to 4% or 5% of Cement to control Flash Set. Extra amount may be harmful. If you add extra amount of Gypsum in the Cement it will affect the Setting time (reduce the expected setting time) and if there is an excess amount of Gypsum in Cement it will make D-crack by forming an ettringite.

Ques what is the effect of following on the bond strength of concrete?

- ① Shape of aggregate.
- ② Size of aggregate.
- ③ Texture of aggregate.
- ④ Bleeding.

Ans is Shape of aggregate crushed stone

produce much more angular & elongated aggregates which have a higher surface to volume ratio better bond characteristics but required more cement paste

(2) Size of aggregate On increasing the

maximum grain size to 120-180 mm the reduction in tensile strength is 30-50% as compared with concretes with maximum aggregate size 20mm.

(3) Texture of aggregate

Texture of aggregate affects the bond strength of concrete.

Texture can be either smooth or rough. Smooth surface reduce the bond strength due to less friction.

(4) Bleeding

Bleeding in concrete may consider as the physical migration of water towards the top surface. It is not always favorable as it increases finishing time produce laitance at the surface, decrease strength, wear resistance in bond strength & causes poor bonds between successive lifts.

Ques what is the effect on the following on workability of concrete?

(1) porosity and absorption.

(2) Air entraining agent.

(3) coarse aggregate to fine aggregate

(4) Grading of aggregate.

(10)

Date: ___/___/20___

Ans^r is porosity and absorption

The porosity and absorption of aggregate is important consideration because some water added is absorbed by aggregate hence affecting workability.

(2) Air entraining agent

Air entraining affects Compressive Strength of concrete and its workability. It measures the workability by concrete with out much increase in water/cement ratio.

(3) Coarse aggregate to fine aggregate

- Coarse aggregate tends to increase workability provided there is no particle interference.
- Fine aggregate generally decrease workability. Finer aggregate may lead to sticky mixes.

(4) Grading of aggregate

will graded aggregate tends to fill up voids easily get workability.

If grading is not good then workability of concrete will be not so good and if grading is better then there will be fewer voids and excess paste will be available to give better lubricating effect.

Quesⁿ ^r what is the effect of fineness of cement on the following?

- (1) Strength of concrete.
- (2) Rate of heat evolution during hydration.
- (3) Total heat of hydration.
- (4) workability of cement.

Ansⁿ in Strength of Concrete:- The Fineness of Cement influences the drying shrinkage of concrete when the water content is increased because of fineness the drying shrinkage is increased. The 28 days compression strength of concrete with or without entrained air increases with increase in cement fineness:

(2) Rate of heat evolution during hydration

partially replacing cement with fly ash of different fineness, decreased the cumulative heat evolution. The reduction in heat evolved increased with an increase in fly ash content.

Fly ash generated more heat of hydration.

(3) Total heat of hydration

The rate of heat generation increases as cement fineness increases and result indicates that increase of cement fineness^{ess} has no effect on total heat of hydration at 7 days.

(4) workability of concrete

when fineness of cement increases beyond a certain particle size, the particles of cement itself start acting as lubricants in the concrete. Therefore the particles flow and less effort is required for compaction of concrete. i.e:- The water demand decreases to obtain the same degree of workability.

Ques :- What steps can be taken during transportation and placement of concrete to prevent segregation of concrete?

Ans :- Segregation in concrete is commonly thought as separation of some size groups of aggregates from cement matrix in ~~selected~~ selected locations with corresponding deficiencies of these materials in other locations.

Segregation could result from internal factors such as concrete that is not proportioned properly and not mixed adequately. It could result from external factors also such as too much vibration improper transportation placement or adverse weather conditions.

We can avoid happening of segregation by
 (1) The concrete mix should be properly designed with optimum quantity of water to make a cohesive mix. Such concrete will not exhibit any tendency for segregation.

(2) Field quality control must be maintained while handling, transporting, placing and compacting and finishing concrete.

(3) While transporting or placing if at any stage segregation is observed, then remaining should be done to make concrete homogeneous.

(4) Admixtures, such as pozzolanic materials.

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 The End
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