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Paper : Concrete technology

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Question : 1

Answer :-

If inadequate amount of gypsum are added to the cement, flash set can occur a rapid development of rigidity in freshly mixed Portland Cement Paste, mortar or concrete. Further mixing can't dispel this rigidity, and a large amount of heat is produced in the processes.

- Calcium sulfate, such as gypsum, are intentionally added to portland cement to regulate early hydration reactions to prevent flash setting, improve strength, development, and reduce

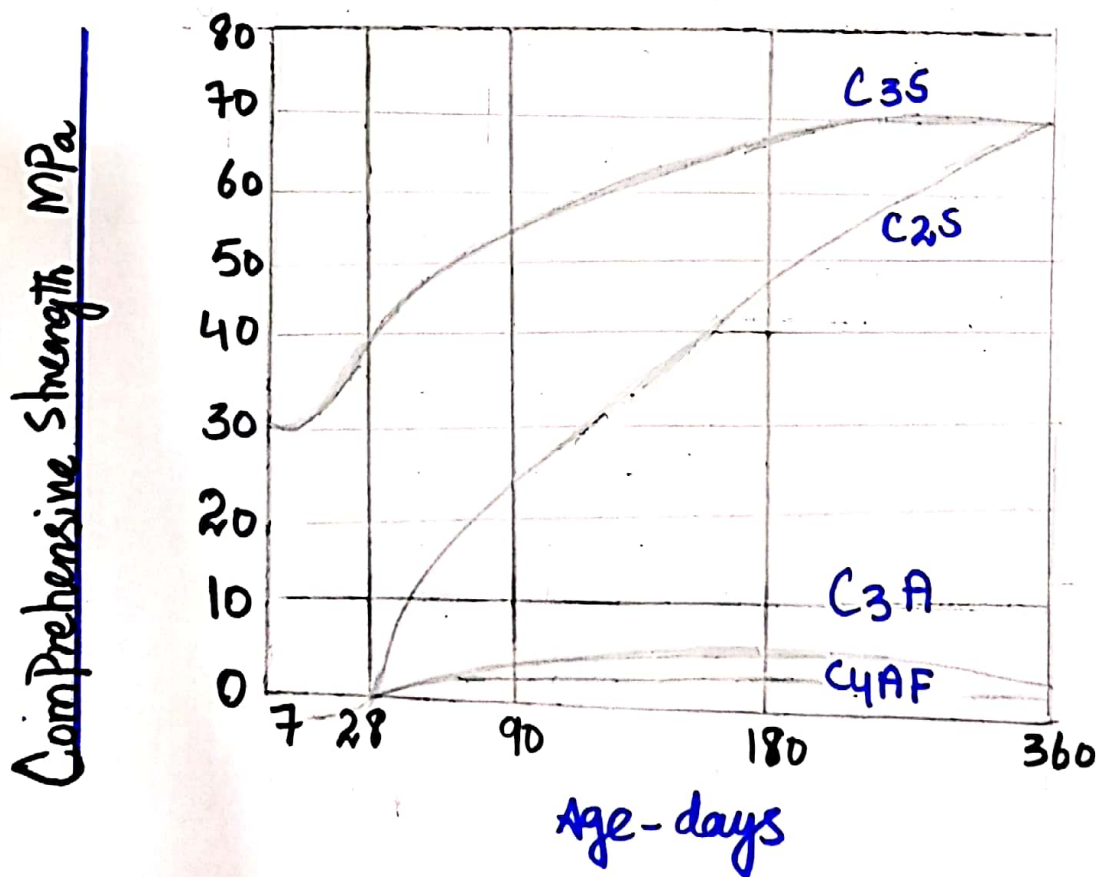
drying shrinkage.

Rapid development of rigidity can also be caused by false set. But in this case, little heat is generated. False set occurs because of some of the gypsum dehydrated as a result of contacting hot clinker of high temperature in the grinding mill and creates gypsum and stiffen the concrete.

Question : 2

Answer :-

Development of strength of pure compounds :-

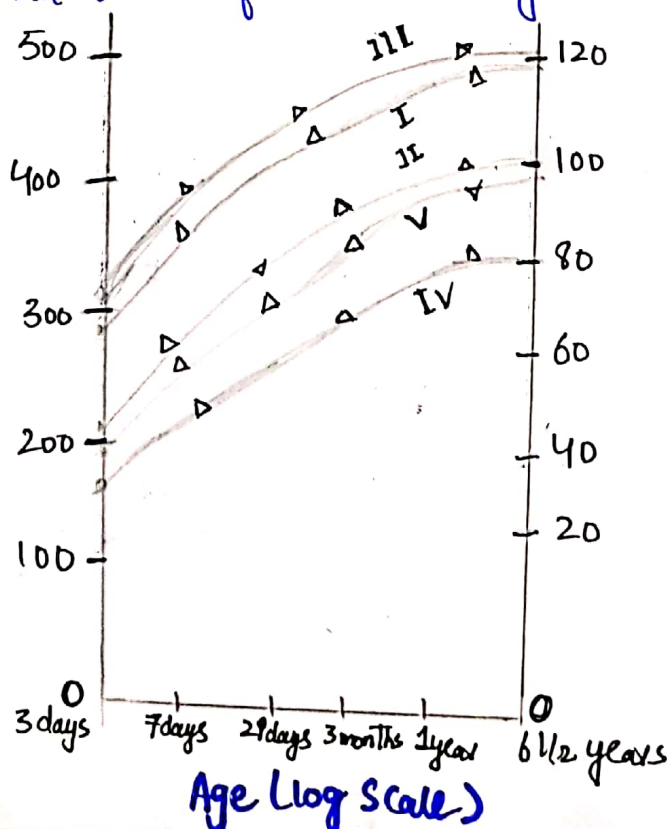


Question : 3

Answer :-

Type III Cement classified as a rapid hardening cement, it is finer than Type I and has a higher C₃S content and sulfate level. It is also gains 28 days strength in 7 days. useful where the framework must be quickly stripped or areas that allow traffic early the road surfaces.

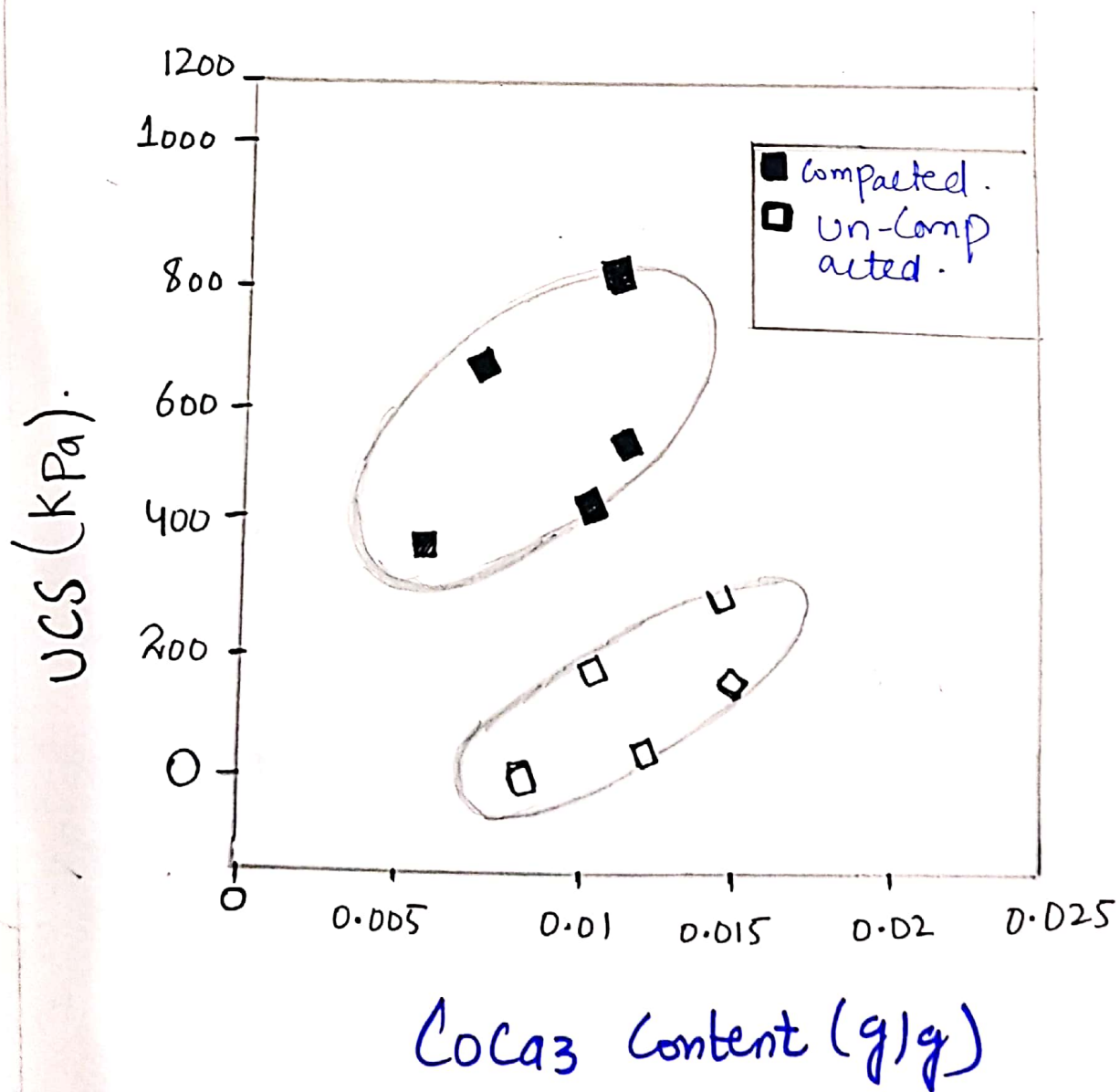
usually Type IV cement low heat Portland cement develops less heat of hydration during setting and curing. This is helpful in mass concrete placements since large volumes of concrete retains and develop high temperature during hydration without a mechanism for releasing the heat.



Development of heat hydration
of different cement types.

Question 4

GRAPH :-



Question : 4

Answer :-

Compaction is The Process which expels entrapped air from freshly Placed Concrete and Packs the aggregate Particles together so as to increase The density of Concrete. It increases significantly the ultimate strength of Concrete and enhances the bond with Reinforcement.

Question : 5

Answer :- Gypsum is often added to prevent early hardening or "Flash setting" allowing a longer working time. Gypsum slows down the setting time of Cement so that Cement is adequately hardened This is also called setting. "Flash setting", allowing a longer working time, Gypsum slows down the setting time of Cement so that Cement is adequately hardened. This is also called setting of Concrete.

Question : 6

Answer :-

1. Shape of Aggregate :-

Particles shape is principally affects the water cement ratio by its effect on water demand and amount of paste required of workability of a given mixture.

2. Size of Aggregate :-

The smaller the size of aggregates the higher is the strength of concrete and less will be workability. It is so because smaller aggregates consequences less attention of strength that causes due to dissimilar elastic module of paste and aggregates, around particles.

3. Texture Aggregate :-

The surface texture of Aggregate can be either smooth or rough. A smooth surface can improve workability, yet a rough surface generates a stronger bond between the paste and aggregates creating a higher strength.

4. Bleeding :- Bleeding in concrete may be as the physical migration of water towards the top surface. Concrete Bleeding can have multiple negative repercussions on a project.

Question : 7

Answer :-

→ Porosity and Absorption :-

The porosity of an aggregate may also affect workability of concrete. If the aggregate can absorb a great deal of water less will be available to provide workability. If the aggregate absorbs water and equivalent water for this absorption is not added above the required water cement ratio, the workability reduces.

Absorption is not added above the required water cement ratio, the workability reduces.

2. Air entraining agent :-

Air entraining affects compressive strength of concrete and its workability. It increases the workability of concrete without much increase in water cement ratio.

3. Coarse aggregate to fine aggregate ratio :-

Fine particles require more water for a longer surface, hence aggregate with finer particles need more water to make it workable. On the other hand higher particles have less surface area, demand less water for wetting surface and require less amount of paste for lubricating.

4. Grading of Aggregate :-

well Graded aggregates tends to fill up voids and easily get workability less amount of water can make it workable. If grading is better, There will be fewer voids and excess Paste will be available to give better lubricating affect.

Question : 8

Answer :-

1. Strength of Concrete :-

The fineness of cement affects hydration rate, and in turn, the strength increasing, fineness causes an increased rate of hydration, high strengths and high heat generation.

2. Rate of heat of evolution during hydration :-

The increasing fineness increases the rate of hydration of cement, which increases the rate of gain in strength and also the rate at which heat is liberated as in type III compared with type I.

3. Total heat of hydration:-

The size of cement particles directly affects the hydration, setting and hardening strength and heat of hydration. The finer the cement particles are the larger the total surface area is and the bigger the area contacting with water is.

4. Workability of Concrete:-

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

Question : 9

Answer:-

Concrete placement is important process in the construction that determines the success of the structure and its life. Technical and environmental conditions are taken into strict consideration while the

Fig # 9

Concrete is transported, Poured, vibrated, matured, and Cured.

Method of Concrete transportation is mortar Pan, wheel barrow/hand Cast. bucket and ropeway, truck mixture and dumper, and belt conveyor etc.

Segregation of Concrete can be prevented by correctly proportionating the mix and using the recommended water cement ratio, so as to prevent using excess water. Care should be taken while handling, placing transporting, compacting, and also at the finishing stages.

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