

NAME :- M. Shahab  
khan.

ID :- 16068

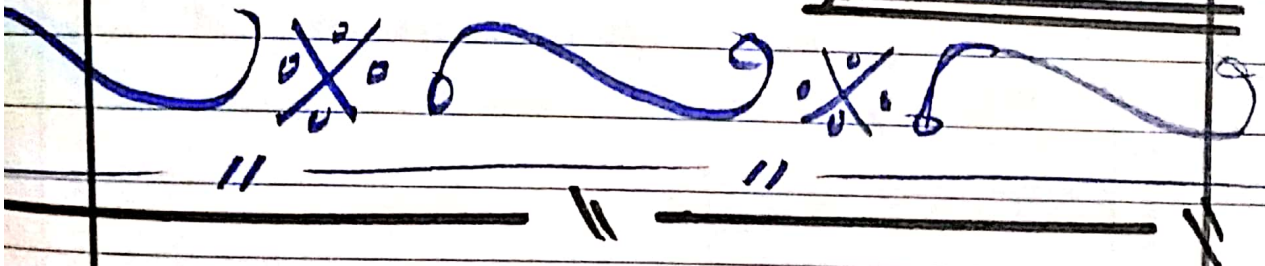
Department :- Bs(Civil)

Subject :- Concrete  
Technology

Section :- A

Submitted to :-

Sir Usama.



## QUESTION No 1:-

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which step is taken to prevent flash setting of cement? Also, write steps to prevent false setting of concrete.

## ANSWER No 1:-

### \* FLASH SET:-

It is immediate stiffening of cement paste in a few minutes after mixing with water. It is accompanied by large amount of heat generation upon reaction of C3A with water. Gypsum is added in cement to prevent flash set.

### \* FALSE SET:-

It is a rapid development of rigidity of cement paste without generation of much heat. This rigidity can be overcome & plasticity can be regained by further mixing without addition of water. In this way cement paste restores its plasticity and sets in

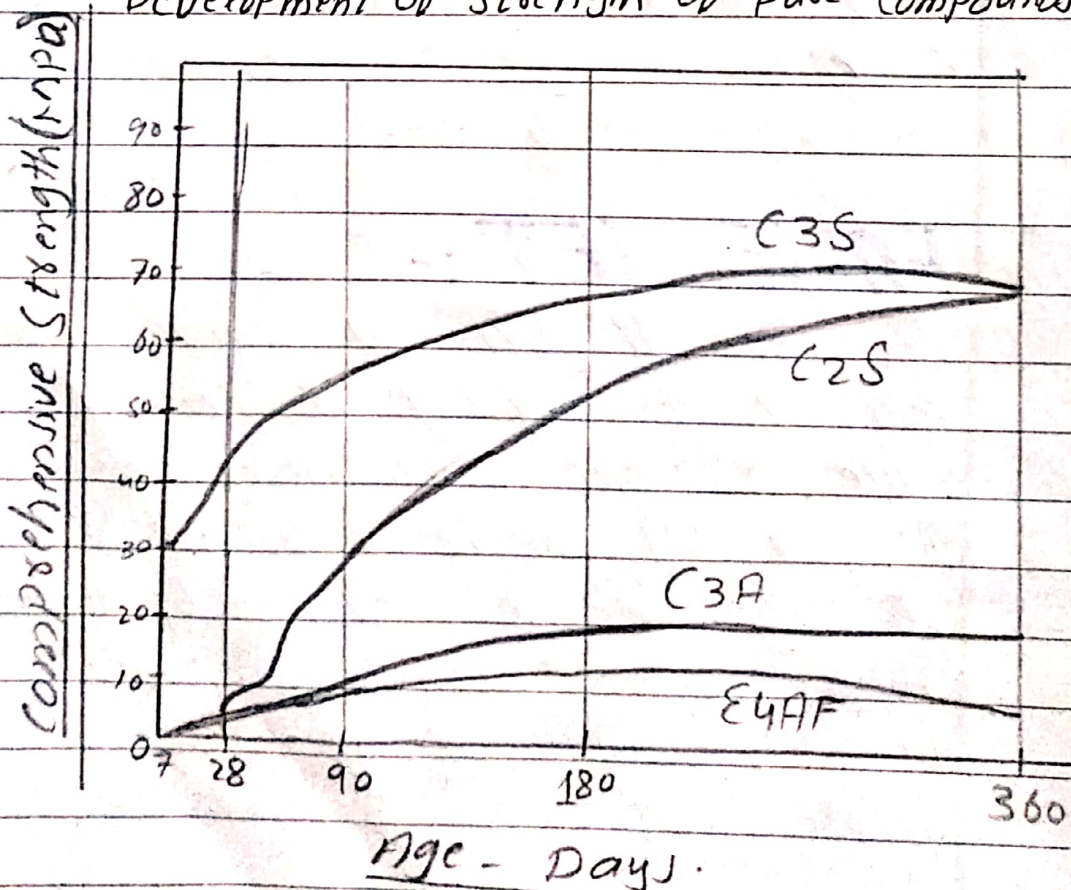
a normal manner without any loss of strength. It may be due to dehydration of gypsum as a result of contacting hot clinker or due to activation of C3S by aeration in high humidity.

## QUESTION NO 2:-

Draw a graph showing the strength development of pure compounds of cement.

## ANSWER NO 2:-

Development of Strength of pure Compounds:-



QUESTION No 7:-

What is the effect of following on workability of aggregate?

Porosity and absorption.

Air entraining agent.

Coarse aggregate to fine aggregate ratio

Grading of aggregate.

ANSWER:-POROSITY AND ABSORPTION:-

i)

\* Some of the aggregate are porous and absorptive. Porosity and absorption of aggregate will affect the water cement ratio and hence the workability of concrete as well as the bond between it and cement paste.

\* The porosity of aggregate will also affect the durability of concrete where the concrete is subjected to freezing and thawing.

\* The porosity of normal rocks vary from 0 to 50%.

\* The ratio of the increase in weight to the weight of the dry sample exposed as percentage is known as absorption of aggregate.

### ii) Air Entraining Agent:-

Air entraining agent or pore-forming agents are compounds that contain microscopic air bubbles in cement composition, which then harden into concrete having microscopic air voids.

### iii) Coarse Aggregate And Fine Aggregate:-

These are an optimum coarse to fine aggregate ratio for RCC. (RCC compacted concrete pavement) increasing cement from 9% to 12% has significant effect on the properties of RCC. Relationship between tensile strength and compressive strength were determined.

### iv) Grading of Aggregate:-

It is determining the average grain size of aggregate before they are used in construction. This is applied to both coarse and fine aggregate. The aggregate sample is sieved through a set of sieves and weights retained on each sieve in percentage terms are summed up.

QUESTION NO 3:-

Why type III cement is Rapid Hardening and type IV Low heat producing? Draw a graph showing the development of heat of hydration of different cement types.

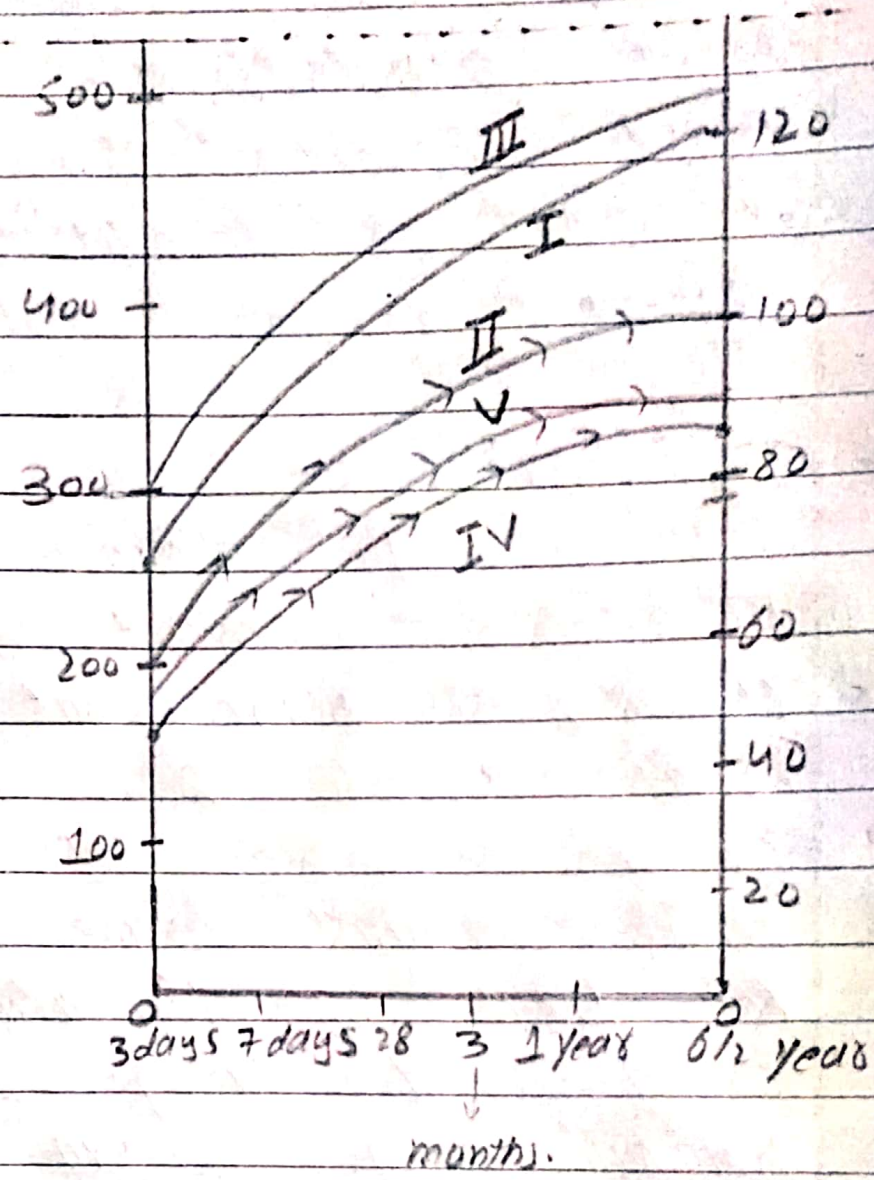
ANSWER :-

⇒ Rapid Hardening of type III cement because the initial strength is higher, but they equalize at 2-3 months setting time of ordinary portland cement usually type IV develops low heat of hydration during setting and curing. This is helpful in mass concrete placements since large volumes of concrete retain and develop high temperature during hydration without ~~temperature~~ a mechanism for releasing the heat.

(P.T.O) ✓

⇒ Diagram:-

Average Heat of hydration - J/gm  
of cement.



Development of heat of hydration of different cement types.

QUESTION No 5:-

Why the percentage of gypsum added to cement is only 5%?

ANSWER NO 5:-

Gypsum is added to cement 2 to 4% during cement manufacturing to control flash set. The limit is 5% but if we exceed the limit it will effect harmful. If you have high amount of C3A then it may react with extra sulphate of gypsum which form ettringite. Ettringite can expand in volume which may cause cracks in plaster.

QUESTION No 4:-

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

Ans:-

EFFECT OF COMPACTION ON ENTRAPPED AIR OF CONCRETE:-

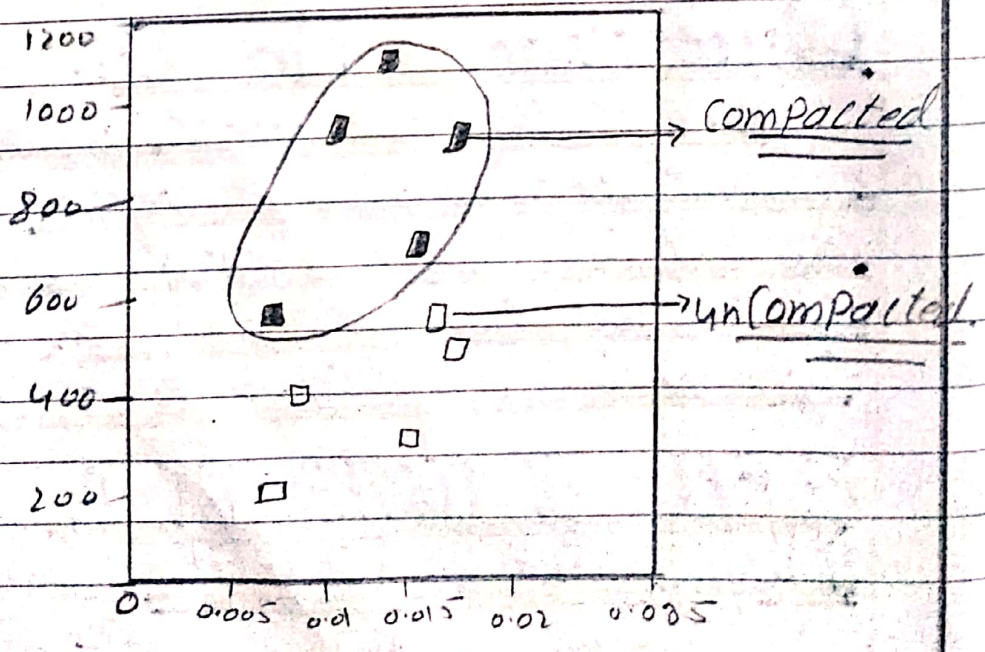
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ite.

⇒ Compaction significant increase the ultimate strength of concrete and enhances the bond with Reinforcement. It also increases the absorption resistance and general durability of the concrete, decrease the permeability and helps to minimize its shrinkage creep characteristics. Compaction of concrete is an important component in the process of laying a concrete slab. If compaction is not carried out as required a series of defect may become appear and the concrete slab will suffer from significant loss of strength.

GRAPH:- CaCO<sub>3</sub> content (g/g)



# QUESTION No 6:-

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What is effect of following on the bond strength of concrete?

(Use not more than 2 sentence to answer each part)

- i) Shape of aggregate.
- ii) Size of aggregate.
- iii) Texture of aggregate.
- iv) Bleeding.

## ANSWER:-

### iv) BLEEDING:-

Bleeding in concrete may be considered as the physical movement of water towards the top surface. It is not always favorable as it increases finishing time, decreases strength, wear resistance and bond strength and causes poor bonds between successive lifts.

### ii) SIZE OF AGGREGATE:-

Several factors including chemical adhesion, roughness and reinforcement with concrete. Therefore maximum aggregate size is critical for bond strength when smaller size aggregates are used.

## i) SHAPE OF AGGREGATE:-

The shape and texture of aggregate affect the property of fresh concrete more than hardened concrete. The aggregate have smooth surface can improve workability and rough surface generates a stronger bond between the paste and aggregate create a high strength.

## iii) TEXTURE OF AGGREGATE:-

The texture of aggregate also effected the properties of fresh concrete. A ~~smooth~~ smooth surface can improve workability thus a rougher surface aggregate creat a strong bond between the past and aggregate.

QUESTION NO 9:-

What step can be taken during transportation and placement of concrete to prevent segregation of concrete.?

ANSWER:-

Segregation on concrete can be prevented correctly proportion the mix and using the recommended water cement ratio so as prevent using excess water care should be taken while handling transporting, compacting and also at finishing stages.

QUESTION NO 8:-

What is the effect of fineness of cement on the following? (Use not more than 2 sentence to answer each part).

- i) Strength of concrete
- ii) Rate of heat evolution during hydration.
- iii) Total heat of hydration.
- iv) workability of concrete.

ANSWER NO 8:->

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## iv) WORKABILITY OF CONCRETE :-

The workability of non air-entrained concrete is increase by increasing the cement fineness. ~~of cement~~  
 In Air-entrained concrete the effect of fineness of cement on workability is very much less pronounced.  
 → the 28 days compressive strength of cement, with or without entrained air, increases with increase in cement fineness.

## (i) STRENGTH OF CONCRETE :-

Increasing fineness causes an increased rate of hydration, high strength and high heat generation bleeding can be reduce by increasing fineness.

## iii) TOTAL HEAT OF HYDRATION :-

The size of cement particle directly affected the hydration setting and harding strength and heat of hydration. The finer cement particles are the longer the total surface area is and bigger the area contacting with water is.

## ii) RATE OF HEAT EVALUTION DURING HYDRATION :-

The fineness

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of cement has an important bearing on the rate of hydration and hence on the rate of gain of strength and also on the rate of evolution of heat. Finer cement offers a greater surface area for hydration and hence faster the development of strength.

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