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Submitted To \* Engr. USAMA

DEPARTMENT \* BE (Civil)

SEMESTER \* 2nd

SECTION \* B.

DATE OF SUBMISSION \* 16.4.2020

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Q1 which step is taken to prevent flash setting of cement? Also, write steps to prevent false setting of concrete.

Ans:-

## \*Flash Setting\*-

It is an early loss of workability of cement due to dehydration of gypsum in the formation of the cement.

## Steps To prevent flash setting:-

Gypsum is often added to Portland cement to prevent early hardening or flash setting.

Water can also be used for temporary prevention of flash setting of cement in concrete mix.

## II STEPS TO PREVENT FALSE SETTING OF CONCRETE:-

1 false setting is the rapid development of rigidity in freshly mixed concrete.

sufficiently if create honey comb of

52  
mixture without producing much heat, as compare to flash set.

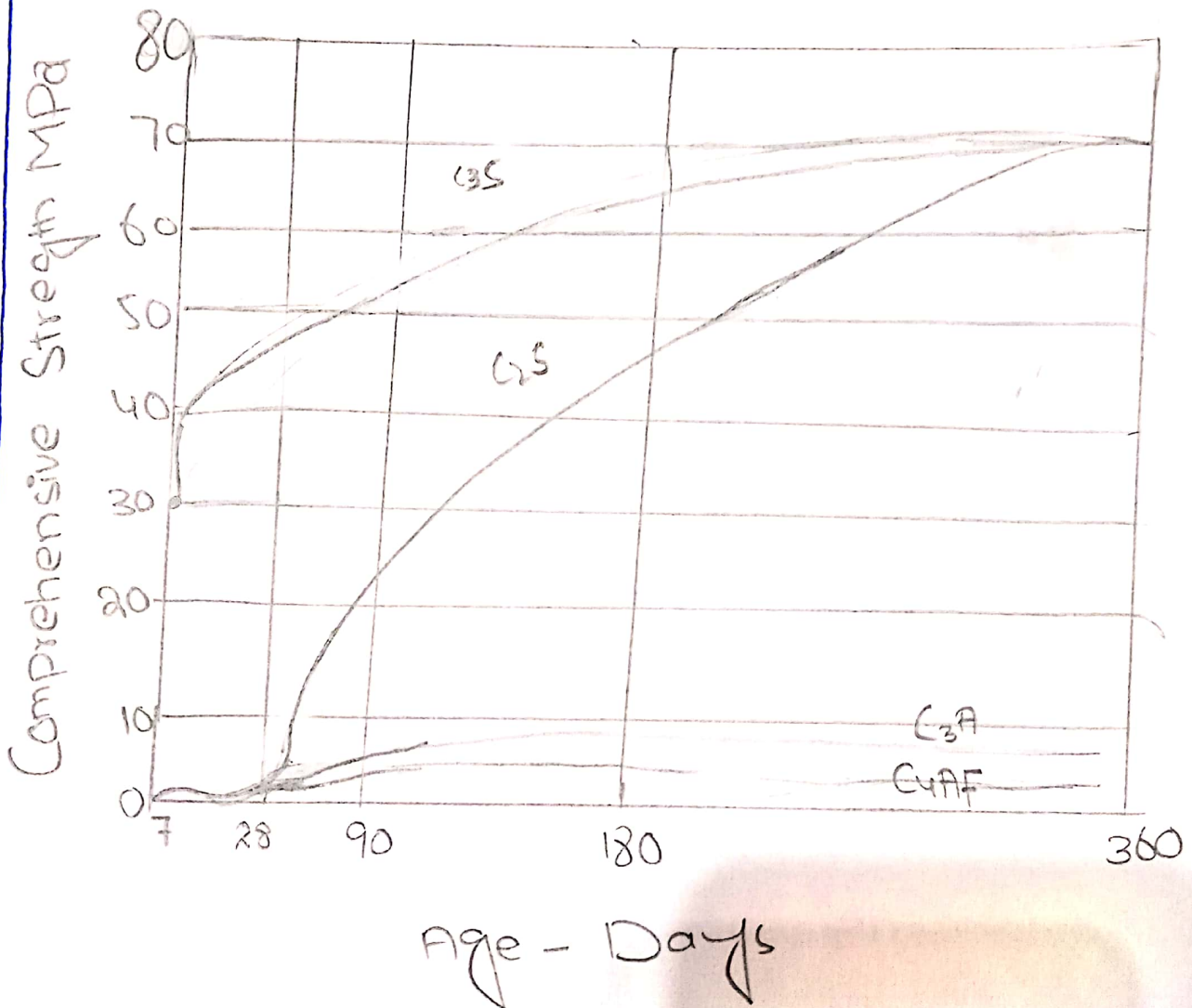
2) Addition of Gypsum.

3) Water can be added to prevent/avoid false setting

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Q. Draw a graph showing the strength development of pure compounds of Cement.

Ans. Strength Development of Pure Compounds of cement.



Q3 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: **TYPE III (Rapid Hardening Portland Cement)**

As the name implies, the strength of this cement develops rapidly, because of a higher C<sub>3</sub>S content (upto 70%) and a higher fineness (minimum 325 m<sup>2</sup>/kg)

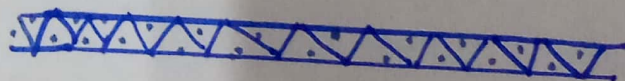
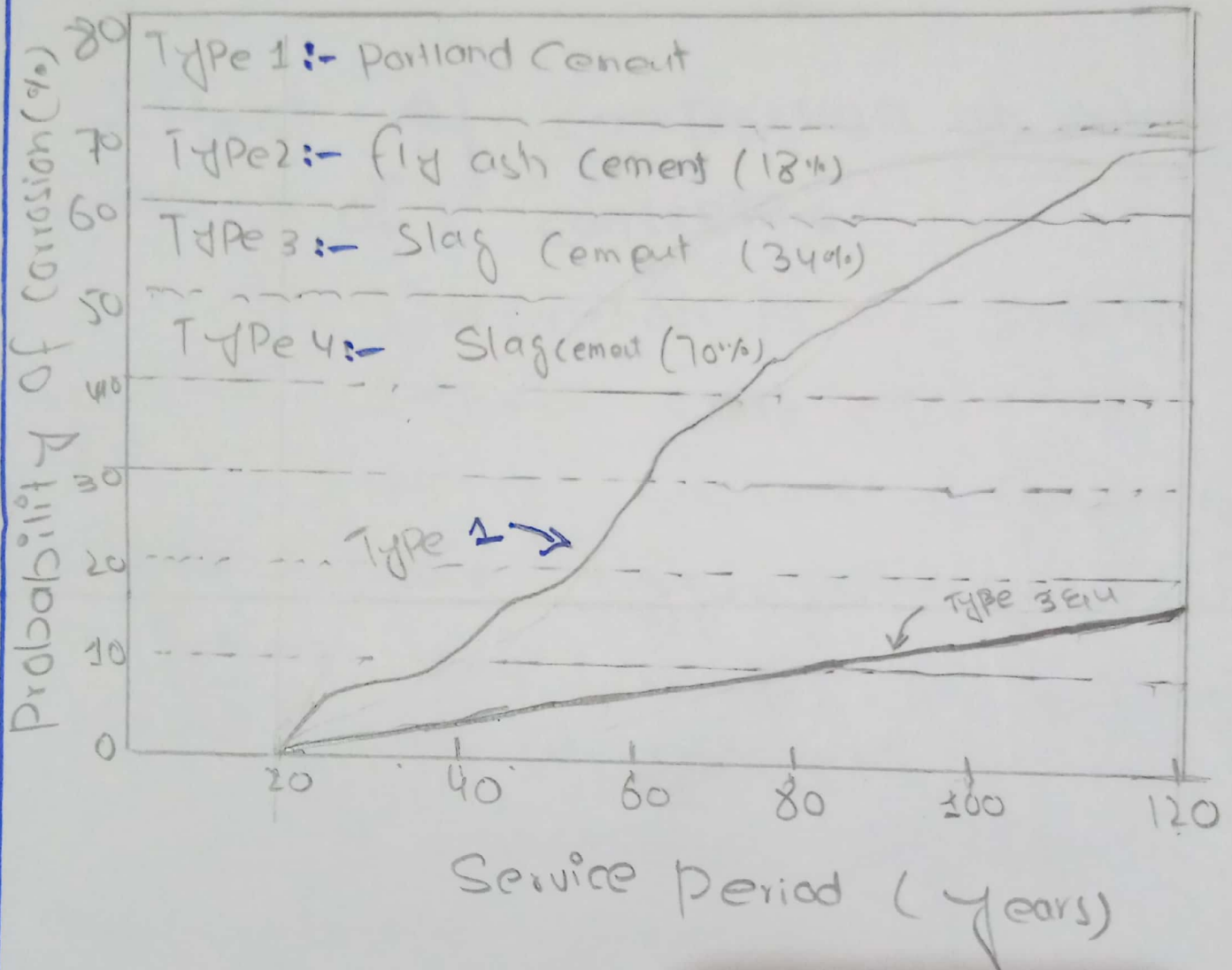
**TYPE IV (Low Heat Producing)**

Control the lime content by limiting the lime saturation factor to 0.66 to 1.08 and because of the lower content of C<sub>3</sub>S and C<sub>3</sub>A.

There is a slower development of strength than with ordinary Portland Cement. The fineness must not be less than 320 m<sup>2</sup>/kg to ensure a sufficient rate of gain of strength.

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# Graph of Heat of hydration of Different Cement Types.



Q4 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 \***

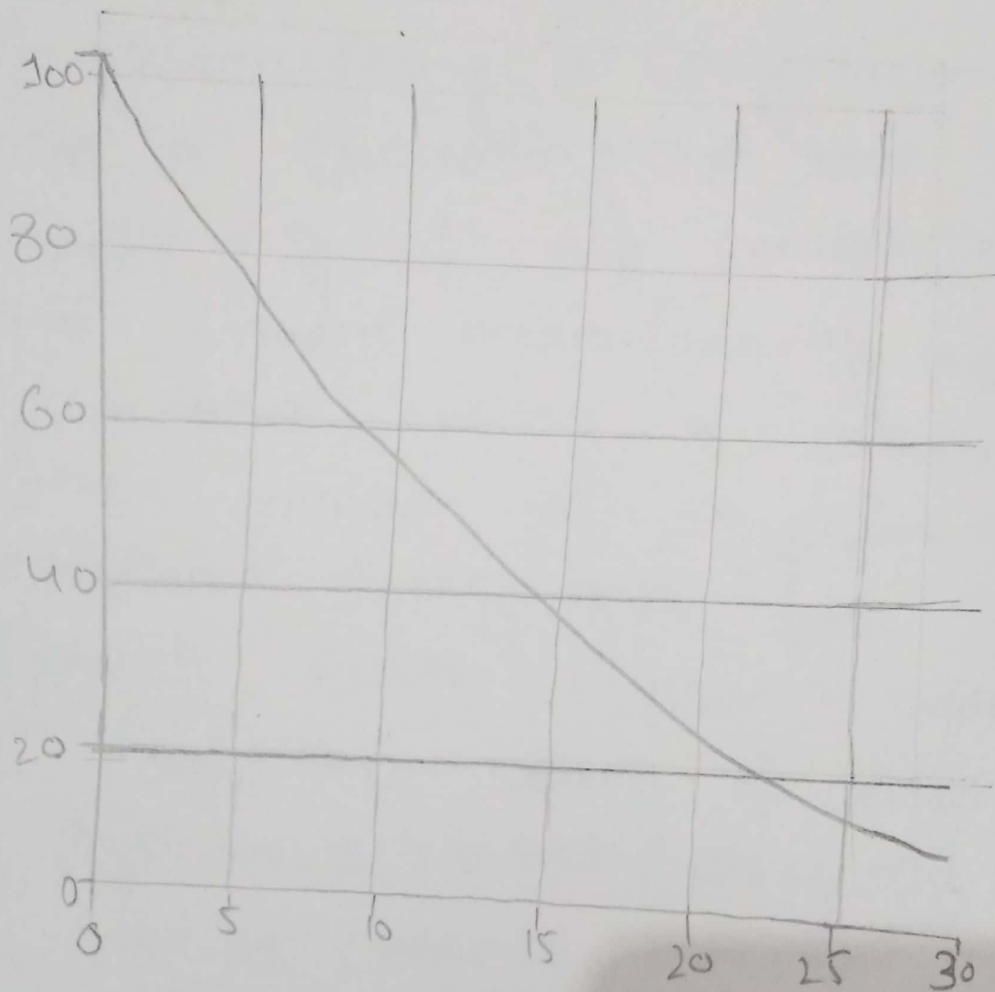
Compaction is the process which expels entrapped air from freshly placed concrete and pack the aggregate particles together, so as to increase the density of it concrete.

it increase significantly the ultimate strength of concrete, bond with reinforcement abrasion resistance and general durability of concrete.

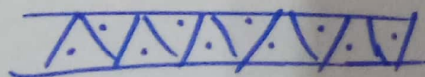
**\* Effect on strength if concrete is \*  
\* is not compacted sufficiently \***  
when concrete is not compacted sufficiently it create honey comb &

P.T.O

irregular surface which reduce density of Concrete and decrease ultimate Strength of Concrete.



Loss of strength through  
in complete compaction.





Q5#

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

Ans:-

Gypsum play a very important role in controlling the rate of hardening of the cement. During the cement manufacturing process, upon the cooling of clinker, a small amount of gypsum is introduced during the final grinding process. Gypsum is added to control the setting of cement.  $\Rightarrow$  Gypsum is limited only upto 5 percent in cement because it increases the setting time of cement and more than 5 percent of gypsum in it can lead to much setting time which will not be useful for many construction work.

~~XXXXXXXXXX~~

Q6# What is the effect of following on the bond strength of concrete?

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

Ans:- \* Effects of following on the \*  
\* bond strength of concrete \*

## I SHAPE OF AGGREGATE :-

shape of aggregate influence considerably the strength of concrete. More angular aggregates provide a greater bond.

Since the degree of packing of particles all of one size depends on their shape of aggregate principally effect the w/c ratio by effecting the water demand. It influence the bond strength of concrete.

## 2 size of AGGREGATE :-

size of aggregate can vary bond strength of concrete. Concrete containing

2  
of different grades aggregates gives stronger bond rather than the concrete contain single grade aggregate.

### 3 TEXTURE OF AGGREGATE :-

Surface texture of aggregate influence considerably the strength of concrete, especially, so for high strength concrete.

A rough texture results in a greater adhesion or bond between the particles and cement matrix.

### 4 BLEEDING :-

Bleeding is known as water gain. it is a form of segregation.

As a result of Bleeding the top of every lift (layer of concrete placed) may become too wet, and if the water is trapped by ~~some~~ super

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Q6 continue

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imposed concrete, a porous and weak layer of non durable concrete will result. Thus it reduce the bond strength of the concrete.



Q7# What is the effect of following on workability of aggregate?

- i Porosity absorption
- ii Air entraining agent
- iii Coarse aggregate to fine aggregate
- iv Grading of aggregate

Ans:-1 Effect of Porosity & Absorption on workability of concrete.

If there is more porosity the concrete will be more workable and vice versa. Absorption will effect the workability in the following way since concrete contains aggregates which disturbs the water to the ratio of cement because aggregate by itself also absorb water. If the aggregate absorbs water and equivalent water for this absorption is not added as per the required water to the ratio of cement. the workability will reduce. The case will be opposite  
P.T.O

Q? Continue

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if aggregates contain excess water.

2 Effect of Air Entraining Agent on workability of concrete.

Air entraining agents form small bubbles of air in the concrete. These bubbles reduce the friction that occurs during the concrete pumping stage. As a result workability improves.

3 Effect of coarse aggregate to fine aggregate on workability.

fine aggregates require more water for a larger surface, hence aggregate with finer particles need more water to make it workable. On the other hand coarse aggregate have less surface area, demand less water for wetting surface and making workable.

Gravel and crushed stones are generally preferred.

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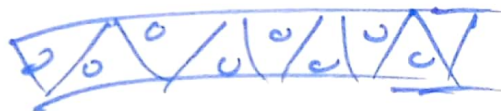
Q7 continue

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Effect of Grading of aggregate  
On workability of concrete.

Grading of aggregate have the maximum effect on the workability of concrete. well graded aggregate have all size in required proportions.

This help in ~~reduce~~ reducing the voids in a given volume of aggregate. which helps in improving the workability.



Q8 what is the effect of fineness of cement on the following?

Ans:- **\* STRENGTH OF CEMENT CONCRETE \***

Strength of cement is directly proportional to the fineness of cement.

2:- **RATE OF HEAT EVOLUTION:-**

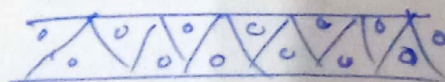
Rate of heat evolution during hydration decreases due to replacing cement with fly ash of different fineness.

3:- **TOTAL HEAT OF HYDRATION:-**

Greater the heat of hydration will be if the cement particles are more finer.

4:- **Workability of CONCRETE:-**

fineness of cement leads to make the concrete paste more workable.





Q9:- What steps can be taken during transportation and placement of concrete to prevent segregation of concrete?

Ans:- STEPS TAKEN TO PREVENT SEGREGATION OF CONCRETE DURING TRANSPORTATION AND PLACEMENT:-

wherever depth of concrete is more than 1.5 meters. it should be placed through temporary inclined chutes.

The angle of incline should be 1:3 - 1:2, so that the concrete from top of chutes travels smoothly toward the bottom.

Use of little bit of water from top helps in lubricating the path of flow of concrete.

The delivery end of chute should be as close possible to point of deposit.

Choose the shortest route for transportation of concrete mix.

