

# Image

ID#16076 Section: (A)

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Paper: concrete technology

Semester: 2nd

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Question no(1)

Which step is taken to prevent flash setting of cement? Also write step to prevent false setting of concrete? (4 marks, CLO1).

Answer no(1):- prevent flash setting of cement:-

Calcium sulfate sources, such as gypsum, are intentionally added to portland cement to regulate early hydration reaction to "prevent flash setting" improve strength development, & reduce drying shrinkage. Sulfate & aluminate are also present in supplementary cementitious material & admixture.

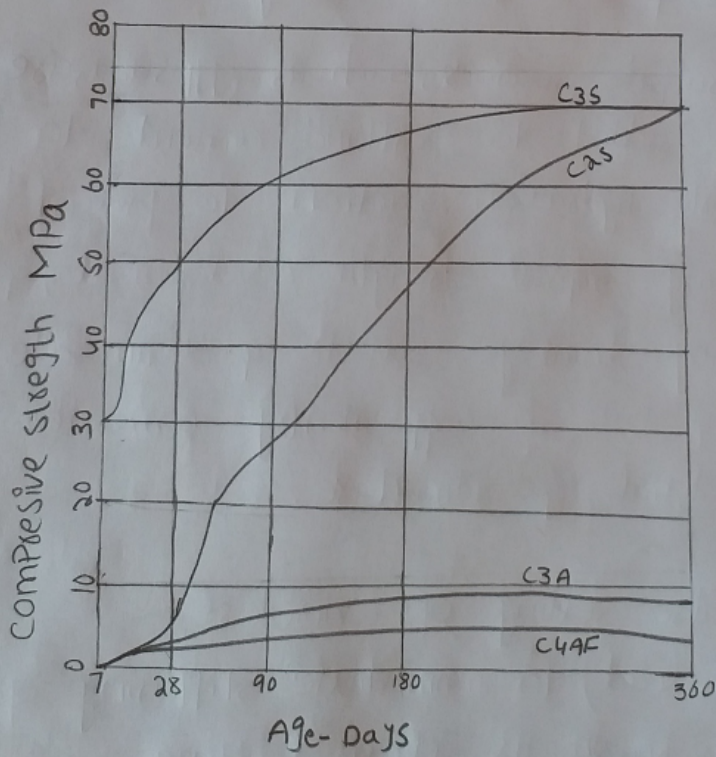
prevent false setting of concrete:-

Hydration lead to immediate stiffening of the paste, known as flash setting. To prevent this false set is the rapid

development of rigidity in freshly concrete without the segregation of much heat false set occur because some of the gypsum dehydrate as a result of contacting hot clinker or high temperature in the grinding mill.

Q2) Draw a graph showing a strength development of Pure compound of cement. (3 marks CLO 01)?

Ans:





Question no(3):-

Why Type III cement is rapid hardening & type IV low heat producing?

Draw a graph showing the development of heat of hydration of different cement type (3 marks) (101).

Answer no(3):-

Type III (Rapid hardening Portland cement):-

Because they have  $C_3S$  compound & obtain by adding 2% calcium chloride they increase the hardening of cement.

⇒ The strength obtained by this cement in 04 day.

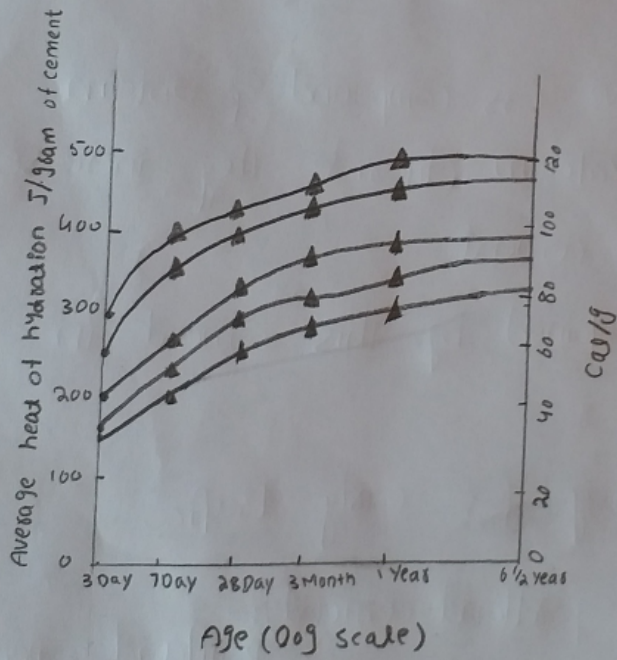
⇒ Used in highway for early traffic.

Type IV (Ordinary Portland cement):-  
Portland cement

is generally known as low heat of hydration. The percentage of  $C_2S$  &  $C_4AF$  are

relatively high  $\epsilon_p$  (C3S)  $\epsilon_p$  (C3A) are relatively low. This cause the heat given off by the hydration reaction to develop at a slower rate.

Diagram:-





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 (3 marks (10)).

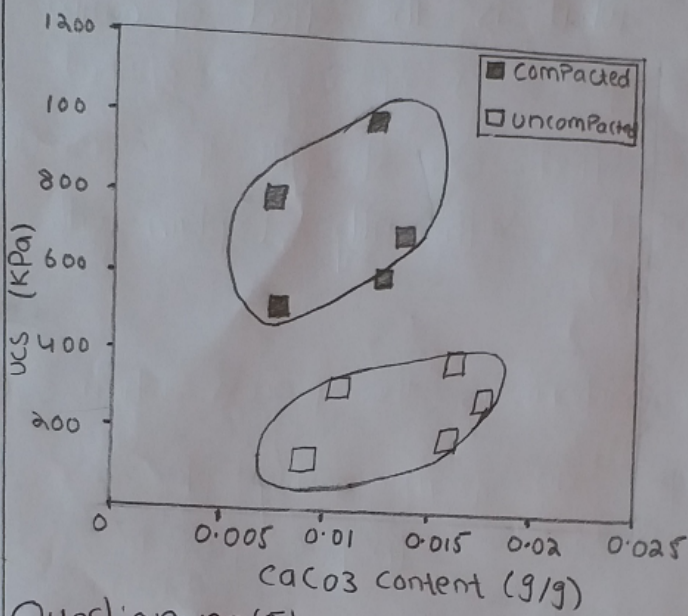
Answer no(4):-

compaction is the process which expels entrapped air from freshly placed 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.

concrete containing air voids left due to insufficient compaction of the freshly placed concrete lowers the strength very much.

Experimental results have shown that 10% air voids left in concrete reduce its strength by more than 50%.

Graph :-



Question no (5):-

Why is the percentage of gypsum added to cement limited only to 5%? (marks or 101).

Answer no (5):-

During the cement manufacture process, upon the cooling of clinkers, a small amount of gypsum is introduced during the final grinding process. Gypsum is added to control the 'setting of cement'. If exceed than 5% its strength & setting time will be

increase in more amount of Gypsum is added to cement in kiln, it lead to expansion of hardened concrete.

Question no (6):- What is the effect of following on the bond strength of concrete? (Use not more than 2 sentence to answer each part) (4 marks, c101)?

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

Answer no (6):- Texture of aggregate:- A smooth surface can improve workability. yet a rough generate stronger bond.

ii). Shape of aggregate:- Rounded or cubed shaped is more workable b/c volume or weight will have less surface area.

Size of aggregate:- bigger size of aggregate



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Will give higher workability & less paste required.

iv) Bleeding:- In fresh concrete refers to the process where free water in the mix is pushed upward to the surface due to settlement of heavier solid.

Question no (7):- What is the effect of following on workability of <sup>concrete:</sup> aggregate? (4 marks, clo 1)?

i:- Porosity & absorption.

ii:- Air entraining agent.

iii:- Course aggregate to fine aggregate ratio.

iv:- Grading of aggregate.

Answer:-

Porosity & absorption:- Some of the aggregate are porous & absorptive. Porosity & absorption of aggregate will effect the water/cement ratio & hence the workability of concrete as well as the bond b/w it & cement paste.

ii:- Course aggregate to fine aggregate ratio:

It is well known that different type of aggregate produce different degree of workability when used in concrete of given mix proportion & water cement ratio a rounded aggregate give concrete are higher workability than all angular aggregate.

particular smaller than 300μ tend to increase concrete workability.

iii> Air entraining agent :- Air entraining effect compressive strength of concrete & workability air entraining admixture is added to increase workability without adding water.

iv> Grading of aggregate :- proper gradation is one of the most important factor in producing workability concrete.

Question no (8) :- what is the effect of finess of cement on the following? (use not more than two sentence to answer



each part? (4 marks (101)?

i) Strength of concrete.

ii) Rate of heat evolution during hydration.

iii) Total heat of hydration.

iv) workability of concrete.

Answer no(8):-

i) Strength of concrete:-

Increasing fineness of cement increase workability & strength.

2). Rate of heat evolution during hydration:-

Increasing the fineness cause an increased ratio of

hydration, high strength, & high generation, Bleeding can be reduced.

3). Total heat of hydration:-

The size of cement particle directly effected the hydration setting & hardening strength heat of hydration.

4). workability of concrete:-

The presence of fineness cement in concrete is likely effect the workability, strength & long term perform.



Question no (9) :-

What step can be taken during transportation & placement of concrete to prevent segregation of concrete? (3 marks, 10/1)

Answer no (9) :-

Transporting the concrete mix is defined as the transferring of concrete from the mixing plant to the construction site.

There are many mode of transportation.

1) wheel barrow or motorised buggy.

2) Truck mixer.

3) Bucket or steel skip.

4) chute.

5) Belt conveyor.

6) concrete pump.

7) pneumatic placer.

Segregation of concrete can be prevented by correctly proportioning the mixing & using

the recommended water-cement ratio so as to prevent using excess water. Care should be taken while handling, placing, transporting, compacting & also in finishing stage.