

①

NAME: Sangeen Khan

ID: 16098

SECTION: A

QUESTION: 05

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

ANSWER:

Gypsum is a mineral and is hydrated calcium sulfate in chemical form. Gypsum plays a very important role in controlling the rate of hardening of the cement.

Generally gypsum is added in the range of 3% - 5% to cement for delaying the setting time of cement. If gypsum is added in excess it accelerates the setting time of cement because gypsum generates its own clotting agent resulting

in quick setting of cement. It also result in weaker strength.

QUESTION:- 06

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

ANSWER:-

(i) SHAPE OF AGGREGATE:-

The shape of aggregate is an important characteristic since it affects the workability of concrete.

(ii) SIZE OF AGGREGATE:-

On the basis of size it is divided into parts, * Coarse aggregate

* Fine aggregate

(3)

80mm size is the maximum size that could be conveniently used for concrete making.

(iii) TEXTURE OF AGGREGATE :-

Surface texture depends upon the hardness, grain size and pore characteristics of the parent rock.

(iv) BLEEDING :-

In the process of bleeding the accumulation of water creates water voids and reduces bond between the aggregate and cement paste.

(4)

QUESTION:- 07

What is the effect of following on workability of concrete?

ANSWER:-

⇒ POROSITY AND ABSORPTION:-

Porosity is the number of pores in a material for instance pores in certain concrete. Porosity is usually expressed in volume percent. Workability increases with the increase of water content.

⇒ AIR ENTRAINING AGENT:-

Air entrainment affects compressive strength of concrete, and its workability. It increases the workability of concrete without much increase in water-cement ratio. When concrete workability increases, its compressive strength decreases.

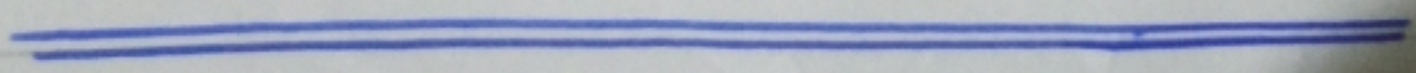
⇒ COARSE AGGREGATE TO FINE AGGREGATE

RATIO:-

As a general rule, the more nearly spherical the particles, the more workable the resulting concrete. This act as "ball bearings" while angular will have more mechanical interlock and will therefore need more work to overcome the resulting friction.

⇒ GRADING OF AGGREGATE :-

Grading of aggregate have the maximum effect on the workability of concrete. This help in reducing the voids in a given volume of aggregate. The less volume of voids makes the cement-paste available for aggregate surface provide better lubrication to the aggregate.



6)

QUESTION:- 08

ANSWER:-

STRENGTH OF CONCRETE :-

The compressive strength of concrete, with or without entrained air, increase with an increase in cement fineness.

(7)

⇒ RATE OF HEAT EVOLUTION :-

The peak rate of heat evolution increases as the fineness of the cement increases.

⇒ TOTAL HEAT OF HYDRATION :-

The fineness of cement affects hydration rate, and in turn, the strength. Increasing fineness causes an increased rate of hydration. Bleeding can be reduced by increasing fineness.

⇒ WORKABILITY OF CONCRETE :-

The workability of non-air-entrained concrete is increased by increasing the cement fineness. In air-entrained concrete the effect of fineness of cement on workability is very much less pronounced.

QUESTION:- 01.

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

ANSWER:-

:- FLASH SETTING:-

Flash set is an early loss of workability in paste, most usually accompanied by the evolution from the rapid aluminates. This test is due to the absence of calcium sulfate.

:- STEPS TO PREVENT SETTING TIME:-

GYPSUM prevents flash setting of cement during manufacturing. It retards the setting time of cement. Allows a longer

working time for mixing, transporting and placing.

FAISE SETTING:-

False setting is usually due to the nature of calcium sulfates added, specially too much calcium sulfate hemihydrate. Hemihydrate may occur in hot spots of the mill during clinker - gypsum co-grinding. 120° - 140° C is enough.

* STEP TO PREVENT FAISE SETTING:-

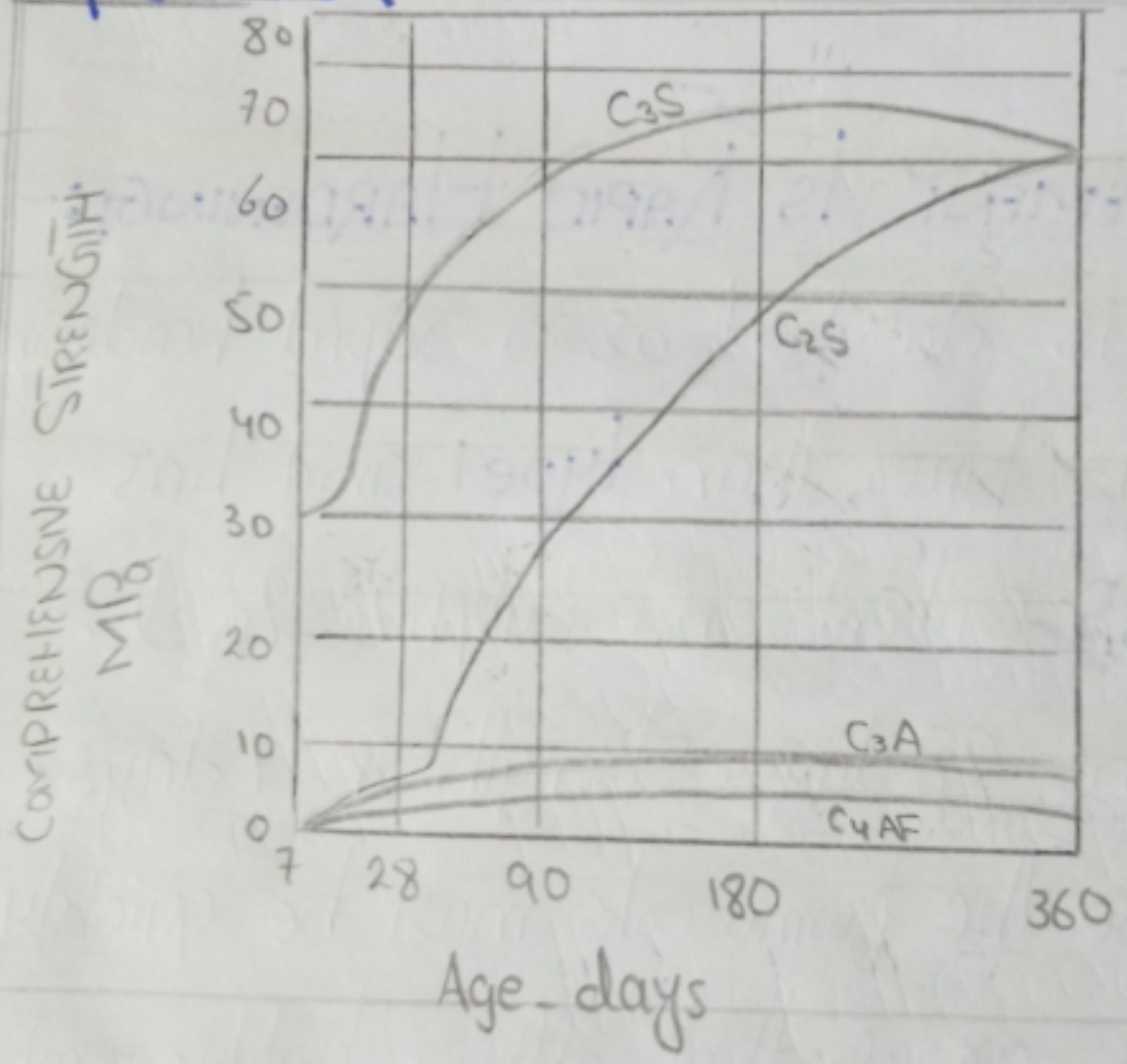
To prevent this from happening,

gypsum is added to cement during grinding.

QUESTION:- Q2

Draw a graph showing the strength development of pure compounds of Cement?

ANSWER:-



"DEVELOPMENT OF STRENGTH OF PURE COMPOUNDS"

QUESTION:-03

Why Type III cement is Rapid Hardening and type IV low Heat of hydration of different producing? Draw a graph showing the ?

ANSWER:-

⇒ TYPE III CEMENT IS RAPID HARDENING:-

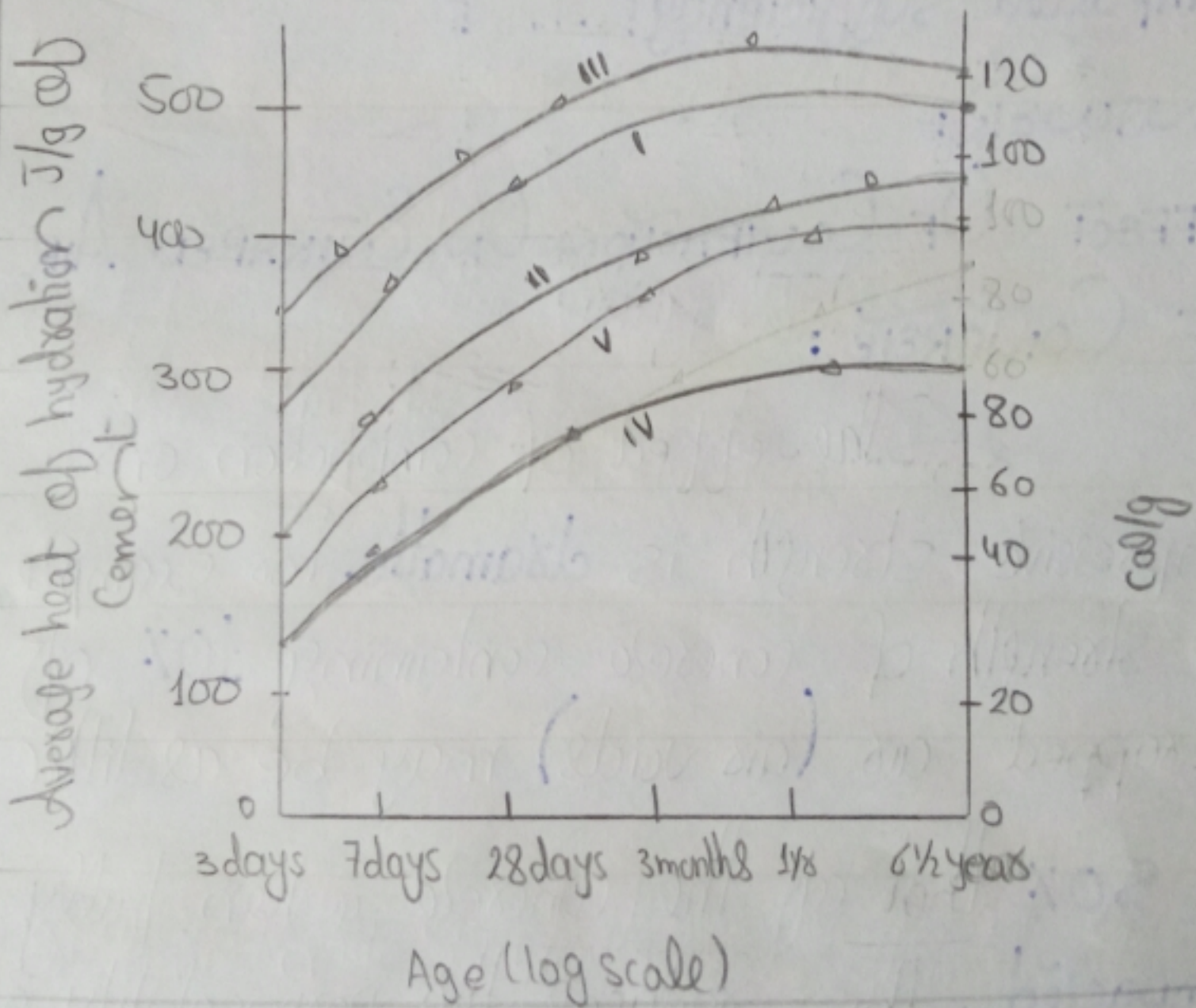
It is classified as a rapid hardening cement, it is finer than type I and has a higher " C_3S " content and sulphate level. It also gains 28 days strength in 7 days. useful where the formwork must be quickly stripped or areas that allow traffic early on the road surface.

⇒ TYPE IV IS LOW HEAT PRODUCING:-

Type IV is low heat of hydration cement for use where the rate and amount

of heat generated must be minimized. It develops strength at a slower rate than type I cement.

* GRAPH:-



“Development Of Heat Of Hydration Of Different Cement Types”

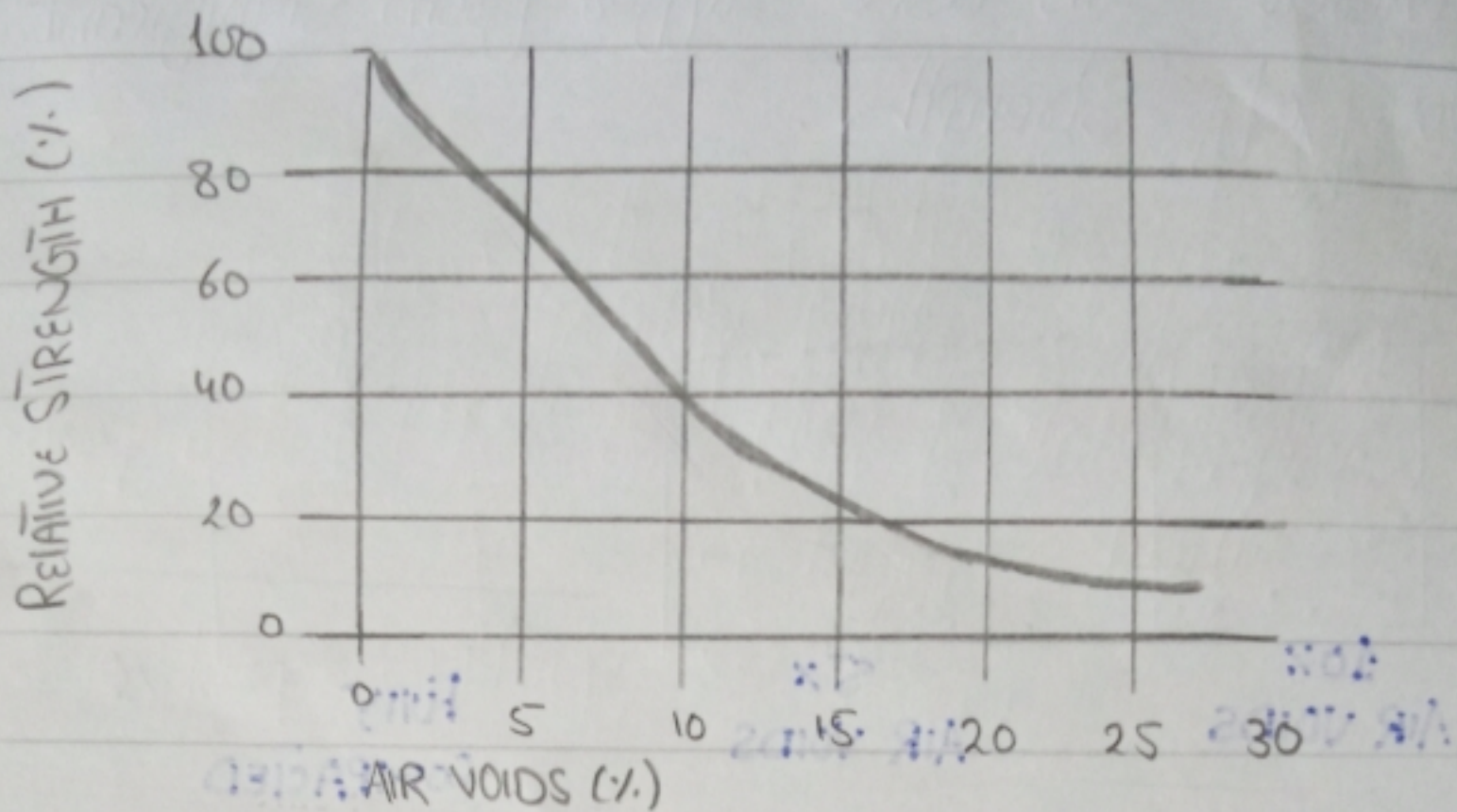
QUESTION:- 04

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

ANSWER:-

⇒ EFFECT OF COMPACTION ON ENTRAPPED AIR OF CONCRETE :-

The effect of compaction on compressive strength is **dramatic**. For example, the strength of concrete containing **10%** of entrapped air (air voids) may be as little as **50%** that of the concrete when fully compacted. This reduces the permeability of the concrete and hence improves its **durability**.

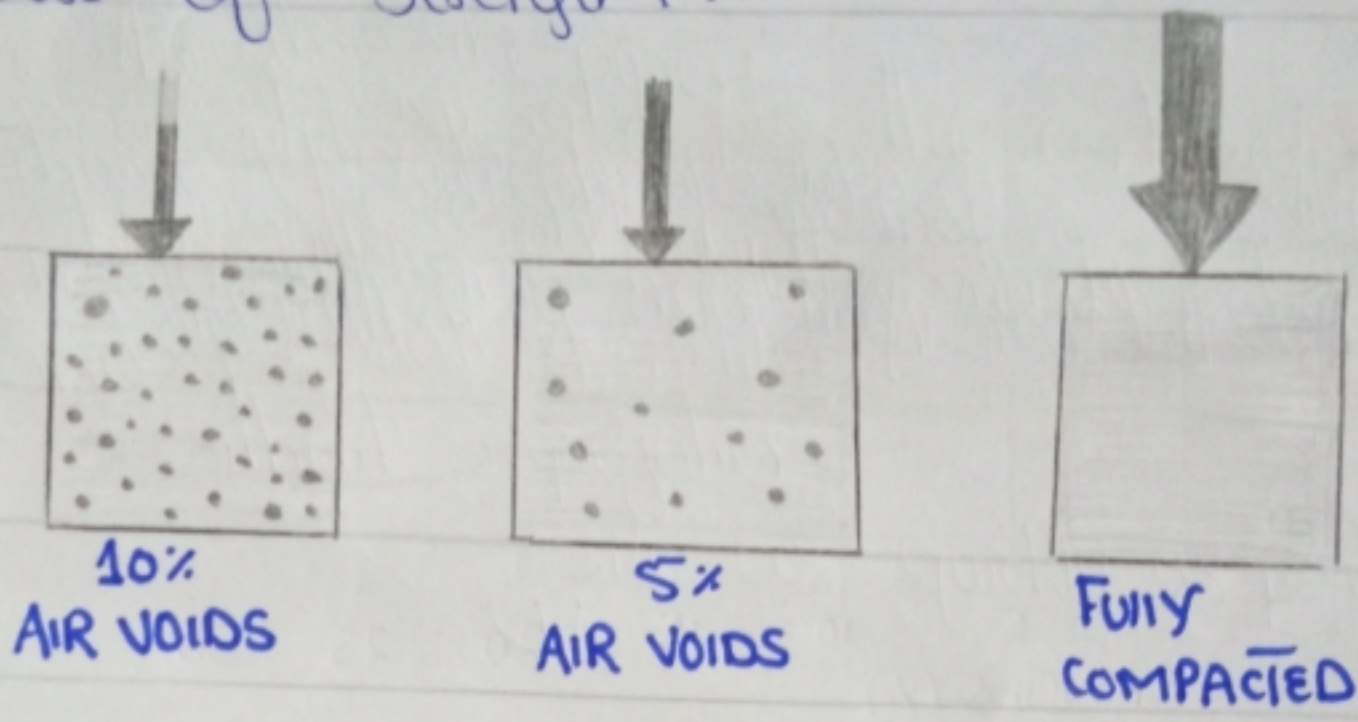


"Loss Of Strength Through Incomplete
Compaction"

⇒ EFFECT OF STRENGTH OF CONCRETE IS NOT
COMPACTED SUFFICIENTLY :-

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 defects may become apparent and the

Concrete slab will suffer from significant loss of strength.



QUESTION:- 09

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

ANSWER:-

- * To avoid segregation, when concrete is to be transported from one conveyance to another, use of hoppers, baffle and short vertical drops should be

used through a pipe to the centre of the receiving container.

- * Segregation occurs because concrete is not a homogeneous combination but a mixture of material differing in **size and specific gravity**, thus as soon as the concrete is discharged from the mixer internal as well as external forces start acting to separate the dissimilar constituents.
 - * After mixing, concrete should be transported and placed at site as quickly as possible without segregation.
-
-