

Name.

Muhammad Anwar.

ID

16649

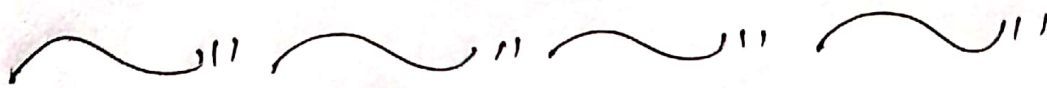
Section.

B.

Subject.

BE (civil).

A Concrete Final Assignment.



### QUESTION # 1

#### Part. A

Retempering of concrete. & retempering of concrete done.

The process of readding of water to concrete in addition to required quantity of water is known as retempering of concrete. Some time extra cement is also added while retempering.

Retempering is done owing to loss of workability or undue stiffness of concrete. At actual site in case of long tunnel road construction etc. where batching plant is few km away.

QUESTION # 1

Part. B.

Mixture generally run at speed of 15-20 revolution per minut- Normally 25-30 revolution are required for a well designed mixer to mix ingredient properly. Mixing time is usually 1.5 to 2.5 minute and depend upon volumetric capacity of mixer. Batching plant takes 12 minut to load a transit mixture of  $6m^3$  capacity.

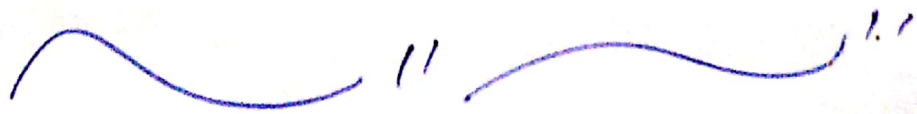
QUESTION # 2.

Part. A

Expected loss = ?

Concrete Strength = 3000 psi

if we can not cure any concrete  
it strength loss up to 60%.



Part. b

ANSWER.

Membrane curing is 80% efficient as compared to water curing.

"~~~~~"~~~~~"~~~~~".  
QNO. 2 Part. C

What is meant by retrogression of strength in concrete? Which method of curing promote retrogression in concrete strength?

ANSWER.

Retrogression of strength in concrete. Strength retrogression is define as a change in the hydration product that are formed when cement is exposed to high temperature.

( $>110^{\circ}\text{C} / 230^{\circ}\text{F}$ ). It can be described as a decline of cement strength at elevated temperature where decreased strength is observed with increases of time.

~~~~~"~~~~~"~~~~~

QUESTION # 3.

Part. B.

What is the difference b/w attrition and erosion of concrete?

Slicing and scraping of concrete surface can cause attrition and in hydraulic structure action of water can cause erosion of concrete. Damage of concrete due to abrasion depend upon cause of wear.



Q# 3. Part. A.

Inclurance level: The fatigue strength decrease as the no of cycle increase the minimum value of fatigue strength below which failure does occur is known as Inclurance level:

Its fatigue strength is represent by  $\sigma_s$  and the number of cycle represented by "N".

Inclurance level of steel, Inclurance level of steel =  $0.5 \times \text{Strength}$   
Inclurance level of concrete, concrete does not have minimum Inclurance level.



~~Part.~~

- 1) Fineness the cement, the strength will be increased.
- 2) Lower the water-cement ratio, higher will be the strength.
- 3) The compressive strength decrease with the increase size of coarse aggregate.
- 4) Strength depend on the texture of the aggregate for more or less zone bonding.

QUESTION #. 14.

Part. A.

6

What is creep? What are the factors that affect creep?

The increase in strain of concrete with the passage of time under sustained stress is known as creep.

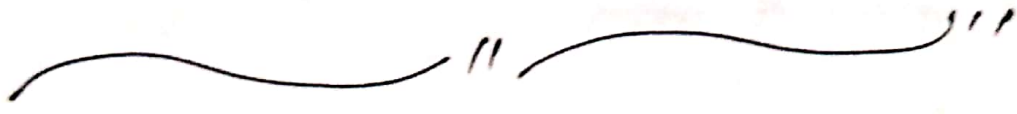
Factors affecting creep:

Stiffer the aggregate lower the creep. More the content of aggregate per unit volume of concrete lower the creep. Decrease in w/c causes decrease in creep. In other words, strength and creep are inversely proportional. Creep is smaller when concrete is cured at high temperature. Because strength is higher then when cured and loaded at high temp creep also depends upon the applied stress. The relationship is directly proportional. Creep also depends on the type of cement. High alumina cement experiences less creep as compared to ordinary Portland cement.

Question. 4. Continue.

Difference b/w creep and Strain Relaxation.

Two terms are some time used and interchangeably Although they are easily different Creep is an increase in plastic strain under constant stress. Stress relaxation is decrease in stress under constant strain Creep is an increased tendency ~~to~~ ~~move~~ toward more strain and plastic deformation with no change in stress.



## QUESTION #. 5.

Diff B/w Plastic Shrinkage and Dry Shrinkage.

(1) Plastic Shrinkage

Plastic Shrinkage is caused by the loss of water by evaporation from the surface of newly laid concrete or by suction of dry concrete underneath. At the surface plastic shrinkage occurs when the rate of evaporation exceeds the rate of bleeding.

Actually the volumetric contraction of concrete is called plastic shrinkage and results in percent reduction per unit volume of cement. Passed this result a crack becomes produced. Plastic shrinkage depends on temperature; it increases with increase in the rate of evaporation.

(2) Dry Shrinkage. The contracting of hardened concrete mixture due to the loss of mix capillary water. This shrinkage causes an increase in tensile stress which may lead to cracking and internal warping. Drying shrinkage is



## Dry Shrinkage Continue.

dependent on several factors which include property of component, proportion of the component, amount of moisture while curing. Dry shrinkage happens mostly because of the reduction of capillary water by evaporation and the water in the cement paste.

Is drying and plastic shrinkage are reversible.

Drying Shrinkage are reversible and plastic shrinkage are not reversible.



## QUESTION # 6.

## Part. A.

In addition to Sulphate present in sea water, chloride are also present. The presence of chloride prevent expansion of concrete unlike Sulphat attack but increase porosity of concrete over time. The resulting decrease in strength, expansion of concrete above high level due to crystallization of Percolated salt can occur which can be prevented by making concrete impermeable. Concrete subjected to alternet waiting wetting & Drying is severally attacked, while concrete that is constantly wet is least affected. Concrete exposed to sea water should have w/c below 0.45 it should have low permeability it should be well compacted with good work man ship. Especially in the construction joints.

~~~~~"~~~~~"~~~~~"

Step: 1.

$$\text{Slump} = 50 \text{ mm.}$$

Step: 2      maxi Siz of Agg = 25 mm.

Step 3:      quantity of water =  $180 \text{ Kg/m}^3$ .

Step 4:      Average strength of concrete.

$$\begin{aligned} \text{28 day of strength of concrete} &= x + y + 15 \\ &= 8 + 8 + 15. \\ &= 31 \text{ Mpa} \end{aligned}$$

We can use 2nd equation.

$$f_m = 31 + 8.5$$

$$= 39.5 \text{ Mpa}$$

OR.

$$f_m = 1.1 \times 31 + 5.$$

$$= 39.1 \text{ Mpa}$$

Probability of air content.

Step 5:      water cement ratio.

we can find from table.

19.1.

$$w/c = 0.41$$

12

$$\text{Cement quantity } W/Mc = \frac{180}{0.41} = \boxed{439 \text{ Kg/m}^3}$$

Step: 6. Quantity of Course Aggregate.

We can find from Table. - 19.9.

$$C.A = 0.69$$

$$\text{Weight of C.A} = 0.69 \times 1600 = \boxed{1104 \text{ Kg/m}^3}$$

Step: 7:

Quantity of F.A. by Volume Method.

$$\text{Weight of C.A} = 2.65 \left( 100 - \left[ \frac{439}{3.5} + \frac{180}{1} + \frac{1104}{2.7} \right] \right)$$

$$C.A = 2.65 [1000 - 139.3 - 180 - 408 - 15]$$

$$C.A = 2.65 [257.7]$$

$$C.A = \boxed{682.9 \text{ Kg/m}^3}$$

Step 8

For 1% absorption C.A =  $\frac{1}{100} \times 1104$ .

$$\boxed{C.A = 11.04 \text{ Kg}}$$

Step 9

For 2% moisture present in F.A that will added after mix.

$$\frac{2}{100} \times 682.9 \text{ Kg/m}^3 = \boxed{13.65 \text{ Kg}}$$

(13)

$$\text{Net quantity of water} = 185 + 13.85 - 11.04 \\ = \boxed{187.61 \text{ Kg.}}$$

Net quantity of C.A

$$1104 - 11.04 = 1092.96 \text{ Kg.}$$

$$\text{Net quantity of F.A} = 68.9 + 13.65 \\ = 696.55 \text{ Kg.}$$

Final quantities.

$$\boxed{\text{Cement} = 439 \text{ Kg/m}^3}$$

$$\boxed{\text{Water} = 187.61 \text{ Kg/m}^3}$$

$$\text{F.A} = 696.55 \text{ Kg/m}^3$$

$$\text{C.A} = 1092.96 \text{ Kg}$$

The END.