IQRA NATIONAL UNIVERSITY

DEPORTMENT: CIVIL ENGINEERING

PAPER: CONCRETE TECHNOLOGY

EXAM: FINAL TERM

SEMESTER: 2ND

STUDENT:16595

NAME: NIAMAT ULLAH

QUASTION:-1

1. **(a):-**<u>**What Is Re-Tempering Of Concrete? In Which Case Is Re-Tempering Of Concrete Done**</u>?

Answer:- <u>Re-Tempering Of Concrete:-</u>

- ✓ The process of remixing of water to concrete, in addition to required quantity of water is known as re-tempering of concrete. Sometimes, extra cement is also added while re-tempering..
- ✓ Re-tempering is done owing to loss of workability or undue stiffness of concrete at actual side in case of long tunnels, road construction etc. where batching plant is few kilometers away.

---

b):-<u>**WHAT Is The Normal RPM Of The Agitator Of A Transit Mixer? What Is The Minimum Limitation Of Total revolutions of Agitator In A Transit Mixer Set By Astm Before Concrete Placement?**</u>

Answer:-

For agitating, a range from 2 to 6 rpm is sufficient. For mixing, the concrete drum must turn faster, with a maximum of 12 to 18 rpm.

Adjust the rotation speed to the flow rate of the concrete pumping equipment.

So as not to exceed the 300 rotationsACI recommended during the complete loading, transport, and unloading cycle, you should calculate the rpm used during loading and transport so that the available margin required for unloading the mixture can be adjusted to the pump flow.

END

QUASTION:-2

a):- What Will Be The Expected Loss In Strength Of 3000psi Concrete If It Curing Has Not Been Performed At All?

Answer:-

When concrete is not cured properly, its durability, strength and abrasive resistance are affected.
When the surface of the concrete is not kept moist within the first 24 hours after the casting, the evaporation from the exposed horizontal surface results in plastic shrinkage cracks and a weak and dusty surface.

---

b):- What Is The Percentage Efficiency Of Membrane Curing As Compared To Water Curing?

Answer:-

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

---

c):- What Is Meant By Retrogression Of Strength In Concrete? Which Method Of Curing Promotes Retrogression In Concrete Strength?

Answer:-

Curing at high temperature can cause 'Retrogression in strength' which refers to high strength in early age due to heating but loss in strength at later age.
Steam Curing cause of retrogression.

END

QUASTION:-3

(a) What Do You Mean By Endurance Level? What Is The Endurance Level Of Concrete And Steel?

Answer:-

The fatigue strength (S) decreases as the number of cycles (N) increases. The minimum value of S below which failure does not occur is known as endurance level. For steel S=0.5xstrength. Concrete does not have a minimum endurance level.

(b) What Is The Difference Between Attrition And Erosion Of Concrete?

Answer:-

Sliding and scraping of concrete surface can cause *attrition,* and in hydraulic structures, action of water can cause *erosion* of concrete.

(c) What Steps Should Be Taken To Improve Bond Strength Of Reinforcement In Concrete?

Answer:-

- The bond strength increase with increase in compressive strength of concrete.
- Deformed (ribbed) bars should be used to increase friction between reinforcement and concrete.

END

QUASTION:-4 What Is Creep? What Are The Factors Affecting Creep? What Difference Is Between Creep And Strain Relaxation.

Answer:-

Creep:-

The increase in strain of concrete with in 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 and inversely proportional.
- Creep is smaller when concrete is cured at high temperature because strength is higher than when cured and loaded at high temperature.
- 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.

Difference Is Between Creep And Strain Relaxation:-

- In Statically indeterminate structures the creep may relieve (by relaxation) the stress concentration induced by shrinkage, temperature changes etc.

END

QUASTION 5:- What Is The Difference Between Drying Shrinkage And Plastic Shrinkage? Is Drying And Plastic Shrinkage Reversible?

Answer:-

Difference Between Drying Shrinkage And Plastic Shrinkage:-

Drying Shrinkage:-

- Withdrawal of water from hardened concrete causes *drying shrinkage*.
- A part of drying shrinkage is reversible through *moisture movement (40 to 70%).*

Plastic Shrinkage:-

- Plastic cracking (Plastic Shrinkage Cracking) is cracking that occurs in the surface of the fresh concrete soon after it is placed and while it is still plastic.

Drying And Plastic Shrinkage Reversible:-

Draying and plastic shrinkage is not reversible.

- END

QUASTION6:-

a) What Are Risks To Concrete Structure Exposed To Sea Water? How Do You Increase Resistance Of Concrete To Sea Water?

Answer:- ## Concrete Structure Exposed To Sea Water:-

- In addition to sulphates present in sea water, chlorides are also present. The presences of chlorides prevents expansion of concrete unlike sulphate attack, but increase porosity of concrete over time, resulting decrease in strength.

Increase Resistance Of Concrete To Sea Water:-

- Expansion of concrete above high level of water due to crystallization of percolated salts can occur which can be prevented by making concrete impermeable. Concrete subjected to alternate wetting and drying is severely 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 workmanship, especially in the construction joints.

b):

Solution :-

1) Slump — 50mm

2) Required quantity of water from table # 19.4

$W = 185\ kg/m^3$, $C.A = 2\%$

3) aggregate size = 25 mm

4) Find area strength of concrete

$f_m = f_{min} + 1.5$

$f_{min} = x + y + 15 \Rightarrow$ (my id # 16395)

then,

$f_{min} = 9 + 5 + 15 = 29$ MPA

$f_{min} = 29$ MPA

$f_m = f_{min} + 8.5 \Rightarrow f_{min} = 1.1 \times f_{min} + 5$ for $21 MPA < f_{min} < 35 MPA$

5) w/c ratio

The table 19.1 S.# 1 and 8

C

$$= \frac{41.4 - 34.5}{0.48 - 0.41} \times \frac{37.5 - 34.5}{0.48 - x}$$

$$= \frac{5.9}{0.07} \times \frac{3}{0.48 - x}$$

$$= (0.48 - x)(5.9) = 3(0.07)$$

$$\Rightarrow 0.48 - x = \frac{0.21}{5.9}$$

$$= 0.48 - x = 0.035$$

$$= 0.48 = 0.035 + x$$

$$0.48 - 0.035 = x$$

$$x = 0.44$$

w/c ratio = 0.44

6) Quantity of cement $\Rightarrow$ w/w/c

$$\frac{185}{0.44} = 420.45 \text{ kg/m}^3$$

7) Quantity of C.A from table # 19.9

C.A = 0.69

Weight of C.A = 0.69 x Bulk of C.A

= 0.69 x 1600 = 1104 Kg/m³

8) Quantity of F.A by volume method

Weight of C.A ⇒

$$\Rightarrow 2.65\left(1000-\left(\frac{420.45}{3.15}+\frac{185}{1}+\frac{1104}{2.65}+20\right)\right.$$

$$\Rightarrow 2.65\,(1000-(133.47+185+416.60+20)$$

$$\Rightarrow 2.65\,(244.93)$$

$$\Rightarrow C.A = 649.06\ Kg/m^3$$

9) for 1% of Absorbed moisture in C.A we have,

$$\Rightarrow 1/100 \times 1104 = 11.04\ Kg/m^3$$

10) for 2% of moisture absorption F.A that will be added to water after mixing

$\Rightarrow 2/100 \times 649.06 = 12.98 \text{ kg/m}^3$

Net Quantity of water = 185 + 11.04 − 12.98 = 183.06 kg/m³

Net Quantity of CA = 1104 + 11.04 = 1115.04 kg/m³

Net Quantity of F.A = 649.06 + 12.98 = 662.04 kg/m³

Cement = 420.45 kg

Water = 186.25 kg

F.A = 662.65 kg

C.A = 1115.04 kg