Q1Answer. The process of remixing of water to concrete, in addition to required quantity of water is known as retempering of concrete. Sometimes, extra cement is also added while retempering..

Retempering is done owing to loss of workabilty or undue stiffness of concrete at actual side in case of long tunnels, road construction etc. where batching plant is few kilometers away

B.

Mixers generally run at speed of 15-20 revolutions per minute.

Normally 25-30 revolutions are required for a well designed mixer to mix ingredients properly.

Mixing time is usually 1.5 to 2.5 minute and depends upon volumetric capacity of mixer.

Batching plant takes 12 minutes to load a transit mixer of $6m^3$ capacity

Transit mixers have capacity ranging from 4-7m³. Speed of agitator varies from 2 to 5rpm. A limit of 300 revolutions has been set by ASTM before placing.

Q2Answer.

(a)

Hydration is not an instantaneous process. Water is required for hydration reaction to achieve 100 percent.

If curing is not done, there is water deficiency which causes insufficient hydration. As a result there will be capillary pores which won't be segmented, causing cracks and shrinkage in the long run.

Thus the concrete if not cured results in poor strength development and lower durability and 3000 psi strength could be decreased upto 50% .

(b)

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

Retrogression of strength in concrete.

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Strength retrogression is defined as a change in the hydration products that are formed when cement is exposed to high temperatures (>110°C / 230°F). It

can be described as a decline of cement strength at elevated temperatures where decreased strength is observed with increasing time.
into four categories:
A. Water curing
B. Membrane curing
C. Application of heat
D.Miscellaneous.

Q3Answer. (a)
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. As the compressive strength of concrete increases with age, fatigue strength also increase.
(b)
Sliding and scraping of concrete surface can cause attrition, and in hydraulic structures, action of water can cause erosion of concrete.
(C)
Strength of bond depends upon the friction between steel and concrete. The bond strength increase with increase in compressive strength of concrete.

Deformed (ribbed) bars should be used to increase friction between reinforcement and cconcret.

Q4Answer. The increase in strain of concrete with in passage of time under sustained stress is known as 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 also depends upon the applied stress. The relationship is directly proportional.
they are really different. Creep is an increase in plastic strain under constant stress. Stress relaxation is a decrease in stress under constant strain. ... Creep is an increased tendency toward more strain and plastic deformation with no change in stres.

Q5Answer. If the volume reduction occurs before the concrete hardens, it is called plastic shrinkage. The volume reduction that occurs primarily due to moisture loss after the concrete has hardened is known as drying shrinkage.

Plastic shrinkage occurs in a freshly mixed concrete, with loss of water by evaporation from its surface, after placing and before hardening of the concrete. This can lead to **plastic shrinkage** cracking if the rate of evaporation is higher than that of the bleeding water rising to the surface of the concrete.

Drying shrinkage results from the loss of capillary water from the hardened cement mixture, leading to contraction and crack formation within concrete. According to the previous studies, the addition of plant fibers, such as sisal, to cement mortar increases its **drying shrinkage**.

Q6Answer. 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.

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.