IAT- 2

Q 1) Workability is the term that is used to describe how the concrete can be layed without segregation & losing the homogenity is called workability of concrete.

Factors affecting workability :-

1) Water content :- Water content is a important factor that affects workability. ~~More~~ The quantity of water to be added depends on the type of concreting. The water content that is workable for mass concreting may not be workable for concreting of slab. Also water content that is workable for compaction using vibrator may not be workable for compaction by hand.

2) Size of aggregate :- More is the size of aggregate lesser is the surface area available for welting & less amount of paste is required for lubricating to prevent internal friction. Hence bigger size of aggregates increases workability

Surface texture of aggregate :-

Aggregate with rough & surface will have more surface area that will decrease the workability Hence ~~smooth~~ smooth surface of the aggregates will increase the workability

Use of admixture :-

It is one of the most important factor affecting workability. Certain admixture that is added during the mixing of concrete will help to increase the workability

Shape of agregates :-

Flaky & angular aggregate ~~will make~~ make will the decrease the workability whereas, globular aggregates will increase the workability.

Mix proportion :-

When the agregate /cement ratio is more it makes the concrete leaner that decreases the workability. Less aggregate cement ratio will make the aggregate thicker & increases the workability

Grading :-

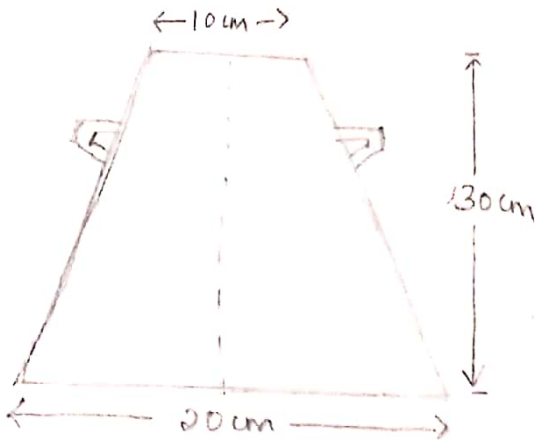
Proper grading of aggregate will prevent formation of voids & bring the aggregate close to each other & thereby increase the workability.

Q2) Laboratory tests conducted to measure workability

1) Slump test
2) Compaction factor test
3) Flow test
4) Vee-Bee consistometer test

SLUMP TEST :-

* The apparatus used for slump test consists of a mould in the shape of a frustum of a cone with bottom diameter 20 cm & top diameter 10 cm. The height of the mould is 30 cm



The concrete mix that is made is filled in the mould in 4 layers by filling $\frac{1}{4}$th of the height of the cone each time & tamping it 25 times using a tamping rod.

After the concrete it filled upto the top the excess concrete is removed & the top layer is leveled.

* After this ~~this~~ the mould is lifted carefully in the vertical upward direction

* The concrete is let to subside for some time

* Height of the concrete after subsiding is measured & it is subracted from the height of the frustum of cone mould

* The slump that is formed after subsidence will be of three type 1) Normal slump 2) Shear slump 3) Collapse

* From the type of slump that we get we ~~ge~~ can decide if the amount of water in the concrete is to be increased or decreased.

Normal slump

Shear slump

Collapse

Q5) Methods of cement concrete curing :-

1) Water curing
2) Membrane curing
3) Steam curing in normal pressure
4) Steam curing in high pressure
5) Infrared curing
6) Curing using $CaCl_2$

1) Water curing :-

Precasted concrete can be immersed in water for curing. In case of walls and columns curing can be done by spraying of water or in some case wet gunny bags are place on top of the concrete for curing.

2) Steam curing :-

It is not usually preffered for insitu curing of concrete. It is usually done for precast concrete structures wherein these concrete structures are stored in closed chambers & water is heated to produce steam & this steam is used for curing purpose

3) Membrane curing :-

It is usually done at sites that is not easy to reach or to go. Here curing is done by placing membrane on the structures the prevent the escape of the vapours.

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Internal Assessment Test 2 – AUG. 2022

Sub:	Concrete Technology					Sub Code:	18CV44	Branch:	Civil Engg	
Date:	04.08.2022	Duration:	90 min's	Max Marks:	50	Sem / Sec:	4 A		OBE	

Answer any FOUR FULL Questions, Qn.no 7 is mandatory.

		MARKS	CO	RBT
1 (a)	Define workability and explain the factors which affect the workability of concrete?	[10]	CO3	L2
2 (a)	List the different laboratory tests conducted to measure workability. Briefly discuss any one of them in detail with the help of a neat sketch.	[10]	CO3	L3
3 (a)	Write brief note on i) Batching, ii) Mixing, iii) Transportation.	[10]	CO3	L2
4 (a)	What are the good and bad practices of making and using fresh concrete?	[10]	CO3	L2
5 (a)	List the different methods cement concrete curing. Briefly discuss any two of them in detail.		CO3	L2
6 (a)	Explain briefly any two of the following. i) Concept of mix design, ii) Variables in mix proportioning, iii) Exposure condition with respect to concrete mix design.	[10]	CO6	L2
7 (a)	Design the concrete mix for M40 grade concrete using fly ash with the following data. **STIPULATIONS FOR PROPORTIONING:** a. Grade designation : M40 b. Type of cement : OPC 43 grade conforming to IS 269 c. Type of mineral admixture : Fly ash conforming to IS 3812 (Part1) d. Maximum nominal size of aggregate : 20 mm e. Exposure conditions as per Table 3 and Table 5 of IS 456 : Moderate(for reinforced concrete) f. Workability : 125 mm (slump) g. Method of concrete placing : Pumping h. Degree of supervision : Good i. Type of aggregate : Rounded aggregate j. Maximum cement content (OPC content) : As per IS 456 k. Chemical admixture type : Superplasticizer- normal **TEST DATA FOR MATERIALS** a. Cement used : OPC 43 grade conforming to IS 269 b. Specific gravity of cement : 3.10 c. Fly ash : Conforming to IS 3812 (Part 1) d. Specific gravity of fly ash : 2.3 e. Chemical admixture : Superplasticizer conforming to IS 9103 f. Specific gravity of g. Coarse aggregate (at SSD condition) : 2.72 h. Fine aggregate (at SSD condition) : 2.65 i. Chemical admixture : 1.145 j. Water absorption Coarse aggregate : 0.5 percent Fine aggregate : 1.0 percent k. The coarse and fine aggregates are wet and their total moisture content is 2 percent and 5 percent respectively. Therefore, the free moisture content in coarse and fine aggregate shall be as shown in (w) below l. Free (surface) moisture Coarse aggregate : Free moisture = Total moisture content –Water absorption = 2.0 – 0.5 = 1.5 percent Fine aggregate : Free moisture = Total moisture content –Water absorption = 5.0 – 1.0 = 4.0 percent z. Fine aggregates confirming to Zone II of Table 9 of IS 383	[20]	CO6	L4