

**GOVERNMENT COLLEGE OF ENGINEERING, JALGAON****(An Autonomous Institute of Government of Maharashtra)**

National Highway No.6, JALGAON – 425 002

Phone No.: 0257-2281522

Fax No.: 0257-2281319

Website : www.gcoej.ac.in

E-mail : princoej@redifmail.com

Name of Examination : **Winter 2020** - (Preview)Course Code & Course Name : **CE203U - Concrete Technology**Generated At : **19-04-2022 10:36:41**Maximum Marks : **60**Duration : **3 Hrs**[Edit](#)[Print](#)[Close](#)**Answer Key Submission Type:** No marking scheme and solution

Instructions:

1. *All questions are compulsory.*
2. *Illustrate your answer with suitable figures/sketches wherever necessary.*
3. *Assume suitable additional data; if required.*
4. *Use of IS:456, IS:383, IS:10262, logarithmic table, drawing instruments and non programmable calculators is allowed.*
5. *Figures to the right indicate full marks.*

1) Solve any Two of the following:

- a) How Ready-mixed Concrete is different than normal concrete ? [6]
 - b) Explain in brief any two techniques used for Non-destructive testing of concrete. [6]
 - c) What do you mean by "Recycled-aggregate concrete" ? What are its applications ? [6]
- 2) a) Which are the methods used to measure workability of concrete ? Explain in brief the method that is used on construction sites. [4]**
- b) What will be the effect on the properties of concrete if we use Fly-ash and silica-fume as an admixture ? [4]
 - c) What do you mean by chemical admixtures ? What is their use during preparation of concrete? [4]

3) Please Read the following Test Report and Answer any Six of the following Sub-Questions given below:

Name of The Work: Providing, and laying M.S. pipe-line for Water Supply Projects under JNNURM (Mukane Dam Source project)**Name of Contractor:** - Larsen & Toubro Ltd. Nashik.**TEST - R E P O R T****Mix Design No - 14**

Sr. No	GRADE OF CONCRETE	Cement	SAND River	AGG. 12 mm	AGG. 20 mm	ADMIXURE by Wt of Cement	W / C Ratio	28 DAYS. Strength (N/mm ²)	Cement Consmp. kg/m ³
1	M 20	1.00	2. 21	1. 64	2. 45	0.6 %	0. 52	28. 74	330. 00
2	M 25	1.00	2. 10	1. 43	2. 15	0.6 %	0. 46	37. 34	360. 00
3	M 30	1.00	2. 52	0. 76	1. 76	0.7 %	0. 40	43. 80	385. 00

1) Mix Proportion :- (M: 20)

- Cement :- 50.0 kg. (Ultra Tech 53 Grade O.P.C.)
- Sand (River) :- 110.5 kg.
- Agg. 10 mm :- 82.0 kg Slump = 75 mm
- Agg. 20 mm :- 122.5 kg Compaction Factor:- 0.93
- Water :- 26.0 Litre. Plastic Density:-2555 kg/m³
- Admixture :- 500 ml (Flowcon 07FP)

2) Mix Proportion :- (M: 25)

- Cement :- 50.0 kg. (Ultra Tech 53 Grade O.P.C.)
- Sand (River) :- 105.0 kg.
- Agg. 10 mm :- 71.5 kg Slump = 100 mm
- Agg. 20 mm :- 107.5 kg Compaction Factor:- 0.94
- Water :- 23.0 Litre. Plastic Density:-2516 kg/m³
- Admixture :- 500 ml (Flowcon 07FP)

3) Mix Proportion :- (M: 30)

- Cement :- 50.0 kg. (Ultra Tech 53 Grade O.P.C.)
- Sand (River) :- 126.0 kg.
- Agg. 10 mm :- 38.0 kg Slump = 155 mm
- Agg. 20 mm :- 88.0 kg Compaction Factor:- 0.98
- Water :- 20.0 Litre. Plastic Density:-2533 kg/m³
- Admixture :- 550 ml (Flowcon 07FP)

Brand Name of Cement :- Ultra Tech OPC 53 Grade (W:50 M : 12 Y: 2020)**1) Fineness of Grinding :-**

Residue on I.S. Sieve 5 %

2) Compressive Strength :- (Cement & Sand)

- | | |
|------------------------------|-------------------------|
| 3 Days (Average of 3 Cubes) | 27.94 N/mm ² |
| 7 Days (Average of 3 Cubes) | 37.68 N/mm ² |
| 28 Days (Average of 3 Cubes) | 54.02 N/mm ² |

3) Setting Time :-

Normal Setting Time of Cement. Hr. Mins.

- Initial 1. 35
- Final 6. 40

SIEVE ANALYSIS OF Aggregate :- (12 mm)

Sr.No	Opening in mm	Weight Retained. in gms.	Weight Retained %	Cumulative % of Weight Retained.	Cumulative % of Weight Passing.
1	16	---	----	----	100.00
2	12.5	0036	00.72	0.72	99.28
3	10.0	0600	12.00	12.72	87.28
4	6.3	4176	83.52	96.24	03.76
5	4.75	0188	03.73	100.00	00.00
6	TOTAL	5000			

1) Water absorption:- 1. 1 %**2) Sp.Gravity :- 2. 98****1. SIEVE ANALYSIS OF Aggregate :- (20 mm)**

Sr.No	Opening in mm	Weight Retained. in gms.	Weight Retained %	Cumulative % of Weight Retained.	Cumulative % of Weight Passing.
1	25.0	----	-----	----	100.00
2	20.0	0274	05.48	05.48	94.52
3	16.0	2126	42.52	48.00	52.00
4	12.5	1930	38.60	86.60	13.40
5	10.0	0636	12.72	99.32	00.68
	Total	5000			

1) Water absorption:- 0.9 % 2) Sp.Gravity :- 2.91

1. SIEVE ANALYSIS OF River SAND

Sr.No.	Opening in mm	Weight retained in gms.	Retained %	Cumulative Retained %	Cumulative Passing. %
1	4.75	049	04.90	04.90	95.10
2	2.36	118	11.80	16.70	83.30
3	1.18	152	15.20	31.90	68.10
4	0.60	235	23.50	55.40	44.60
5	0.30	338	33.80	89.20	10.80
6	0.15	094	09.40	98.60	01.40
7	Less than 0.15	014	01.40	100.00	00.00
8	Total	1000			

1) Silt content: - 1.3 % 2) Sp.Gravity :- 2.62 3) Water absorption:- 1.8 % 4) Moisture Content:- 2.5 %

Table 9 Fine Aggregates (Clause 6.3)

Sl No.	IS Sieve Designation	Percentage Passing			
		Grading Zone I	Grading Zone II	Grading Zone III	Grading Zone IV
(1)	(2)	(3)	(4)	(5)	(6)
i)	10 mm	100	100	100	100
ii)	4.75 mm	90-100	90-100	90-100	95-100
iii)	2.36 mm	60-95	75-100	85-100	95-100
iv)	1.18 mm	30-70	55-90	75-100	90-100
v)	600 μ m	15-34	35-59	60-79	80-100
vi)	300 μ m	5-20	8-30	12-40	15-50
vii)	150 μ m	0-10	0-10	0-10	0-15

- According to IS:456 assumed standard deviation for M20 and M25 Concrete is 4.0 MPa and that for M30 is 5.0 MPa. Check whether strength of trial mixes is sufficient or not. [4]
- For this concrete work, what workability criteria do you suggest? Does the trial mixes satisfy it? [4]
- To which grading zone the above fine aggregates belong? (Refer the Table given at end) [4]
- Calculate fineness modulus of the river sand. Do you recommend this sand to be used as fine aggregates as it is? If not then what modifications shall be made? [4]
- Can you explain the combined grading of *All-in-aggregates* as given in the above report? [4]
- Work out the quantities for M25 Grade concrete trial for the casting of Six cubes. [4]
- Does the Cement satisfy the acceptance criteria? [4]
- Calculate quantity of water to be adjusted (concrete volume 1cu m) for Trial mix of M30 as mentioned above. [4]

- 4) a) Three cubes casted on site have shown readings 450 kN, 458 kN and 432 kN during compressive testing. Check whether this sample is acceptable for M20 Grade concrete. [4]
- b) During flexure test, one of the concrete specimen (150 mm x 150 mm x 700 mm) got failed at the load of 1.2 kN. Calculate modulus of rupture for the concrete. [4]
- c) During Split-tensile test on concrete cylinder(150 mm x 300 mm), the load at failure was observed as 85 kN. What is the split-tensile strength of the concrete? [4]

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