* R M - 7 6 6 5 / 2 0 0 *

RM-7665

B. E. - IV (Sem. VIII) (Civil) Examination

May / June – 2010

Concrete Technology

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ B. E. - 4 (Sem. 8) (Civil)

Name of the Subject :

☛ Concrete Technology

☛ Subject Code No. : 7 6 6 5 ☛ Section No. (1, 2,.....) : 1&2

Seat No. :

Student's Signature

(2) Figures to the right indicate full marks.
(3) To the point answers will be given full credit.
(4) Assume suitable data, if necessary.
(5) No codes of practice are permitted.

SECTION - I

1 Attempt any **three** :

(a) State the chemical composition of ordinary postland cement. **6**

(b) Explain initial and final setting time test of cement. **6**

(c) What is heat of hydration explain its effect on quality of concrete. **6**

(d) Discuss accelerators and retarders used in concrete. **6**

2 Attempt any **three** :

(a) What is angularity number, describe angularity test. **6**

(b) Discuss the test for flakiness and elongation index. **6**

(c) Explain alkali aggregate reaction and factors controlling it. **6**

(d) Discuss cold weather concreting. **6**

3 Attempt any **two** :

(a) State factors affecting workability and explain any two in detail. **7**

(b) Describe any one test to determine workability. **7**

(c) What is competition, explain different methods of compaction of concrete. **7**

SECTION - II

4 Design the concrete mix for following using IS 10262-1982 recommendations. **16**

Grade of concrete : M_{30}
Degree of control : Very good
Maximum size of aggregates : 20 mm
Condition of exposure : Sever
Degree of workability : 0.9 compaction factor
Specific gravity, cement : 3.15
Fine aggregates : 2.6
Coarse aggregates : 2.67
Free surface moisture, fine aggregates : 2%
Water absorption, coarse aggregates : 0.5%
Sand conforming to Zone II
Note :
(i) 5% of the low results are acceptable.
(ii) Refer Table 1 to 7.
(iii) W/C ratio from 28 days strength of cement = 0.50
(iv) Coarse aggregate : 20 mm and 12.5 mm mixed in the ratio 60:40

5 Attempt any **four** : **24**

(i) Enlist various factors which affect the test results of concrete. Explain any two out of them.
(ii) Discuss the split tension test on concrete and its merits.
(iii) Discuss the steam curing of concrete with application.
(iv) Discuss Ultrasonic Pluse Velocity Test for concrete with sketch of equipment.
(v) Write a note on aggregate alkali reaction.

6 Complete the following with appropriate words/sentences : (any **ten**) **10**

(i) Gypsum is added in cement with a purpose _____.
(ii) For determining final setting time of cement the apparatus used is known as _____.
(iii) The _____ type of aggregates improves workability but reduces strength.
(iv) The fineness modulus of aggregates is _____.
(v) The over vibration results into _____.
(vi) Ready mixed concrete is preferred in case of _____ and _____.
(vii) The water ponding method of curing is used only for _____.
(viii) The tensile strength of concrete is about _____ percentage of it's compressive strength.

(ix) The flexural strength of concrete is given by the expression_____.

(x) The maturity of concrete is defined as _____.

(xi) As per IS 456 for normal concrete the accepted proportion of low result is _____.

(xii) The reason why slump test is most widely used is (a) _____ (b) _____.

Table: 1 to 7

Table – 1: Suggested Values of Standard Deviation:

Grade Of Concrete	Standard Deviation for Different Degree of Control		
	Very Good	Good	Fair
M 10	2.0	2.3	3.3
M 15	2.5	3.5	4.5
M 20	3.6	4.6	5.6
M 25	4.3	5.3	6.5
M 30	5.0	6.0	7.0

Table - 2: Values of 't':

Accepted Proportion of Low Results	Value of 't'
1 in 5	0.84
1 in 10	1.28
1 in 15	1.50
1 in 20	1.65
1 in 40	1.86
1 in 100	2.33

Table - 3: Values of W/C and Compressive Strength:

Compressive Strength in N/mm^2 at 28 days	W/C
20	0.6
25	0.525
30	0.48
35	0.42
40	0. 375
45	0.335

Table - 4: W/C as per Durability Requirements:

Exposure Condition	Maximum Water Cement Ratio
Mild	0.65
Moderate	0.55
Sever	0.45

Table – 5: Approximately sand and water concrete per meter of concrete for grade upto M 35 :

Nominal maximum size of aggregate - mm	Water content per cubic meter of concrete in kg	Sand as percentage of total aggregate by absolute volume
10	208	40
20	186	35
40	165	30

Table – 6: Approximate Air Content:

Nominal maximum size of aggregate - mm	Entrapped air as percentage of volume of concrete
10	3.0
20	2.0
40	1.0

Table -7: Adjustment in water content and sand percentage

Change in condition	Adjustment require in	
	Water content	% sand in total agg.
For sand conforming to Zone I, Zone III or Zone IV	0	+ 1.5% for Zone I
	0	-1.5% for Zone III
	0	-3.0% for Zone - IV
Increase or decrease in compacting factor by 0.1	± 3%	0
Each 0.05% increase or decrease in W/C ratio	0	± 1%