Total No. of Questions : 6]

SEAT No. :

P5847

[Total No. of Pages : 4

BE/Insem./Oct.-506
B.E. (Civil)
ADVANCED CONCRETE TECHNOLOGY
(2015 Pattern) (Semester - I) (Elective - I)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) *Answer Q1 or Q2, Q3 or Q4, and Q5 or Q6.*
2) *Neat diagrams must be drawn wherever necessary.*
3) *Figures to the right indicate full marks.*
4) *Your answers will be valued as a whole.*
5) *Use of electronic pocket calculator is allowed.*

Q1) a) What is heat of hydration? Explain the factors affecting heat of hydration. **[4]**

b) What is copper slag? Explain its effect on workability & strength of concrete. **[6]**

OR

Q2) a) "Manufactured sand is best alternative to natural sand", Justify. **[4]**

b) What are the factors affecting strength of concerete? Describe the influence of gel space ratio on strength of concrete. **[6]**

Q3) a) Write a short note on structural light weight concrete? **[4]**

b) Write a short note on: **[6]**

i) Gap graded concrete

ii) Mass concrete

OR

Q4) a) What are the different types of industrial waste materials useful for construction industry? Explain any one waste material used in concrete in detail. **[4]**

b) Write a short note on: **[6]**

i) Ultra light weight concrete

ii) Vacuum concrete

P.T.O.

Q5) A) Using Indian Standard recommended guidelines, design a concrete mix for a reinforced concrete structure to be subjected to the very severe exposure conditions for the following requirements: **[10]**

a) Stipulations for proportioning

i) Grade designation: M45

ii) Standard deviation, S=5

iii) Type of cement: OPC 43 grade conforming to IS 8112

iv) Maximum water - cement ratio: 0.45

v) Workability: 125 mm (slump)

vi) Degree of supervision: Good

vii) Type of aggregate: Crushed Angular aggregate,

viii) Minimum Cement content: 320 kg/m3

ix) Method of concrete placing pumping

x) Chemical admixture type: Super plasticizer having efficiency 25 %

xi) Assume dose of admixture 1.2% by weight of cement.

b) Test data for materials

i) Specific gravity of cement: 3.15

ii) Specific gravity of admixture: 1.1

iii) Specific gravity of

1) Coarse aggregate - 2.80

2) Fine aggregate - 2.70

iv) Water absorption

1) Coarse aggregates - 0.5%

2) Fine aggregates - 1.00%

v) Free surface moisture

1) Coarse aggregates - Nil

2) Fine aggregates - Nil

vi) Sieve analysis

1) Coarse aggregate:

IS Sieve sizes (mm)	Analysis of Coarse aggregate Fraction		Percentage of Different Fractions			Remarks
	I	II	I (60%)	II (40%)	Combined (100%)	Confirming
20	100	100	60	40	100	of Table 2
10	0	71.2	0	28.5	28.5	of IS 383
4.75		9.40		3.7	3.7	
2.36		0				

2) Fine aggregate: Conforming to grading zone II

c) Design considerations:

Table 1: From IS 10262; Maximum water content per cubic meter of concrete

Sr. No	Nominal Maximum size of Aggregate (mm)	Maximum Water Content (kg)
i)	10	208
ii)	20	186
iii)	40	165

Table 2 : From IS 10262; Volume of Coarse Aggregate per Unit Volume of Total Aggregate

Sl. No.	Nominal Maximum size of Aggregate (mm)	Volume of Coarse Aggregate per Unit Volume of Total Aggregate For Different Zones of Fine Aggregate			
		Zone IV	Zone III	Zone II	Zone I
i)	10	0.50	0.48	0.46	0.44
ii)	20	0.66	0.64	0.62	0.60
iii)	40	0.75	0.73	0.71	0.69

OR

Q6) a) Explain the role of NDT Testing in civil engineering structures. **[4]**

b) Write a short note on:

i) Nuclear method.

ii) Ground penetration Radar. **[6]**

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