Student Exam No._____

GANPAT UNIVERSITY

B. Tech. 4th Semester Civil Engineering, Regular Examination: May June - 2013

2CI406 Concrete Technology

Time: 3 Hours **Total Marks: 70**

Instructions: - (1) Answer to the two sections must be written in separate answer books.

(2) Figures to the right indicate full marks.

(3) Assume suitable data if required.

Section - I

Que. – 1 Design a concrete mix (as per IS: 10262-2009) for a reinforced concrete work which will be exposed to the Severe condition. The concrete mix is to be designed as below data. **15**

(a). Stipulations for proportioning :

- Grade of designation: M 30
- Types of cement : OPC 43 grade conforming to IS 8112:1989
- Maximum nominal size of aggregate : 20 mm
- Minimum cement content: 320 kg/m^3 (As per IS :456 – 2000 ,Table -5)
- Maximum water-cement ratio: 0.45(As per IS :456 – 2000 ,Table -5)
- Workability in terms of Slump: 100 mm
- Method of concrete placing: Pumping
- Degree of supervision: Good
- Type of aggregate: Crushed angular aggregate
- Maximum cement content: 450 kg/ m^3
- Chemical admixture type: Super plasticizer

(b)Test data of materials (As per IS) :

- Specific gravity of: Coarse aggregate: 2.70, Fine aggregate: 2.67, Cement: 3.15 and Chemical admixture: 1.145
- Water absorption (IS 2386:1963) : (I) Coarse aggregate: 0.5% and (II) Fine aggregate: 1 %
- Free (surface) moisture: (I) Coarse aggregate: Nil (absorbed moisture also nil) (II) Fine aggregate: nil
- Sieve analysis (IS 2386 Part 1): (I) Coarse aggregate: (Conforming to Table 2 of IS 383) and (II) Fine aggregate: Conforming to grading Zone I of below table of IS 383:1970 (Reaff. 2007)
- Stander derivation = 4 N/mm^2
- From Table 2 of IS 10262 – 2009 = 186 kg (for 25 to 50 mm slump range) for 20 mm aggregate.
- From Table 3 of IS 10262 - 2009 volume of coarse aggregate corresponding to 20 mm size aggregate and fine aggregate (Zone I) for water-cement ratio of 0.50 = 0.60.

Que. – 2 Compression between IS, ACI and DOE method for concrete mix design. **05**

OR

Que. – 2 Enlist the data required for mix design material data. 05

Que. – 3 (A) Explain Non – destructive testing (NDT) and its different methods. 05

(B) Discuss the statement: "Small cubes of concrete show more strength. 05

(C) State factors affecting compressive strength of concrete and explain any one. 05

OR

Que. – 3 **Write Short note on : (Any Three)** 15

(a) High Performance Concrete (b) Rebound Hammer Test (C) Ultrasonic Plus Velocity Test (d) Nuclear Concrete (e) Self Compacting Concrete

Section - II

Que. – 4 (A) List out the advantages and disadvantages of concrete. 04

(B) State the different types of cement with its IS code number and its use. 04

(C) Enlist the physical properties of cement and explain any one test in detail. 04

OR

Que. – 4 (A) Enlist and explain manufacture of Portland Cement. 04

(B) Describe the Bogue's Chemical compounds composition of Portland cement. 04

(C) State the different types of cement with its IS code number and its use. 04

Que. – 5 (A) Enlist the classification of aggregate and explain in detail any two type classification of aggregate. 04

(B) Explain aggregate impact value test. 04

(C) Explain adverse effect of excessive use of admixtures. 03

OR

Que. – 5 (A) Explain laboratory procedure to find flakiness and elongation index of aggregates. 07

(B) Write explanatory note on : Gap Grading: 02

(C) Differentiate between fresh concrete and hardened concrete. 02

Que. – 6 (A) List methods of measurement of workability and explain one of them. 07

(B) Define curing, state different methods of curing Describe any one method. 05

The End