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10CV81

**Eighth Semester B.E. Degree Examination, Dec.2015/Jan.2016**  
**Advanced Concrete Technology**

Time: 3 hrs.

Max. Marks: 100

**Note: 1. Answer any FIVE full questions, selecting  
atleast TWO questions from each part.  
2. Use of IS40262-2009 code is permitted.**

**PART – A**

- 1 a. Explain the four major components of Portland cement contributes the strength development. Which compounds are responsible for rapid stiffening and early settling problems of the cement? **(10 Marks)**
- b. Discuss the physical-chemical characteristics of the C-S-H and Calcium Hydroxide in a well hydrated cement paste. How many types of voids and water are associated with saturated cement paste? **(10 Marks)**
- 2 a. What is the role of chemical admixtures in concrete and its mechanisms? Mention four types of chemical admixtures and its functions. **(10 Marks)**
- b. Explain the mechanism by which mineral admixtures are able to improve the durability, pumpability and finishability of concrete mixtures. Name some of the pozzolanic admixtures used in concrete. **(10 Marks)**
- 3 Design a concrete mix of M30 grade of concrete for the following data:  
Design parameters:  
Max size of aggregate – 20 mm  
Coarse aggregate – 20 mm and 12.5 mm mixed in the ratio of 60:40  
Shape of coarse aggregate – Angular Degree of workability – 0.85  
Degree of quality control – Fair Degree of exposure – Severe  
Cement – OPC 53 Grade Specific gravity of cement – 3.15  
Specific gravity of Fine aggregate – 2.6 Specific gravity of coarse aggregate – 2.67  
Free Surface moisture:  
Coarse Aggregate – Nil Fine Aggregate – 2%  
Water Absorption:  
Coarse Aggregate – 0.5% Fine Aggregate – 1.0%  
Entrapped Air – 2% **(20 Marks)**
- 4 a. Explain in brief various types and causes of cracks in concrete. **(10 Marks)**
- b. Discuss in brief the mechanism of chloride induced corrosion of steel and its control. **(10 Marks)**

**PART – B**

- 5 a. Write a note on :  
(i) Ready Mixed Concrete (RMC) **(05 Marks)**  
(ii) High Volume Flyash Concrete (HVFC) **(05 Marks)**
- b. Define self compacting concrete (SCC) and its benefits & requirements/ characteristics. **(10 Marks)**

- 6 a. What are the factors affecting the properties of fiber reinforced concrete (FRC) and its applications? (10 Marks)  
b. Explain briefly “Ferrocement” casting techniques and its applications. (10 Marks)
- 7 Explain in brief following types of concrete with respect to properties, method of production and its application:  
a. Structural light weight concrete (06 Marks)  
b. High Density concrete (06 Marks)  
c. High performance concrete (08 Marks)
- 8 a. What are the factors influencing the strength of concrete? (06 Marks)  
b. How to determine flexural strength of concrete under three-point loading method? (06 Marks)  
c. What are the factors affecting the measurement of pulse velocity with respect to properties of concrete? (08 Marks)

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10CV82

## Eighth Semester B.E. Degree Examination, Dec.2015/Jan.2016

### Design and Drawing of Steel Structures

Time: 4 hrs.

Max. Marks:100

- Note:** 1. Answer any ONE full question from each part.  
2. Use of IS – 800 – 2007 and steel tables are permitted.  
3. Missing data, if any, may be suitably assumed.

#### PART – A

- 1 a. A secondary beam ISMB 300@ 44.2 kg/m is to be connected to the main beam ISMB 400@ 61.6kg/m. two angles ISA 100 × 100 × 6 are used to connect the webs of beams. Three bolts of dia 20mm are used to connect angles to web of secondary beam. Six bolts of 22mm dia are used to connect to angles to web of main beam. The top flanges of both beams are at the same level.  
Draw to a suitable scale,  
i) Sectional elevation    ii) Side view showing all details. (15 Marks)
- b. The beam ISMB 400@61.6kg/m is connected to the web of a column ISHB 450@95.5 kg/m by unstiffened seated connection. A seat angle ISA 150 × 115 × 15 and a cleat angle ISA 100 × 100 × 10mm are used. Four bolts of 20mm are used to connect seat angle and two bolts of 20mm are used to connect cleat angles.  
Draw to a suitable scale,  
i) Sectional elevation (section through web of column)  
ii) Side elevation showing all details. (15 Marks)
- 2 a. A built up column of four ISA 90×90×8 placed with toe to toe spacing of 200mm. The battens are provided at a distance of 850mm c/c. The sizes of intermediate battens are 150mm × 6mm and end battens are 250mm × 6mm.  
Draw to a suitable scale  
i) Elevation  
ii) Plan showing complete details. (15 Marks)
- b. Two channels ISMC 400@ 494 N/M placed back to back with a spacing of 250mm between webs. The channels are supported over a slab base of size 700mm × 500mm × 80mm. The angles connecting column and base plate are 100 × 100 × 10mm and are connected by suitable bolts. Base plate is connected to concrete pedestal 1.2m × 1.2m size using four anchor bolts of diameter 20mm having 250mm length. Draw to a suitable scale the following.  
i) Sectional elevation  
ii) Plan of slab base assembly giving full details. (15 Marks)

#### PART – B

- 3 Design the top chord member and bottom chord member including connections to gusset using bolts of class 4.6. Force in the member under service load conditions are presented in the following table. Refer Fig Q3 for truss. (40 Marks)

Member	Force (under service loads)		
	DL (in KN)	LL (in KN)	WL (in KN)
Top Chord	20.2 (Comp)	20.2 (Comp)	48.75 (Ten)
Bottom Chord	18.75 (Ten)	18.75 (Ten)	31.82 (Comp)
Others	4.05 (Comp)	4.05 (Comp)	16.00 (Ten)

Draw to a suitable scale,

- i) Elevation of truss greater than half span
- ii) Enlarged view of (details at) joint A
- iii) Enlarged view of (details at) joint C

(20 Marks)

(05 Marks)

(05 Marks)

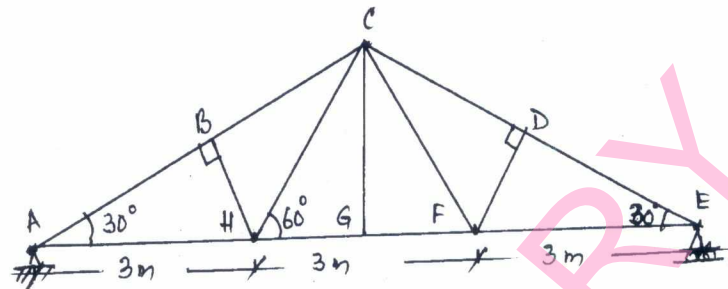


Fig Q3

- 4 Design a simply supported gantry girder to support an electrically operated crane, for the following data:

- i) Span of crane girder = 15m
- ii) Span of gantry girder = 7.5m
- iii) Capacity of crane = 200kN
- iv) Self wt. of crane (excluding crab) = 200kN
- v) Weight of crab = 40kN
- vi) Wheel base distance = 3.5m
- vii) Minimum hook approach = 1.2m
- viii) Self wt. of rail = 0.3 kN/m
- ix) Height of rail = 75mm

(40 Marks)

Draw to suitable scale,

- a. The cross section of gantry girder and its attachments to supporting column and bracket (Detail of column and bracket to be assumed). (10 Marks)
- b. Plan details (arrangement of column, crane, gantry) (10 Marks)
- c. Side elevation. (10 Marks)

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