Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–III • EXAMINATION – WINTER 2013**

**Subject Code: 131304** **Date: 28-11-2013**

**Subject Name: Basics of Structural Engineering**

**Time: 02.30 pm - 05.00 pm** **Total Marks: 70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

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|---|---|---|---|
| **Q.1** | **(a)** | State seven types of cements and their uses. | **07** |
| | **(b)** | Explain initial and final setting time test of cement. | **07** |
| **Q.2** | **(a)** | What is permeability? State and explain the factors affecting permeability of soils. | **07** |
| | **(b)** | What is admixture? State five types of admixture and their uses. | **07** |
| | | **OR** | |
| | **(b)** | Distinguish between standard proter test and modified proctor test. | **07** |
| **Q.3** | **(a)** | Explain alkali aggregate reaction and methods to control it. | **07** |
| | **(b)** | What is curing? Explain water curing in detail. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Sketch particle size distribution curve for well graded, uniformly graded and gap graded soils. Define coefficient of uniformity and coefficient of curvature. | **07** |
| | **(b)** | What is soil exploration? In general what information is collected in soil exploration? | **07** |
| **Q.4** | **(a)** | State field methods of compaction of soils and factors affecting compaction. | **07** |
| | **(b)** | Define water content, void ratio, air content, degree of saturation and specific gravity. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Explain the middle quarter rule for circular sections. | **07** |
| | **(b)** | A rectangular column of width 200 mm and of thickness 150 mm carries a point load of 240 kN at an eccentricity of 10 mm as shown in Figure 1. Determine the maximum and minimum stresses on the section. | **07** |
| **Q.5** | **(a)** | Analyse the following beam by moment distribution method (Ref. Figure 2. Support B sinks by 12 mm. E=200kN/mm$^2$ and I = 20 x 10$^6$ mm$^4$. Draw bending moment diagram also. | **10** |
| | **(b)** | Explain carry over factor and distribution factor. | **04** |
| | | **OR** | |
| **Q.5** | **(a)** | Using moment area method, prove the deflaction at centre of simply supported beam with UDL w kN/m thr'out is 5/384wl$^4$/EI. | **07** |
| | **(b)** | Find the expression for the maximum and minimum stresses at the base of an unsymmetrical column which is subjected to eccentric load. | **07** |

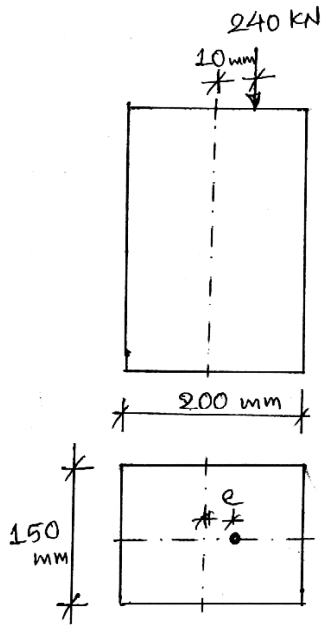


Figure 1

(OR. Q. 4 (b))

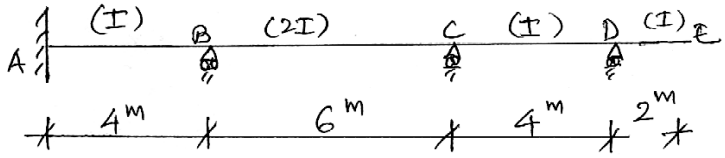


Figure - 2

(Q. 5 (a))

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