*Seat No.: _____* *Enrolment No._____*

# GUJARAT TECHNOLOGICAL UNIVERSITY

**M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2014**

**Subject code: 714305** **Date: 24-06-2014**

**Subject Name: Soil Stabilization and Grouting Technology**

**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 mark.**

| | | | |
|---|---|---|---|
| **Q.1** | **(a)** | Define soil stabilization. Classify in detail various stabilizing agents and discuss their suitability with at least one case study. | **07** |
| | **(b)** | Define grouting. Enlist the types of grouting with explain permeation grouting and compaction grouting in detail with their neat sketch. | **07** |
| **Q.2** | **(a)** | Classify stabilization process. Explain the role of surface area and surface characteristics of soil particles in stabilization phenomena. State any criteriaôs for selection of stabilization process if any? | **07** |
| | **(b)** | Enlist the various physical properties of grout to be checked in grout mix design. Explain the basic principle each property. | **07** |
| | | **OR** | |
| | **(b)** | What do you understand by chemical grouts, classify them? Which physical parameters are to be verified before selection of chemical grouts? | **07** |
| **Q.3** | **(a)** | Explain lime stabilization in detail and also discuss the role of various stabilizing agents in development of strength. | **07** |
| | **(b)** | Explain inorganic stabilizers. How they are selected and which parameters are mainly affected by it with respect to soil conditions. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Define electrical and thermal stabilization. Explain their suitability with fundamental mechanism. | **07** |
| | **(b)** | What do you understand by bituminous stabilization, where they are used? Classify the various bituminous stabilized mixtures with their applicability. | **07** |
| **Q.4** | **(a)** | Enlist various cement based grouts and explain their time vs. strength characteristics in detail. Support your answer with necessary plots. | **07** |
| | **(b)** | Define coarse and fine grouts. Explain the penetrability of grouts. Also discuss the various criteria of blockages. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Explain mixing mechanism for coarse grouts with neat sketch. Discuss various types of viscosity and flow measurements. | **07** |
| | **(b)** | Discuss gel strength in detail and explain various methods to measure gel strength. | **07** |
| **Q.5** | | Define Newtonian and binghamian grouts. Explain various factors affecting physical, rheological and strength measurements. Support your answer with necessary plots. | **14** |
| | | **OR** | |
| **Q.5** | | Enlist the various techniques of grouting. Discuss in detail various stage grouting methods with their neat sketch. | **14** |