GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-I Remedial Examination April 2010

Sub code: 711303
Subject: Highway Materials and Construction

Date: 08 / 04 / 2010   Time: 12.00 noon – 02.30 pm
                                                                Total Marks: 60

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

Q.1 **(a)** What are the various tests for judging the stability of road aggregates? Discuss the objectives for carrying out the tests with the desirable values of the test results.   **06**

(b) What is lime stabilization? Under what condition it is required? How can it be applied? What type of improvement will result due to stabilization?   **06**

Q.2 **(a)** What are the desirable properties of bituminous mixes? Explain the Marshall Stability test.   **06**

(b) Explain briefly various problems in hill road construction and how they are overcome.   **06**

OR

(b) Enlist different types of cutback. When are these used? Discuss in brief the tests carried out on cutback bitumen.   **06**

Q.3 **(a)** Discuss the principle, application and limitations of direct shear and triaxial test.   **06**

(b) Explain the process of embankment stabilization using Geo-textile.   **06**

OR

Q.3 **(a)** What is CBR test? Soil sub grade sample was obtained from project site and CBR test was conduct on it. Find the CBR value for the following data.   **06**

Penetration (mm)	Load (Kg)	Penetration (mm)	Load (Kg)
0.0	0.0	3.0	56.5
0.5	5.0	4.0	67.5
1.0	16.2	5.0	75.2
1.5	28.1	7.5	89.0
2.0	40.0	10.0	99.5
2.5	48.5	12.5	106.5

(b) Explain the Plate Bearing Test procedure and how the correction for "K" value may be done for different plate sizes, for adverse moisture conditions   **06**

Q.4 **(a)** The maximum quantity of water expected in one of the open longitudinal drains on clay soil is 1 m³/sec. Design the cross section and longitudinal slope of trapezoidal drain assuming the bottom width of the trapezoidal section to be 1 m and cross slope to be 1.2 vertical to 2.0 horizontal. The allowable velocity of flow in the drain is 1.5 m/sec. and roughness coefficient is 0.02. **06**

(b) What are the various types of bituminous construction in use? Discuss advantages and limitations of each. **06**

OR

Q.4 **(a)** Discuss the principles and application of soil bitumen & Enlist the factors affecting the properties of mix and also explain how soil bitumen mix is designed. **06**

(b) Explain with sketches how the sub surface drainage system is provided to lower the water table and control seepage flow. **06**

Q.5 **(a)** What is blending? Explain the method of blending? State its advantages. **06**

(b) Explain WBM road with its advantages and limitations and also write down the construction steps for WBM road. **06**

OR

Q.5 **(a)** What is the importance of fine in bituminous mix? Which material is normally used as fine in bituminous mix? **06**

(b) Write note on the construction of roads on water logged area. **06**

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