Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**M.E Sem-I Remedial Examination April 2010**

## Sub code: 711304

## Subject: Basics of Transportation Engineering

**Date: 10 / 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 do you understand by Transportation Engineering? Discuss about various modes of Transportation with its suitability. **06**

**(b)** Enumerate IRC Recommendation for flexible pavement design by CBR method. Discuss the limitations of CBR method. **06**

**Q.2** **(a)** What are the objects and scope of Traffic Engineering? Discuss the significance of Road user characteristics in Traffic Engineering. **06**

**(b)** Explain the stages involved in Transport Planning Process with flow chart. **06**

**OR**

**(b)** The total trips volume from zone 1 to 2 is 2500. Find the volume on each route connecting the two zones using following data. Use TRC Trip assignment model. **06**

| Route No. | Length (Kms.) | Speed (Km/Hr.) |
|---|---|---|
| 1 | 2.0 | 30 |
| 2 | 1.5 | 25 |
| 3 | 1.0 | 20 |
| 4 | 2.5 | 15 |

**Q.3** **(a)** Explain Flexible and Rigid Pavement and bring out their points of differences. **06**

**(b)** Enlist materials used for highway construction. Briefly write about desirable properties of road aggregates and bitumen with its tests to identify these properties. **06**

**OR**

**Q.3** **(a)** Explain in details the principle and uses of Benkelman beam test. **06**

**(b)** Discuss about causes of flexible pavement failure with its remedial measures. **06**

**Q.4** **(a)** What are the different causes of traffic accidents? Explain various measures to prevent accidents. **06**

**(b)** What is significance of Dowel bar and Tie bar in C. C. Pavement? Explain its design. **06**

**OR**

**Q.4** **(a)** Write a short note on following: 1). Para transit system & 2) PCU **06**

**(b)** Design Spacing of Contraction and Expansion joints and Pavement Slab Thickness of a plain cement concrete pavement for two lane highway by IRC recommendation & Westergaard's Stress questions, using given data and assume any other data not provided here. **06**

Width of expansion joint gap = 2.5 cm.
Max. variation in temperature in summer and winter = 35° C
Allowable tensile stress = 0.8 kg/cm$^2$ & Flexural Strength = 40 Kg/cm$^2$
Thermal coefficient of concrete = $10 \times 10^{-6}$ per ° C
Coefficient of friction = 1.5 & K = 8 Kg/cm$^2$
Unit weight of C. C. = 2400 kg/cm$^3$
Design wheel load = 5100 kg, E = $3 \times 10^5$ Kg/cm$^2$
Radius of Contact area = 15 cm & $\mu$ = 0.15
Present traffic intensity = 950 commercial vehicles/day
Temperature differential value for 15 cm, 20 cm and 25 cm slab thickness, are 14.6, 15.8 and 16.3 respectively.
Take, Cx =0.90 and Cy = 0.75

**Q.5** **(a)** Enumerate various types of Traffic Intersections and explain Traffic Rotary with its advantages and limitations. **06**

**(b)** Explain the traffic signs and classify them into proper groups according to Traffic practice. **06**

**OR**

**Q.5** **(a)** Explain Planning and Design of terminal area facilities in Airport development. **06**

**(b)** Write a note on Highway Financing and Explain economics of Transportation Projects. **06**

**********