Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. IST Semester–Remedial Examination – July- 2011

Subject code: 711308N

Subject Name: Highway Geometric Design

Date:12/07/2011 **Time: 10:30 am – 01:00 pm**

Total Marks: 70

Instructions:

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

Q.1	**(a)**	Explain the importance of total reaction time. Describe PIEV theory.	**07**
	(b)	Explain various vehicular characteristics.	**07**
Q.2	**(a)**	Describe the classification system of urban highways in India.	**07**
	(b)	What is the difference between slip and skid? Explain various factors affecting friction between pavement surface and tyre.	**07**
		OR	
	(b)	What is the importance of super elevation on horizontal curve? Derive an expression for calculating super elevation.	**07**
Q.3	**(a)**	What is camber? Discuss the object, types and factor affecting the camber.	**07**
	(b)	Calculate the SSD on a highway at a descending gradient of 3%for a design speed of 80 KMPH. Coefficient of friction is 0.35.	**07**
		OR	
Q.3	**(a)**	Explain with sketch, the methods of eliminating camber and introduction of superelevation.	**07**
	(b)	Explain compensation in gradient on horizontal curves.	**07**
Q.4	**(a)**	Derive an expression for finding out overtaking sight distance on a highway.	**07**
	(b)	Explain the merits of transition curve in the highway. Enlist the methods of setting out transition curve in the field.	**07**
		OR	
Q.4	**(a)**	Explain the following term (i) Ruling Gradient (ii) Limiting gradient (iii.) Exceptional gradient (iv) Minimum gradient	**07**
	(b)	The speeds of overtaking and overtaken vehicle are 80 and 60 kmph respectively. If the acceleration of the overtaking vehicle is 2.5 kmph per second, Calculate the safe passing distance for two way traffic.	**07**
Q.5	**(a)**	Discuss the factors to be considered in the design of sight distance at intersection.	**07**
	(b)	Calculate the length of transition curve and the shift. The design speed and radius of circular curve is 65 kmph and 220 m respectively. Pavement width including extra widening is 7.5 m. Allowable rate of introduction of superelevation is 1:150 (Note: pavement rotated about centre line)	**07**
		OR	
Q.5	**(a)**	Describe channelization.	**07**
	(b)	Explain the factor to be considered in geometric design of the fly over in the urban region.	**07**

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