

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-V Examination-Nov/Dec.-2011

Subject code: 150601**Date: 22/11/2011****Subject Name: Highway Engineering****Time: 2.30 pm -5.00 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) Briefly discuss about road development in India and role of different road authorities in India. **05**
- (b) Describe various factors controlling the highway alignment. **04**
- (c) Draw a typical cross section of NH in embankment. Show its all components and boundaries stating the significance. **05**
- Q.2** (a) Explain the PIEV theory and derive the expression for SSD at gradient $n\%$. What is ISD? **07**
- (b) Find the SSD for a design speed of 80 kmph. Assume suitable data. What are SSD requirements at a gradient of 1 in 30 for the same design speed? **07**
- OR**
- (b) Design following geometric elements on horizontal curve of two lane leveled highway for the design speed of 80kmph and radius of 250m. (i) Super elevation, (ii) Extra widening and (iii) Set-back distance. **07**
- Q.3** (a) What are the desirable properties of sub-grade soil? Explain with sketch CBR test for soil. **07**
- (b) Distinguish between Bitumen and Tar. Explain with sketch Penetration test for bitumen. **07**
- OR**
- Q.3** (a) What are the desirable physical and engineering properties of aggregates and their respective tests? Explain with sketch Impact test for the aggregates. **07**
- (b) Briefly discuss about any two: (i) Soil-cement stabilization, (ii) ESWL, (iii) Radius of relative stiffness, (iv) Maintenance of bituminous surfaces. **07**
- Q.4** (a) What is the importance of highway drainage? Explain with sketches surface drainage systems for rural highways and urban roads. **07**
- (b) Briefly explain: (i) The objects of road side development and arboriculture. (ii) Design factors of highway lighting. **07**
- OR**
- Q.4** (a) Explain with sketches various measures required for alignment and drainage of hill roads. **07**
- (b) Discuss about financing of road projects. Give a brief note on PPP models. **07**
- Q.5** (a) Discuss briefly different road user's characteristics affecting traffic performance. **04**
- (b) Enlist different vehicular characteristics affecting the traffic performance. **03**
- (c) Enlist different methods of spot speed study and explain with sketch any one method. What are the applications of spot speed study? **07**
- OR**
- Q.5** (a) Discuss briefly different causes of accidents. Explain preventive measures for accidents. **04**
- (b) Classify the traffic signs and briefly explain any two signs with sketch. **04**
- (c) What are the advantages and disadvantages of traffic signals? Briefly explain various types of traffic signals. **06**
