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## GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V • EXAMINATION - SUMMER • 2014

Subject Code: 150601 Date: 11-06-2014 **Subject Name: Highway Engineering** 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. 0.1 Explain the following (i) Central Road Fund (ii) Indian Road Congress. 07 (a) The following data were collected for planning the road development programme **(b)** 07 of a district. (i) Total area =  $9600 \text{ km}^2$ . (ii) Agricultural and developed area = 3200 km<sup>2</sup> (iii) Existing railway track length = 105 km. (iv) Existing length of metalled road = 322 km (v) Existing length of unmetalled road = 450 km. (vi) Numbers of towns of villages in different population ranges are as below. 2001 - 5000 1001 -2000 **Population** > 5000 501 - 1000 < 500 Number of villages and 8 40 130 280 590 towns Calculate the additional lengths of metalled and unmetalled roads for the road system based on Nagpur Road Plan formulae for this district. **Q.2** (a) Explain with sketches the various factors controlling the alignment of roads. 07 Write short note on (i) Carriage way (ii) Width of roadway. **(b)** 07 OR Draw a typical cross section of the following roads (i) M.D.R in embankment (ii) 07 **(b)** National Highway in embankment in rural area. The speed of Overtaking and overtaken vehicles are 70 and 40 kmph respectively **07** 0.3 (a) on a two way traffic road. If the acceleration of overtaking vehicle is 0.99 m/sec<sup>2</sup>. Calculate safe overtaking sight distance. Adopt t = 2.0 sec. Discuss various factors affecting on subgrade soil strength. **07 (b)** Q.3 Compare tar and bitumen. Explain softening point test on bitumen. 07 (a) Explain Joint Filler and Sealer with sketches. **(b)** 07 **Q.4** (a) What are the methods of subsurface drainage? Explain subsurface drainage system 07 with transverse drain with neat sketch. Discuss various types of curves in alignment of hill roads. 07 **(b) Q.4** (a) What are design factors for highway lighting? Discuss any two. 07 Explain protective works for hill roads. **(b)** 07 What are different vehicular characteristics which affect in road design? Briefly 07 0.5(a)

Draw neat Sketches of various types of interchanges.

**(b)** 

## OR

- (a) Define: Traffic volume, Traffic density, Time-mean speed, Space-mean speed, Q.5 **07** Journey speed, Running Speed, Spot speed.
  - **(b)** What are the purposes of parking studies? Explain method of on street parking. 07

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