

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.

- Q.1** (a) Explain the following (i) Central Road Fund (ii) Indian Road Congress. **07**
 (b) The following data were collected for planning the road development programme of a district. **07**
- (i) Total area = 9600 km².
 - (ii) Agricultural and developed area = 3200 km²
 - (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.

Population	> 5000	2001 - 5000	1001 - 2000	501 - 1000	< 500
Number of villages and towns	8	40	130	280	590

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**
 (b) Write short note on (i) Carriage way (ii) Width of roadway. **07**
- OR**
- (b) Draw a typical cross section of the following roads (i) M.D.R in embankment (ii) National Highway in embankment in rural area. **07**
- Q.3** (a) The speed of Overtaking and overtaken vehicles are 70 and 40 kmph respectively on a two way traffic road. If the acceleration of overtaking vehicle is 0.99 m/sec². Calculate safe overtaking sight distance. Adopt t = 2.0 sec. **07**
 (b) Discuss various factors affecting on subgrade soil strength. **07**
- OR**
- Q.3** (a) Compare tar and bitumen. Explain softening point test on bitumen. **07**
 (b) Explain Joint Filler and Sealer with sketches. **07**
- Q.4** (a) What are the methods of subsurface drainage? Explain subsurface drainage system with transverse drain with neat sketch. **07**
 (b) Discuss various types of curves in alignment of hill roads. **07**
- OR**
- Q.4** (a) What are design factors for highway lighting? Discuss any two. **07**
 (b) Explain protective works for hill roads. **07**
- Q.5** (a) What are different vehicular characteristics which affect in road design? Briefly explain. **07**
 (b) Draw neat Sketches of various types of interchanges. **07**

OR

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

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