

**GUJARAT TECHNOLOGICAL UNIVERSITY****B.E. Sem-V<sup>th</sup> Examination December 2010****Subject code: 150601****Subject Name: Highway Engineering****Date: 13 /12 /2010****Time: 03.00 pm - 05.30 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 summaries the characteristics of road transport. **06**  
 (b) Give detailed classifications of roads. Briefly outline the classification suggested in the Nagpur Road Plan. **05**  
 (c) What are the significant recommendations of Jayakar committee report? **03**  
 Mention how this helped in road development in India
- Q.2** (a) Discuss briefly various requirements of an ideal highway alignment. What are obligatory points? Discuss how these control the alignment **07**  
 (b) What are the objects of Highway geometric design? List the various geometric elements to be considered in highway design. **07**
- OR**
- (b) Explain PIEV theory. The speeds of overtaking and overtaken vehicles are 90 and 70 kmph respectively. If the acceleration of the overtaking vehicle is 2.5 kmph per second. Calculate the safe passing sight distance for  
 i) One way traffic.    ii) Two way traffic.
- Q.3** (a) Discuss briefly the different causes of traffic accidents. Also explain the collision diagram and condition diagram. **07**  
 (b) Write short note on **07**  
 i) Road user characteristics    ii) Vehicular characteristics, which affect the road design
- OR**
- Q.3** (a) Explain the term Traffic Volume. Enumerate the different methods of carrying out traffic volume studies. What are the uses of same? **07**  
 (b) Explain Spot speed, Running speed and Journey speed. How is the spot speed studies carried out? **07**
- Q.4** (a) Explain in detail the PPP model of highway financing in India **07**  
 (b) Write short note on    i) Surface drainage    ii) Sub-surface drainage **07**
- OR**
- Q.4** (a) What are the essential requirements of a good highway drainage system? **07**  
 (b) Write short note on    a) Road arboriculture    b) Street lighting **07**
- Q.5** (a) i) Explain the significance of subgrade soil? Which are the desirable properties of soil as a highway material? **07**  
 ii) Enumerate the advantages and disadvantages of WBM road.  
 (b) Explain the desirable properties of aggregate to be used in the different types of pavement construction. Briefly explain the crushing value test with the recommended IRC values for the different layers and type of roads. **07**
- OR**
- Q.5** (a) Discuss the desirable properties of bitumen. Explain the penetration test and its use. Also compare Tar and Bitumen **07**  
 (b) Discuss the factors affecting the design of pavement. **07**

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