

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER- V EXAMINATION-SUMMER 2023

Subject Code: 2150601

Date: 30/06/2023

Subject Name: Highway Engineering

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Describe road user characteristics in detail. **03**
(b) Derive an expression for calculating overtaking sight distance on a highway. **04**
(c) Explain briefly modified classification of road system in India as per Lakhnow plan. **07**
- Q.2** (a) Define Spot speed. What are the objectives of spot speed studies? **03**
(b) Define camber? What are the objects of camber? Sketch different types of camber. **04**
(c) Enlist different tests for bitumen and explain softening point test in brief. **07**
- OR**
- (c) Enlist different tests for aggregates and describe impact test in brief. **07**
- Q.3** (a) Write a short note on soil classification based on grain size. **03**
(b) Explain road safety audit. **04**
(c) Describe road marking in brief with neat sketches. **07**
- OR**
- Q.3** (a) Explain various factors to be considered in pavement design. **03**
(b) Enlist causes of road accidents? Describe preventive measures of accidents. **04**
(c) write a short note on grade separated intersection. **07**
- Q.4** (a) What is gradient? Explain various types of gradients in brief. **03**
(b) In a district where rainfall is light, state highway of bituminous concrete pavement 7.0 m wide and a major district road of thin bituminous surface 3.75 m wide are to be constructed. Calculate the height of crown with respect to edges in both the cases. **04**
(c) Enlist the component parts of road pavement with neat sketch. Explain each component of road pavement in detail. **07**
- OR**
- Q.4** (a) Write a short note on road arboriculture and street lighting. **03**
(b) Explain obligatory points with sketches. **04**
(c) The radius of horizontal circular curve is 105 m. The design speed is 60 kmph and design coefficient of lateral friction is 0.15. Calculate the following: **07**
(i) Super elevation required if full lateral friction is assumed to develop.
(ii) Coefficient of friction needed if no super elevation is provided.
(iii) Equilibrium super elevation if the pressure on inner and outer wheels should be equal.
- Q.5** (a) Explain the necessity of soil investigations in brief. **03**
(b) Explain types of road patterns with neat sketches. **04**
(c) Compare flexible and rigid pavement. **07**
- OR**
- Q.5** (a) Explain methods of off street parking. **03**
(b) What are the significant recommendations of Jaykar committee report? **04**
(c) Describe maintenance problems in hill roads. **07**
