

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2023****Subject Code:2150601****Date:15-12-2023****Subject Name: Highway Engineering****Time:10:30 AM TO 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.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
<b>Q.1</b>	(a) Critically discuss the significance of highways for country like India.	<b>03</b>
	(b) Define these terms – 01. Rural area. 02. Urban area. 03. Camber 04. Super elevation.	<b>04</b>
	(c) What is sight distance? State various types of the same. With the help of neat diagram, explain the sight distance at an intersection where two roads intersect each other at right angle.	<b>07</b>
<b>Q.2</b>	(a) Explain the significance of friction in highway pavement design and state the factors affecting the same in brief.	<b>03</b>
	(b) Explain these terms in one sentence each – 01. Design Speed. 02. Expressway. 03. Unevenness Index. 04. Kerb.	<b>04</b>
	(c) Draw neat diagram of - 01. Straight line camber. 02. Parabolic camber. Mention dimensions in both the diagrams.	<b>07</b>
<b>OR</b>		
	(c) Explain the super elevation with neat diagram. Calculate the super elevation required for 07 m wide road, with radius of 300 m., permissible speed of 100 km/h. Let the co efficient of friction be 0.15.	<b>07</b>
<b>Q.3</b>	(a) Briefly state the requirement of an ideal pavement.	<b>03</b>
	(b) Briefly state the desirable properties of soil as highway materiel and explain any two in detail.	<b>04</b>
	(c) With help of neat diagram, explain the California Bearing Ratio Test for soil.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) Explain the significance of bitumen as highway construction material.	<b>03</b>
	(b) Explain the difference between the hardness and the toughness of aggregates for highway construction.	<b>04</b>
	(c) With help of neat diagram, explain the Plate Bearing Test for soil.	<b>07</b>
<b>Q.4</b>	(a) State and explain the constituents of bituminous mix.	<b>03</b>
	(b) What are the various types of bituminous mix?	<b>04</b>
	(c) Explain road arboriculture in detail.	<b>07</b>
<b>OR</b>		
<b>Q.4</b>	(a) In brief explain cement concrete in context to highway construction.	<b>03</b>
	(b) Explain temperature stresses in cement concrete pavement.	<b>04</b>
	(c) What is a collision? Explain some measures to reduce the collisions on highways.	<b>07</b>

- Q.5** (a) Explain the significance of parking. **03**  
(b) Explain the relation between the fundamental parameters of traffic flow. Use neat diagram. **04**  
(c) Write short note – Traffic signals. ( With neat diagram.) **07**
- OR**
- Q.5** (a) Give full forms of – 01. IRC 02. NHAI 03. RCC **03**  
(b) Explain the advantages and disadvantages of traffic rotary. Use neat diagram. **04**  
(c) Explain highway drainage with neat diagram. **07**

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