

**Birla Institute of Technology & Science, Pilani- Pilani Campus**

**First Semester 2022-2023**

**Mid Semester Exam**

Course No: CE G567

Nature of Exam: Closed Book

Duration: 90 Min

Course Title: Highway Design

Max. Marks: 50 (Weightage: 30%)

Date of Exam: 31/10/2022

**Note:**

1. All questions are compulsory.
2. Figures to the right indicate full marks

Q.1	Explain the effect of speed of vehicle on highway geometric design. [10]
Q.2	Explain the necessity of traffic volume studies. [16]
Q.3	Explain the tire properties affecting the friction. [05]
Q.4	Explain the rules of maneuvering at intersection with all-way stop control. [06]
Q.5	The speed of overtaking and overtaken vehicles are 75 and 40 kmph respectively. (a) Calculate safe overtaking sight distance for two-way traffic road by using the equations recommended by AASHTO. [13]

Component of passing maneuver	Metric				US Customary			
	Speed range (km/h)				Speed range (mph)			
	50-65	66-80	81-95	96-110	30-40	40-50	50-60	60-70
	Average passing speed (km/h)				Average passing speed (mph)			
<b>Initial maneuver:</b>								
a = average acceleration <sup>a</sup>	2.25	2.3	2.37	2.41	1.4	1.43	1.47	1.5
t <sub>1</sub> = time (sec) <sup>a</sup>	3.6	4.0	4.3	4.5	3.6	4	4.3	4.5
d <sub>1</sub> = distance traveled	45	66	89	113	145	216	289	366
<b>Occupation of left lane:</b>								
t <sub>2</sub> = time (sec) <sup>a</sup>	9.3	10.0	10.7	11.3	9.3	10	10.7	11.3
d <sub>2</sub> = distance traveled	145	195	251	314	477	643	827	1030
<b>Clearance length:</b>								
d <sub>3</sub> = distance traveled	30	55	75	90	100	180	250	300
<b>Opposing vehicle:</b>								
d <sub>4</sub> = distance traveled	97	130	168	209	318	429	552	687
<b>Total distance, d<sub>1</sub>+d<sub>2</sub>+d<sub>3</sub>+d<sub>4</sub></b>	<b>317</b>	<b>446</b>	<b>583</b>	<b>726</b>	<b>1040</b>	<b>1468</b>	<b>1918</b>	<b>2383</b>

Note: In the metric portion of the table, speed values are in km/h, acceleration rates in km/h/s, and distances are in meters. In the U.S. customary portion of the table, speed values are in mph, acceleration rates in mph/sec, and distances are in feet.