Total number of printed pages: **Civil Engineering (D)/V/DCE505**

2024

TRANSPORTATION ENGINEERING

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1.	a)	Explain the role of transportation in the overall development of any country.	5
	b)	What is transition curve? What are the purposes of providing it?	5
	c)	Explain different methods to conduct speed and delay studies.	10
2.	a)	Give the recommended values of camber for different types of road surfaces.	5
	b)	A four lane NH is designed for a speed of 80 kmph. If there is horizontal curve of radius 200 m, compute the extra widening required.	5
	c)	Draw the cross section of the railway track and explain the functions of its various components.	10
3.	a)	Why too large camber is not recommended?	5
	b)	Derive an expression for SSD.	5
	c)	Explain different methods to conduct origin and destination studies.	10
4.	a)	An ascending gradient of 1 in 100 meets a descending gradient of 1 in 120, design the length of summit curve for an overtaking sight distance of 470m.	5
	b)	The design speed of a highway on a horizontal curve of radius 200 m is 80 kmph. Design the rate of superelevation.	5
	c)	On a single lane two way road, two vehicles are travelling in the same direction with a speed of 80 kmph and 50 kmph respectively. The acceleration of vehicle with higher speed during overtaking operation is 0.9 m/s2. Determine OSD. What is the minimum and desirable length of overtaking zone? Draw the sketch of overtaking zone and show the position of sign post.	10
5.	a)	Draw the cross section of road and show the various components.	5

<table>
<tr><td></td><td>b)</td><td>A valley curve is formed by a descending gradient of 1 in 25 meeting an ascending gradient of 1 in 30. Design the length of valley curve for speed of 80 kmph.</td><td>5</td></tr>
<tr><td></td><td>c)</td><td>What are the different causes for road accidents?</td><td>10</td></tr>
<tr><td>6.</td><td>a)</td><td>The following data were obtained from the spot speed studies carried out on a city road during a certain period of time. Suggest (a) Speed limit for regulation (b) Speed to check geometric design elements. (c) Lower speed causing congestion
<table>
<tr><th>Speed kmph</th><th>No. of vehicles</th><th>Speed kmph</th><th>No. of vehicles</th></tr>
<tr><td><5</td><td>45</td><td>30-35</td><td>430</td></tr>
<tr><td>5-10</td><td>230</td><td>35-40</td><td>290</td></tr>
<tr><td>10-15</td><td>375</td><td>40-50</td><td>110</td></tr>
<tr><td>15-20</td><td>500</td><td>50-60</td><td>25</td></tr>
<tr><td>20-25</td><td>680</td><td>60-70</td><td>8</td></tr>
<tr><td>25-30</td><td>525</td><td>>70</td><td>2</td></tr>
</table></td><td>10</td></tr>
<tr><td></td><td>b)</td><td>The design speed for a national highway is 80 kmph. Design SSD, Radius of horizontal curve, Superelevation, Extra widening of pavement on horizontal curve, Length of transition curve. Assume suitable data wherever required.</td><td>10</td></tr>
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