

CBCS SCHEME

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BCV403

Fourth Semester B.E./B.Tech. Degree Examination, June/July 2026 Transportation Engineering

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1				M	L	C
Q.1	a.	What are the various methods of classifying roads? Briefly outline the classification based on location and function as suggested in the Nagpur road plan.	10	L1	CO1	
	b.	Explain briefly the various factors affecting highway alignment.	10	L1	CO1	
OR						
Q.2	a.	Explain the various factors affecting the geometric design of highways.	10	L1	CO1	
	b.	Calculate the safe stopping sight distance for design speed of 50 kmph for i) Two way traffic on two lane road ii) Two way traffic on a single lane road. Assume $f = 0.37$.	10	L3	CO1	
Module – 2						
Q.3	a.	List the desirable properties of road aggregates and explain any one test in detail. Specify desirable values of test result as per MORTH specification.	10	L2	CO2	
	b.	With the sketch, explain the functions of component parts of flexible pavement.	10	L3	CO2	
OR						
Q.4	a.	With the sketch, explain the different types of joints in rigid pavement.	10	L3	CO2	
	b.	The maximum quantity of water expected to flow in one of the open longitudinal drains on clayey soil is $0.9 \text{ m}^3/\text{sec}$. Design the cross section and longitudinal slope of trapezoidal drain assuming the bottom width of the trapezoidal section to be 1.0 m and cross slope to be 1.0 vertical to 1.5 horizontal. The allowable velocity of flow in the drain is 1.2 m/sec and Manning's roughness coefficient is 0.02.	10	L3	CO2	
Module – 3						
Q.5	a.	List the various traffic engineering studies to be carried out for collecting traffic data and explain any one study in detail.	10	L1	CO3	

	b.	Spot speed studies were carried out at a certain stretch of a highway with mixed traffic flow and the consolidated data collected are given below. <table><tr><td>Speed range kmph</td><td>No. of vehicles observed</td><td>Speed range kmph</td><td>No. of vehicles observed</td></tr><tr><td>0 to 10</td><td>12</td><td>50 to 60</td><td>255</td></tr><tr><td>10 to 20</td><td>18</td><td>60 to 70</td><td>119</td></tr><tr><td>20 to 30</td><td>68</td><td>70 to 80</td><td>43</td></tr><tr><td>30 to 40</td><td>89</td><td>80 to 90</td><td>33</td></tr><tr><td>40 to 50</td><td>204</td><td>90 to 100</td><td>9</td></tr></table> Determine: i) Upper and lower speed limits for regulations ii) Design speed for checking the geometric design elements of the highway.	Speed range kmph	No. of vehicles observed	Speed range kmph	No. of vehicles observed	0 to 10	12	50 to 60	255	10 to 20	18	60 to 70	119	20 to 30	68	70 to 80	43	30 to 40	89	80 to 90	33	40 to 50	204	90 to 100	9	10	L3	CO3
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Q.6	a.	Briefly explain the different traffic characteristics.	10	L2	CO3																								
	b.	Explain the following: Total reaction time of a driver with PIEV theory.	10	L2	CO3																								
Module – 4																													
Q.7	a.	What do you understand by a permanent way? Mention the requirements of an ideal permanent way.	10	L2	CO4																								
	b.	What are the functions and requirements of rails?	10	L1	CO4																								
OR																													
Q.8	a.	What are the functions and requirements of sleepers?	10	L1	CO4																								
	b.	Calculate the quantity of materials required/km length of the railway track assuming sleeper density of (n+4).	10	L3	CO4																								
Module – 5																													
Q.9	a.	What are the various factors considered in the selection of suitable site for airport?	10	L2	CO5																								
	b.	An airport is planned at an elevation of 380 m above MSL. The monthly mean of maximum and average daily temperatures for the hottest month at the site are 40°C and 28°C respectively. The effective gradient is 0.18 percent. Determine the length of runway required at the proposed site if the basic runway length is 1900 m.	10	L3	CO5																								
OR																													
Q.10	a.	List and explain aircraft characteristics which affects planning and design of airports.	10	L2	CO5																								
	b.	What is wind Rose Diagram? Explain any one method of orientation of runway with wind rose diagram.	10	L3	CO5																								
