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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VI**

Branch: Civil Engineering **Duration: 3 hrs.**

Course Code: 20CV6PCTRE **Max Marks: 100**

Course: Transportation Engineering II

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	***CO***	***PO***	**Marks**
1	a)		Enumerate the advantages of railways in comparison to other modes of transport.	*CO1*	*PO 1*	**6**
	b)		Describe the major components of a double-track railway system constructed on a cutting. Explain the role of each component.	*CO1*	*PO1*	**7**
	c)		Evaluate the merits and demerits of using Double-Headed rails versus Flat-Footed rails in railway construction.	*CO1*	*PO1*	**7**
			OR			
2	a)		Describe the fundamental requirements of a well-designed permanent way. Support your answer with a clear diagram.	*CO1*	*PO1*	**8**
	b)		A station yard needs to be upgraded from an existing single-line track on a curved alignment. The specifications are: length = 2.350 km, BG track, 52 kg rail, sleeper density = 1 in 1.65 meters. Estimate the total quantity of materials required for the full upgrade of the yard.	*CO1*	*PO1*	**12**
			UNIT - II			
3	a)		List the tractive resistances with standard notations and define all the parameters.	*CO1*	*PO1*	**8**
	b)		Calculate the maximum train load that a locomotive with five pairs of driving wheels (each bearing an axle load of 22 tonnes) can pull. Assume a BG track with a train speed of 70 kmph on a flat terrain. Also, determine the permissible speed if the gradient is 1 in 150.	*CO2*	*PO1, 2,3*	**12**
			OR			
4	a)		Discuss the key parameters to be considered in the geometric alignment of a new railway track.	*CO1*	*PO1*	**6**

		b)	Using a neat diagram, explain the concept of coning of wheels. Why is rail tilting important in modern railway systems?	*CO2*	*PO1, 2*	**7**
		c)	List the main features of high-quality railway sleepers. Compare RCC sleepers with wooden sleepers, highlighting advantages and disadvantages.	*CO1*	*PO1*	**7**
			UNIT - III			
	5	a)	Discuss the primary considerations in selecting an ideal alignment for a new railway line in hilly terrain.	*CO1*	*PO1*	**10**
		b)	Calculate the equilibrium cant on a MG curved track of 5° for an average speed of 45 kmph. Also, determine the maximum permissible speed with a cant deficiency of 7.5 cm.	*CO2*	*PO1, 2*	**10**
			OR			
	6	a)	Define equilibrium cant. Explain their significance in track design.	*CO1*	*PO1*	**8**
		b)	Calculate the maximum permissible speed on a curve of a high-speed BG track using the following data: Degree of curve = 3°; Super elevation = 10 cm; Length of transition curve = 150 m; Maximum speed of the section = 160 kmph	*CO2*	*PO1, 2,3*	**12**
			UNIT - IV			
	7	a)	Describe how crosswind and headwind components affect the orientation and design of runways.	*CO1*	*PO1*	**8**
		b)	An airport is planned at an elevation of 500 m above mean sea level. The mean of the maximum and minimum temperatures during the hottest month are 43°C and 29°C respectively. The elevation difference along the runway is 6.5 m. If the basic runway length is 1350 m, calculate the actual runway length required.	*CO2*	*PO1, 2*	**12**
			OR			
	8	a)	Elucidate the major considerations affecting the positioning of exit taxiways in modern airports?	*CO1*	*PO1*	**8**
		b)	Design an exit taxiway connecting a runway and a parallel taxiway, where the turn angle is 35°. The aircraft's maximum exit speed is 60 kmph. Provide a labeled sketch of the design with necessary geometric elements.	*CO2*	*PO1, 2*	**12**
			UNIT - V			
	9	a)	Classify tunnels stating their advantages and disadvantages.	*CO3*	*PO1*	**10**
		b)	Explain the natural phenomenon affecting the functioning of harbors.	*CO3*	*PO1*	**10**
			OR			
	10	a)	With a neat sketch, explain the components of harbor.	*CO3*	*PO1*	**10**
		b)	Elaborate on tunneling methods for soft soil conditions.	*CO3*	*PO1*	**10**

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