U.S.N.										

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: 23CV6PCTSE / 22CV6PCTSE **Max Marks: 100**

Course: Transportation Systems Engineering

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.

				CO	PO	Marks
			UNIT - I			
1	a)		Define following: i) Ballast Crib ii) Buffer Stop iii) Double Headed rails	CO 1	PO1	**06**
	b)		Discuss the phenomena of Coning of wheels with a neat sketch.	CO 1	PO1	**06**
	c)		List different types of metal sleepers used in Indian Railways along with merits and demerits of each type.	CO 1	PO1	**08**
			OR			
2	a)		Define following: i) Level crossing ii) Adzing iii) Marshall Yard	CO 1	PO1	**06**
	b)		Discuss the theory of conning with a neat sketch.	CO 1	PO1	**06**
	c)		List different types of concrete sleepers used in Indian Railways along with merits and demerits of each type.	CO 1	PO1	**08**
			UNIT - II			
3	a)		Mention the formaulae to find speed in high-speed rail.	CO 1	PO1	**04**
	b)		Discuss in brief the various tractive resistances on rails.	CO 2	PO1	**06**
	c)		Calculate the maximum permissible train load that can be pulled by a locomotive having four pairs of driving wheels carrying an axle load of 24 tonnes each. The train has to run at a speed of 80 kmph on a straight level track (B.G) Also calculate the reduction in speed, if the train has to climb a gradient of 1 in 200. If the train climbs the gradient with a 2^{o} curve, then what would be reduction in speed?	CO 2	PO1, 2	**10**
			OR			
4	a)		Discuss Hauling Capacity and Tractive Effort in rails.	CO 1	PO1	**04**

		b)	Discuss various expressions involved in total train resistances.	*CO* 2	*PO1*	**06**
		c)	Find out the steepest gradient on a straight track using the following data, for a train having 20 wagons. i) Weight of each wagon = 18 tonnes ii) Rolling resistance of wagon = 2.5kg/tonne iii) Speed of train = 50 kmph iv) Weight of locomotive with tender = 120 tonnes v) Tractive effort of locomotive = 12 tonnes vi) Rolling resistance of locomotive = 3.5 kg/tonne	*CO* 2	*PO1, 2*	**10**
			UNIT - III			
	5	a)	Discuss the necessity of geometric design of railway track. Enumerate the significant features of design of railway track.	*CO* 2	*PO1*	**06**
		b)	Discuss all types of gradients by giving their permissible values adopted in Indian Railways.	*CO* 2	*PO1*	**04**
		c)	A 5° curve diverges from a 3° curve in reverse direction in the layout of a B.G. yard. If the speed on the branch line is restricted to 35 kmph. Determine the restricted speed on the main line.	*CO* 2	*PO1*	**10**
			OR			
	6	a)	Define superelevation. Discuss how is it different from negative superelevation on curves of a railway track.	*CO* 2	*PO1*	**06**
		b)	Write short notes on: i)Cant deficiency ii) Weighted average speed	*CO* 2	*PO1*	**04**
		c)	Calculate the maximum permissible speed on a curve of high speed B.G. track having the following particulars: i) Degree of the curve = 1° ii) Amount of superelevation = 8.0 cms iii) Length of transition curve = 130 meters iv) Maximum speed of the section likely to be sanctioned = 153 kmph.	*CO* 2	*PO1*	**10**
			UNIT - IV			
	7	a)	Draw the layout of an airport with neat a sketch and mention the component parts and the functions of each.	*CO* 1	*PO1*	**06**
		b)	Draw a neat sketch of wind rose diagram for the determination of orientation of runway.	*CO* 1	*PO1,8*	**04**
		c)	Design an exit taxiway joining a runway and a parallel main taxiway the total angle of turn is 40 degrees and the turn off speed is 80 kmph. Draw a neat sketch and show therein all the design elements.	*CO* 2	*PO1, 8*	**10**
			OR			
	8	a)	Discuss the criteria's for airport site selection.	*CO* 1	*PO1*	**06**
		b)	Discuss the factors affecting the layout of a taxiway.	*CO* 1	*PO1,8*	**04**
		c)	The runway length required for landing at a sea level in standard atmospheric conditions is 3000m. Runway length required for	*CO* 2	*PO1, 8*	**10**

			take-off at a level site at sea level in standard atmospheric conditions is 2500m. Aerodrome reference temperature is 24°C and that of the standard atmosphere at aerodrome elevation of 150 m is 14.025°C. if the effective runway gradient is 0.5 percent, determine the runway length to be provide.			
			UNIT - V			
	9	a)	Mention different types of tunnels and draw a neat sketch of four tunnels along with merits and demerits of each.	***CO*** 3	***PO1***	**06**
		b)	Discuss the construction methods and equipments used in tunneling.	***CO*** 3	***PO1***	**06**
		c)	Draw a neat sketch of Harbour layout with their components and define all the components of a Harbour.	***CO*** 3	***PO1***	**08**
			OR			
	10	a)	Enumerate the measures to be taken in tunnel safety and maintenance.	***CO*** 3	***PO1***	**06**
		b)	Differentiate between open cut tunnel and closed tunnels.	***CO*** 3	***PO1***	**06**
		c)	Discuss the requirements of harbor and classify the different types of harbor.	***CO*** 3	***PO1***	**08**

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