U.S.N.										

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

Autonomous Institute Affiliated to VTU

January / February 2025 Semester End Main Examinations

Programme: B.E. **Semester: VI**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 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.

		UNIT – I	CO	PO	Marks
1	a)	Discuss the role of railways in industrial and economic progress of a nation.	CO 3	PO1	06
	b)	Elaborate on the different types of rails. Highlight the advantages of flat-footed rails.	CO 1	PO1	10
	c)	Sketch a typical cross section of permanent way in cutting for a single line B.G track.	CO 1	PO1	04
		OR			
2	a)	Emphasize on the urban modern development in railways by means of Light Rail Transit System (LRTS) or Mass Rapid Transit System (MRTS).	CO 1	PO1	06
	b)	Explain the concept of coning of wheels and tilting of rails.	CO 1	PO1	06
	c)	Define creep in rails. Bring out effective means to reduce creep in rails.	CO 1	PO1	08
		UNIT – II			
3	a)	Discuss the different parameters to be considered for the upgradation of existing tracks to high-speed tracks.	CO 1	PO1	10
	b)	Determine the maximum permissible load that can be pulled by a locomotive on a straight and level track if hauling capacity of engine is 12060 kg and the train has to run a speed of 96.56 k.p.h. Calculate the reduction in speed, if the train has to ascend a slope of 1 in 200 with a 2^0 curve.	CO 3	PO2	10
		OR			
4	a)	Discuss the use of any three types of fittings and fastenings used in railways. Mention the requirement based on the gauges.	CO 1	PO1	10
	b)	Calculate the quantity of material required for laying 20 km of permanent way.	CO 3	PO1 PO2	10
		UNIT - III			
5	a)	Explain the necessity of geometric design of a railway track. Enumerate the significant features of design of a railway track.	CO 2	PO1	10

		b)	A 9 degree branch curve diverges out from a 8^0 main curve in the opposite direction in M.G. yard layout. If the speed restriction on main line is 25 k.p.h and permissible cant deficiency is 5.1 cm, determine the speed limit on branch line. Also, mention the permissible values of cant deficiency for different gauges in India.	***CO*** 2	***PO2***	**10**
			OR			
	6	a)	Calculate the maximum permissible speed on a curve of high speed M.G track having the following particulars: i. Degree of the curve = 3^0 ii. Amount of Superelevation = 8 cm iii. Length of the transition curve = 160 m iv. Maximum speed of the section likely to be sanctioned = 160 km.p.h.	***CO*** 2	***PO2***	**10**
		b)	Explain the necessity of gradients. Discuss all the types of gradients giving their permissible values adopted in Indian Railways.	***CO*** 2	***PO1***	**10**
			UNIT – IV			
	7	a)	Illustrate the layout of an airport. Highlight the components and key functions of each.	***CO*** 1	***PO1***	**10**
		b)	For a Class A airport, an exit taxiway joins a runway and a main parallel taxiway. The total angle of turn is 40 degrees and turn off speed is 65 kmph. The entrance curve radius for a speed of 65 kmph is 517 m and separation clearance are 198.70 m. Design all the components of the exit taxiway.	***CO*** 2	***PO3***	**10**
			OR			
	8	a)	Discuss the different ways of orienting a runway. Explain any one method of runway orientation in detail.	***CO*** 2	***PO1***	**10**
		c)	The length of a runway under standard conditions is 1800 m. The airport is to be provided at an elevation of 450 m above the mean sea level. The airport reference temperature is 32^0C. The construction plan provides the following data: **End to end of runway (m) — Grade (%)** 0 to 400 — + 1.25 400 to 800 — - 1.00 800 to 1200 — + 0.50 1200 to 1600 — +0.20 Determine the length of the runway after applying corrections for elevation and temperature as per ICAO and for gradient as per FAA specifications.	***CO*** 2	***PO2***	**10**

			UNIT – V			
	9	a)	Highlight the typical components of a harbour. Mention one significant characteristic of each component.	***CO*** 1	***PO1***	**10**
		b)	Explain the different natural phenomena and briefly discuss their effect of these phenomena on the harbor design.	***CO*** 3	***PO1***	**10**
			OR			
	10	a)	Use a flowchart to depict the classification of tunnels based on shape, function and usage.	***CO*** 3	***PO1***	**08**
		b)	Explain the concept of breakwater in harbours. Mention the different types of breakwaters.	***CO*** 1	***PO1***	**06**
		c)	Highlight the safety precautions to be followed during the tunnelling procedure.	***CO*** 3	***PO1***	**06**

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