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## **Question Paper Code: 53104**

## B.E./B.Tech. DEGREE EXAMINATION, MAY 2022

Civil Engineering

## 15UCE304 -HIGHWAY AND RAILWAY ENGINEERING

(Regulation 2015)

		(Regulation 2	2013)				
		(Use of IRC 37 is	permitted)				
Dura	ntion: Three hours	Answer ALL Q		imum: 100	Marks		
		PART A - (10 x 1 =	= 10 Marks)				
1.	ISD is – times SSD				CO1- R		
	(a) 1	(b) 2	(c) b3	(d) 4			
2.	1 0 1 1	place compels adopting gradient is used	ng steeper gradient than	ı	CO1- R		
	(a) Limiting	(b)Exceptional	(c)Minimum	(d)Zero			
3.	bars are used across the longitudinal joints of cement concrete pavements						
٦.	(a) Tie		(b) Dowel				
	(c) Stress reinforcemen	ıt	(d) Temperature reinforcement				
4.	The aggregate crushing surface should be	g value of good aggrega	te acceptable for wearing	÷	CO2- R		
	(a) less than 30%	(b) More than 30%	(c) More than 40%	(d) Zero			
5.	When the crack pattern on a bituminous surface course is almost of the same pattern and location as the cracks of lower pavement layer the cracks are known as crack						
	(a) Reflection	(b) Alligator	(c) Longitudinal	(d) Depre	ession		
6.	Diversion or removal of excess soil-water from the subgrade is termed as						
	(a) Surface drainage		(b)Sub surface drainage				
	(c) Special drainage		(d) Capillary cut off				

7.	Longitudinal movement of rail with respect to sleeper in track is known as					as CO4- R		
	(a) I	Kink	(b) Creep	(c) Coning	(d) Buck	ling		
8.		are used in	rail joints to maintain	the continuity of rails.		CO4- R		
	(a) I	Bearing plate	(b) Spikes	(c) Fish plate	(d) Bolt			
9.				e a mechanical relationship the corresponding signal		CO5- R		
	(a) S	Stretcher bar	(b) Tappet	(c) Detector	(d) Point	lock		
10.	Firs	t stop signal at a sta	ation is known as			CO5- R		
	(a) I	Home signal	(b) Outer signal	(c) . Departure signal	(d) Starte	er signal		
			PART - B (5 x	2= 10Marks)				
11.	Enu	CO1- R						
12.	2. Narrate any four the desirable properties of bitumen?							
13.	3. List out the various types of failures in flexible pavement.							
14.	4. Under what condition extra winding is adopted?							
15.	5. List out different types of yards					CO5- R		
			PART – C (5	x 16= 80Marks)				
16.	(a)	(i) Briefly outline commonly used.	the main features of	various road patterns	CO1- U	(8)		
		(ii) Explain the highway.	various factors cor	ntrolling the alignment of	CO1- U	(8)		
			Or					
	(b)	located in rolling radius of curve 2 rate of attainment	g terrain with design 250m. The pavement in that of super elevation	rve on a national highway a speed of 80 kmph curve is rotated about centre lane; on is 1 in 150. Width of as 7.5m. Assume any other	CO1- Ap	p (16)		

17. (a) Narrate the step by step procedure involved in bituminous mix CO2-App (16) design.

Or

(b) Design the flexible pavement for construction of new highway CO2-App (16) with the following data.

Number of commercial vehicles as per last count = 1500

Period of construction = 3 years

Annual traffic growth rate = 7.5%

Category of road = NH, two lane single carriageway

Design life = 10 years. Assume suitable data if required

18. (a) Describe the purpose and use of Benkelman Beam with neat CO3-U sketches. (16)

Or

- (b) Explain the construction procedure of concrete roads with neat CO3-U sketches. (16)
- 19. (a) Draw a typical cross section of permanent way and explain the CO4-U (16) functions of any two components of permanent way.

Or

- (b) Calculate the equilibrium cant on B.G. curved track of 7 degree CO4-App (16) for an average train speed of 50 kmph? Also calculate the maximum permissible speed after allowing the maximum cant deficiency of 7.6 cm.
- 20. (a) Design all the elements required for a turnout of .1 in 8.5 taking CO5- App (16) off from a straight B.G. track with its curve starting from the toe of switch. i.e. tangential to the gauge face of the outer main rail and passes through theoretical nose of crossing, ie TNC .Given heel divergence = 11.4 cm. Assume suitable data if required

Or

(b) Compare the different methods of plate laying during the CO5-App (16) construction of railway tracks.