A		Reg. No. :											
	Question Paper Code: 94105												
B.E. / B.Tech. DEGREE EXAMINATION, NOV 2023													
Fourth Semester													
	Civil Engineering												
19UCE405 - HIGHWAY ENGINEERING													
(Regulations 2019)													
Dura	ation: Three hours							Μ	axim	num:	100	Mark	S
Answer ALL Questions													
PART A - $(10 \text{ x } 1 = 10 \text{ Marks})$													
1.	Jayakar committee is formed for CO							CO1	- U				
	(a) Road development plan (b) recommendation for institutions such as IRC,CRRI												
	(c) Speed limits (d) Toll collection												
2.	The Width of the three lane road is									(	CO1-A	Арр	
	(a) 10.5m	m (b) 15 m (c) 11.5m						(d)9m					
3.	The ruling design speed on a NH as per IRC is CO2-A							Арр					
	(a) 80 Kmph	a) 80 Kmph (b) 100 Kmph (c) 120 Kmph					(d) 140 Kmph						
4.	The degree of the circular curve is 20 Degree. Estimate the radius of CO2-U the curve							2-U					
	(a) 86 m	(b) 96 m	(	<b>c</b> ) 10	6m				(d)	116	m		
5.	The role of Surface course in pavement is CO3-U							3 <b>-</b> U					
	(a) Wear and tear and protecting base course (b) Good look												
	(c) Good wearing surface (d) Prote						otecti	ng t	he vo	ehicl	es		
6.	Dowel bars are used in										CO	<b>3-</b> U	
	(a) Transverse joints (b) Longitudinal joints (c) both joints (d) construction joints								S				
7.	Camber provided in water bound macadam road is CO4						4 <b>-</b> U						
	(a) 1 in 33	(b) 1 in 40		(c)	1 in 2	25			(d)	1 in	13		

8.	Impa		CO4-U						
	(a) B	ase course	(b) Surface course	(c) sub base	(d) wearing	course			
9.	Most common failures in flexible pavement are								
	(a) D	iagonal cracks		(b) Potholes, gullys	ys				
	(c) si	nking of pavemen	t	(d) grouting effect					
10.	Benkelman beam is used to measure				CO5- R				
	(a) S <sup>-</sup>	tructural cracks	(b) Diagonal cracks PART – B (5 x 2=	(c) undulations = 10 Marks)	(d) pothe	oles			
11.	Differentiate between rural roads and urban roads in terms of carriage way spacing CO1- App								
12.	Construct the procedure for calculating the length of valley curve.								
13.	Name factors influencing the design of flexible pavements. CO3- App								
14.	What is the purpose of conducting softening point test on bitumen? CO4- Ap								
15.	Explain how the rescaling of cracks may be carried out in rigid pavements.								
	PART – C (5 x 16= 80 Marks)								
16.	(a)	Describe the con- surveys to be car	g CO1-	U (16)					
	(b)	Justify the new influencing the is of Madurai- Mela	fy the need for considering various factors which CC encing the ideal alignment of a highway, with a case study adurai- Melur Highway.						
17.	(a)	Calculate the C accident of two of 75kmph and assume that the efficient between	Overtaking sight dista cars approaching oppose 85kmph in Madurai reaction time of drive road surface and tyres Or	ince required to a site directions at a sp – Aruppukkottai r ers be 2.5 secs and be 0.14.	void CO2- peed oad. co-	U (16)			
	(b)	D) Express the objectives of widening of road pavements at CO2- horizontal curves? Derive an expression for the extra widening.							

18. (a) Design the pavement for construction of a new by-pass with the CO3-App (16) following data: Two lane carriage way, Initial traffic in the year of completion of construction = 1500 CVPD (sum of both directions), Traffic growth rate = 5% Design life = 15 years, Vehicle damage factor based on axle load survey = 2.5 standard axles per commercial vehicle. Design CBR of subgrade soil = 6%.

## Or

- (b) Write down the functions of providing dowel bars and tie bars in CO3-U (16)
  Cement concrete pavement joints. Highlight their roles and advantages
- 19. (a) Describe the step by step procedure in construction of CO4-U (16) bituminous concrete road

Or

- (b) Describe the step by step procedure in construction of water CO4-U (16) bound macadam road
- 20. (a) Describe any 5 types of failures commonly occur in flexible CO5-U (16) pavement with neat sketches also suggest suitable remedial measures

Or

(b) How cracks and potholes affect the performance of a bituminous CO5-U (16) road. Justify with suitable suggestions to over this issue