MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL (A constituent unit of MAHE, Manipal)

## MANIPAL INSTITUTE OF TECHNOLOGY IV SEMESTER B. TECH (CIVIL ENGINEERING) END SEMESTER EXAMINATION, 2024 TRANSPORTATION ENGINEERING (CIE 2222)

( / / 2024)

## TIME: 3 HRS.

MAX. MARKS: 50

## Note:

- 1. Answer all questions.
- 2. Any missing data may be suitably assumed.
- 3. Use of a formula book is permitted.

Q.	QUESTION	MARKS	CO	B
1A	Describe the materials used in each layer of rigid pavement and draw a neat sketch of rigid pavement.	2	4	2
1B	With a neat sketch, deduce the expression for Overtaking Sight Distance (OSD)	3	2	3
1C	Describe the floating car method of speed and delay study.	5	5	2
2A	Enumerate the basic requirements of an ideal railway alignment.	2	2	1
2B 2C	A descending gradient of 1 in 40 meets an ascending gradient of 1 in 30 to form a vertical curve. Design the vertical curve to fulfil both comfort conditions and provide headlight sight distance for night driving. Assume the design speed as 100 kmph. The runway length at mean sea level, standard temperature and zero gradients is 1600m. The airport site has an elevation of 320m, where	3	2	3
34	the mean of maximum and mean of average daily temperature of the hottest month are 44.8° C and 26.2° C, respectively. Calculate the corrected runway length if the runway is to be constructed with an effective gradient of 0.25 %.	3	3	2
JA 2D	Describe the importance of the Camorina Bearing Ratio (CBR).	<u> </u>	3	2
<u>3B</u>	Brieffy describe the construction of wet mix macadam.	4	3	4
<u> </u>	Describe bituminous concrete (BC).	3	2	1
<b>4</b> A	Describe the load distribution mechanism of rigid pavement.	2	4	2
<b>4B</b>	Describe the effect of contact pressure due to wheel load on pavement.	3	4	2

4C	It is proposed that a one-lane, single-carriageway flexible pavement to be widened to a two-lane flexible pavement. The initial traffic in the year of completion of construction in one direction is estimated to be 2000 CV/day. The design life and traffic growth rate respectively are 15 years and 6.0%. The effective CBR value is 6%. Calculate the thickness of each layer of flexible pavement. Also, draw a neat sketch of the obtained section. Assume lane distribution factor = $0.5$ and vehicle damage factor = $4.5$ .										o e e e h d	5	4	4	
	800 PLATE 4 (CBR 6%)														
	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$														
		2	5	1	10	20	30	50	100	150					
	Traffic in msa □GSB □G.BASE □DBM ■BC/SDBC(upto 5msa)														
5A	Enumerate the objectives of traffic volume studies												2	5	1
5B	Descri	ibe the	e relati	onshij	o betw	veen s	peed,	traffic	densi	ty and	traffi	c	3	5	1
	volum	ie.		-											
5C	Spot s	peed s	tudies	were	carried	l out a	t a spe	cific s	tretch	of a hi	ghway	γ,	5	5	4
	and th	e cons	olidate	ed data	are gi	ven be	elow.				1	ו ר			
	Spe														
	gro														
	up		10	20	30	40	50	60	70	80	90				
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	ph	10	20	30	40	50	60	70	80	90	100				
	No.														
	of														
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	s	12	18	68	89	204	255	119	43	33	9				
		14	10	00	07	201	200	11/	15	55		-   L			
	Calculate														
	<ul><li>i. The upper and lower values of speed limits for regulation of mixed traffic flow</li><li>ii. The design speed for checking the geometric design elements of the highway.</li></ul>										of				
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