Scheme of Valuation/Answer Key

(Scheme of evaluation (marks in brackets) and answers of problems/key)

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2019

Course Code: CE308

Course Name: TRANSPORTATION ENGINEERING - I

Max. Marks: 100		Duration: 3 Hours

PART A

		Answer any two full questions, each carries 15 marks.	Marks
1	a)	Classification as per Nagpur Road Plan	(4)
		Modification as per third Twenty Year Road Development Plan	(4)
	b)	Requirements of ideal alignment	(4)
		Special considerations in case of hill roads	(3)
2	a)	Listing the factors	(2)
		Explanation	(6)
	b)	Speed of overtaken vehicle, Vb=80-16=64 kmph t=2s	(1)
		$d_1=0.28V_bt$= 35.84m	(1)
		$s=0.2V_b+6$ = 18.8 m	(1)
		T= (14.4s/A)^0.5= 13.43 sec	(1)
		$d_2 = 0.28V_b*T+2s$ = 278.27m	(1)
		d_3 =0.28VT = 300.83 m	(1)
		OSD = $d_1+d_2+d_3$ = 614.94 m	(1)
3	a)	Steps for practical design of superelevation for mixed traffic	(4)
	b)	C=80/(75+V) = 0.5	(1)
		(i) Based on comfort condition, Ls =$0.0215V^3$/CR= 86 m	(1)
		(ii) e = 0.07	(0.5)
		We =0.07+0.47=0.54m, B = 7.54 m	(0.5)
		Based on rate of introduction of superelevation, Ls=NeB=79.17 m	(1)
		(iii) Based on IRC formula, Ls = $2.7V^2$/R = 54 m	(1)
		Design value of Ls =86 m	(1)
	c)	SSD = $0.28Vt+V^2/254f$ =127.99 m (t=2.5s, f=0.35)	(2)
		N = 1/40+1/80 =0.0375	(1)
		Assuming L>SSD, L=NS^2/4.4 = 139. 61 m > SSD, Hence assumption is correct	(2)

PART B			
Answer any two full questions, each carries 15 marks.			
4	a)	Explanation on desirable properties of aggregates (Min. 9 points) (1 mark for each)	(9)
	b)	Differences between flexible and rigid pavements (Min. 6 points) (1 mark for each)	(6)
5	a)	Listing the factors Explanation on significance of each factors	(3) (5)
	b)	$N = \frac{365ADF[(1+r)^n-1]}{r}$ = 50 msa GSB = 300 mm GB = 250 mm DBM = 125 mm BC = 50 mm	(3) (1) (1) (1) (1)
6	a)	Brief illustration on steps of construction of bituminous pavement	(6)
	b)	Listing of all the failures in flexible pavement Explanation and Causes of minimum **four** types of failures (2 marks for each)	(1) (8)
PART C			
Answer any two full questions, each carries20 marks.			
7	a)	Listing the road user characteristics and explanation on their influence Listing the vehicular characteristics and explanation on their influence	(5) (5)
	b)	$y_a = q_a/s_a = 0.216$ $y_b = q_b/s_b = 0.178$ $Y = y_a + y_b = 0.395$ L= 2n+R = 20 sec (Assuming n=2) Co = (1.5L+5)/(1-Y) = 58 sec $G_a = y_a(Co-L)/Y$ = 21 sec $G_b = y_b(Co-L)/Y$ = 17 sec Phase Diagram	(1) (1) (1) (2) (2) (1) (1) (1)
8	a)	Explanation on the four mentioned aircraft characteristics and their influence (4x3)	(12)
	b)	Definition on wind rose diagram (Any one type) Explanation on its usefulness in finding the best orientation (Any one type)	(3) (5)
9	a)	Correction for elevation = 1500*(7/100)*(1000/300) =350m	(3)

		Standard temperature =15-0.0065*1000= 8.5^0C	(1)
		Difference in temperature above airport reference temperature = 34-8.5 = 25 5^0C	(1)
		Correction for temperature = 1850*(1/100)*25.5 = 471.75 m	(3)
		Corrected length = 2321.75m	(1)
		Total correction (%) = 54.78 > 35%	(1)
	b)	Listing the design considerations	(4)
		Explanation with sketch	(6)
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