Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V EXAMINATION – SUMMER 2025

Subject Code:3150613 Date:20-05-2025

Subject Name:Pavement Design and Highway construction

Time:02:30 PM TO 05:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Briefly explain CBR.	**03**
	(b)	Give classification of modified bitumen.	**04**
	(c)	Explain factors affecting flexible pavement design.	**07**
Q.2	**(a)**	Enlist physical properties requirement for rural road.	**03**
	(b)	Calculate VDF for wheel load of 2160 kg. Take standard wheel load as 1080 kg.	**04**
	(c)	Calculate CSA for AADT of 2500 veh/hr, design period of 30 years, LDF=0.75, VDF=2, vehicle growth rate = 7% per year.	**07**
		OR	
	(c)	Write and explain formula for calculating CSA.	**07**
Q.3	**(a)**	Explain effect of temperature stresses in rigid pavement.	**03**
	(b)	State critical conditions of stress in rigid pavement.	**04**
	(c)	Compute the radius of relative stiffness and equivalent radius of resisting section of 22 cm thick cement concrete slab from the following data: E of Cement concrete = 2.1 x 105 kg/cm2, Poisson's ratio for concrete = 0.15, Modulus of subgrade reaction = 8 kg/cm3, radius of contact area of wheel load = 15 cm.	**07**
		OR	
Q.3	**(a)**	Draw neat titled sketch expansion joint in rigid pavement.	**03**
	(b)	Differentiate between highway and runway.	**04**
	(c)	Calculate the stresses at interior, edge and corner region of cement concrete pavement using Westergaard's stress equations. Take wheel load = 5200 kg, Ec = 3 x 105 kg/cm2, Pavement thickness = 20 cm, μ = 0.15, Modulus of subgrade reaction K = 7 kg/cm3, Radius of contact area = 15cm	**07**
Q.4	**(a)**	Describe construction procedure of WMM course.	**03**
	(b)	Describe construction procedure of Bituminous base course.	**04**
	(c)	Discuss in detail prime coat and tack coat.	**07**
		OR	
Q.4	**(a)**	Describe construction procedure of drainage layer.	**03**
	(b)	Describe procedure for bituminous mix design.	**04**
	(c)	Discuss importance of joints in rigid pavement.	**07**

Q.5	**(a)**	Discuss types of maintenance of flexible pavement.	**03**
	(b)	State the need of maintenance of pavement.	**04**
	(c)	Discuss design of overlay.	**07**

OR

Q.5	**(a)**	Discuss types of maintenance of rigid pavement.	**03**
	(b)	Briefly explain Recycled Asphalt Pavement.	**04**
	(c)	Discuss microsurfacing.	**07**

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