Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V EXAMINATION – WINTER 2025

Subject Code:3150613 Date:25-11-2025

Subject Name:Pavement Design and Highway construction

Time:10:30 AM TO 01:00 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)**	Draw the cross section of flexible pavement showing all components of it.	**03**
	(b)	Compare Tar and Bitumen.	**04**
	(c)	Enlist the tests on aggregates and explain impact test in detail.	**07**
Q.2	**(a)**	Define: (i) Vehicle Damage Factor (ii) ESWL (iii) Modulus of Resilient	**03**
	(b)	What are the factors considered for rigid pavement design?	**04**
	(c)	Explain the Boussinesq's theory of stress analysis.	**07**
		OR	
	(c)	Explain the Burmister's two-layer and three-layer theory.	**07**
Q.3	**(a)**	Describe various factors affecting selection of type of pavement.	**03**
	(b)	Evaluate the radius of relative stiffness and equivalent of resisting section for the following data. Thickness of pavement=18 cm. Poisson's ratio=0.15 Radius of contact area=15 cm. Modulus of elasticity of cement concrete= 3×10^5 kg/cm^2 Modulus of subgrade reaction= 6 kg/cm^3	**04**
	(c)	Write a short note on Westergaard's stress analysis.	**07**
		OR	
Q.3	**(a)**	Differentiate between flexible and rigid pavement.	**03**
	(b)	Compute the design traffic (in msa) for bituminous pavement by considering the following data. • Two lane single carriageway • Initial traffic in the year of completion of construction = 400 cvpd • Traffic growth rate per annum = 7.5 % • Design life period = 15 years • Vehicle damage factor = 2.5	**04**
	(c)	Write the steps to be followed for analyzing flexible pavements using IITPAVE.	**07**
Q.4	**(a)**	Draw neat, titled sketches of joints in rigid pavement.	**03**
	(b)	Briefly explain the need of soil stabilization.	**04**
	(c)	Explain the construction process of Subgrade.	**07**
		OR	
Q.4	**(a)**	List the properties required for joint filler and joint sealer material.	**03**
	(b)	Describe cement stabilization.	**04**
	(c)	Explain the construction process of WBM and WMM.	**07**
Q.5	**(a)**	Define the terms: (i) PQC and (ii) DLC	**03**

	(b)	Briefly explain the methodology adopted for rigid pavement maintenance.	**04**
	(c)	Explain the importance of ultra-thin white topping over the conventional white topping.	**07**

OR

Q.5	**(a)**	Give the function of Prime coat and Seal coat.	**03**
	(b)	Briefly explain the types of defects in flexible pavements.	**04**
	(c)	Explain the terms: (a) Cold in place (b) Hot in place (c) Micro surfacing	**07**

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