

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2021****Subject Code:3150613****Date:20/12/2021****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) Explain the term 'Effective CBR'	03
	(b) What are the objectives of pavement maintenance	04
	(c) Describe the laboratory procedure for determination of toughness property of road aggregates	07
Q.2	(a) Draw the cross section of typical pavement and label components.	03
	(b) What are the factors to be considered in design of pavements?	04
	(c) Design a concrete pavement for the following data as per the guidelines of IRC 58	07
	Design wheel load: 5000 kg	
	Present traffic: 500 CV/day	
	Design life: 20 years	
	Traffic growth rate: 8%	
	Temperature variation: 10°C	
	Modulus of subgrade reaction K: 6 kg/cm ³	
	Flexural strength of concrete: 40 kg/cm ³	
	Modulus of elasticity E: 3 × 10 ⁵ kg/cm ²	
	Poisson's ratio: 0.15	
	Co-efficient of thermal expansion α: 10 × 10 ⁻⁶ /°C	
OR		
(c) Compare the salient characteristics of cutback and emulsions and describe under what circumstance each one is used	07	
Q.3	(a) What are requirements of expansion and contraction joints in rigid pavements	03
	(b) Describe the construction procedure of WBM road	04
	(c) Describe Group Index Method of flexible pavement design.	07
OR		
Q.3	(a) Write a brief note on dry lean concrete used in construction of concrete pavement	03
	(b) Write a note on: Equivalent Wheel load factor	04
	(c) Design a flexible pavement for the following data using CBR method	07
	Traffic density: 1000 CV/day	
	Traffic growth rate: 8% per annum	
	Road will be opened for traffic after construction period of two years	
	CBR value of WBM course: 70%	
CBR value of Murum sub base: 40%		
Load at penetration of 5 mm: 90 kg		
Load at penetration of 2.5 mm: 60 kg		
Q.4	(a) Discuss the criteria for selection of binder course in pavement construction	03

- (b) Justify the remedial measures for the following defects in flexible pavement **04**
i) Pothole formation ii) Rut formation
- (c) Explain the concept of determining ESWL by graphical method. **07**
- OR**
- Q.4** (a) Enlist general maintenance works required for bituminous road **03**
(b) Explain the alternate bay method of construction of concrete road with neat sketch. **04**
(c) Briefly describe the quality control tests used in construction of concrete pavements **07**
- Q.5** (a) Discuss the causes of pavement deterioration after period of time **03**
(b) Discuss the salient features and suitable sites of Thin White Topping **04**
(c) Explain the salient features of Stone matrix asphalt as per IRC SP-79 **07**
- OR**
- Q.5** (a) Write a note on: Hot In-place recycling **03**
(b) Explain the method of Improvement of Binder in the Reclaimed Material **04**
(c) Explain the procedure of designing thickness of overlay **07**

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