

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2020****Subject Code:3150613****Date:03/02/2021****Subject Name:Pavement Design & Highway construction****Time:10:30 AM TO 12:30 PM****Total Marks: 56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. IRC – 37 and IRC -58 codes are allowed.

	MARKS
<b>Q.1 (a)</b> What are the desirable properties of bituminous mix?	<b>03</b>
(b) Write short notes on (i) Mud pumping (ii) Structural cracks	<b>04</b>
(c) With the help of sketches, mention various layers of flexible pavement. Write function of each layer.	<b>07</b>
<b>Q.2 (a)</b> What are warping stresses? How are they developed in CC pavements?	<b>03</b>
(b) Enlist various tests carried out on bitumen emulsion. Explain any one in detail.	<b>04</b>
(c) Mention various steps involved in mechanistic pavement design of bituminous pavements as per IRC 37	<b>07</b>
<b>Q.3 (a)</b> What are requirements of expansion and contraction joints in rigid pavements?	<b>03</b>
(b) State assumptions and limitations of Boussinesq's theory	<b>04</b>
(c) List the different stresses induced in cement concrete pavements. Discuss the critical combination of these stresses.	<b>07</b>
<b>Q.4 (a)</b> Explain the selection and gradation of Binder course.	<b>03</b>
(b) What is an equivalent single axle load? How can it be determined?	<b>04</b>
(c) A 2.5 cm diameter dowel bar is transferring a vertical load of 3500N across a 0.5 cm wide joint. Compute the dowel bar deflection at the edge of the joint and the corresponding concrete bearing stresses. Can the concrete handle this stress? Given, $K_c$ of 100,000 MPa/m, $E_r$ of 200,000 MPa, and $f_c'$ of 28 MPa.	<b>07</b>
<b>Q.5 (a)</b> Differentiate between WBM and WMM	<b>03</b>
(b) What do you mean by Ultra thin White topping? Explain in brief.	<b>04</b>

- (c) Write the Construction procedure of embankment, subgrade and Sub base 07

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- Q.6** (a) Write a short note on Interlocking Concrete Block Pavement (ICBP) **03**
- (b) Write the steps in Design of overlay **04**
- (c) Explain the construction procedure of Earthwork, Granular sub base, drainage layer and Dry lean concrete as per IRC-49 **07**
- Q.7** (a) Differentiate between Cold in place (CIP) and Hot in place (HIP) **03**
- (b) Explain types of defects in maintenance of pavement **04**
- (c) Explain the Maintenance of pavement and its methodology as per IRC: SP:83 **07**
- Q.8** (a) Enlist different bituminous mix treatments used in construction of pavements **03**
- (b) Explain Cold mix technology as per IRC SP-100 **04**
- (c) Explain Stone matrix asphalt as per IRC SP-79 and Warm mix asphalt as per IRC SP 101 **07**

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