

GUJARAT TECHNOLOGICAL UNIVERSITY**BE – SEMESTER- V EXAMINATION-SUMMER 2023****Subject Code: 3150613****Date: 28/06/2023****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

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|------------|---|-----------|
| Q.1 | (a) What is the difference between bitumen and tar? | 03 |
| | (b) Discuss the environmental characteristics of pavement design. | 04 |
| | (c) Enlist the tests performed for aggregates and explain the Deval abrasion test in detail | 07 |
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| Q.2 | (a) Define (i) Lane distribution factor, (ii) Vehicle damage factor, and (iii) Equivalent single axle load. | 03 |
| | (b) Write a note on (i) cutback bitumen and (ii) bitumen emulsion. | 04 |
| | (c) Explain various types of joints used in concrete pavements. Point out the differences in their functions. | 07 |
| OR | | |
| | (c) Explain the combined effect of temperature stress and load stress considered in concrete pavements. | 07 |
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| Q.3 | (a) Explain briefly the construction procedure of granular sub-base in bituminous pavement. | 03 |
| | (b) Explain the concept of fatigue failure and rutting failure in bituminous layer. | 04 |
| | (c) Explain the design principles for design of dowel bars and tie bars. | 07 |
| OR | | |
| Q.3 | (a) Distinguish between seal coat, prime coat and tack coat. | 03 |
| | (b) Discuss various vehicle parameters considered in design of pavement. | 04 |
| | (c) Mention various steps involved in pavement design of bituminous pavements as per IRC:37. | 07 |
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| Q.4 | (a) Write a note on: mud pumping. | 03 |
| | (b) Explain the importance of dry lean concrete in construction of rigid pavement as per IRC-49. | 04 |
| | (c) Mention the steps followed in estimating the quantity of aggregates and binder in surface dressing. | 07 |
| OR | | |
| Q.4 | (a) Discuss the causes of pavement bleeding. | 03 |
| | (b) Differentiate between wet mix macadam and water bound macadam. | 04 |
| | (c) What is Interlocking Concrete Block Pavement (ICBP). Also explain its procedure of laying. | 07 |
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| Q.5 | (a) Differentiate between hot in place and cold in place. | 03 |
| | (b) Write a note on pavement roughness. | 04 |

- (c) Describe various types of distresses in pavement and also explain possible surface maintenance measures. **07**

OR

- Q.5** (a) Write a note on: slurry seal. **03**
- (b) Explain briefly the cold mix technology as per IRC SP-100. **04**
- (c) Explain the importance of ultra-thin white topping over the conventional white topping. **07**
