

23231

M.Tech. 1st Semester (Civil Engg.) Transportation

Engg. Examination, November-2023

HIGHWAY & AIRPORT PAVENMENT MATERIALS

Paper-CE-643

Time allowed : 3 hours]

[Maximum marks : 100

Note : Attempt any five questions in total.

1. Explain desirable properties of road aggregates used for construction. Brief the classification of road aggregates based on petrology. List various tests on road aggregates. Explain impact test in details. 20
2. Explain the manufacturing process of Bitumen. What are the differences between Bitumen and Tar ? List various tests on Bitumen. Explain softening point test on bitumen. 20
3. (a) Discuss Cutback and its types in detail.
(b) Discuss Emulsion and its types in detail.
(c) Briefly explain the preparation of Bitumen Emulsion. 7+7+6=20
4. Explain the Marshall method of Bituminous mix design. Explain how the optimum bitumen content is determined. 20

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[P.T.O.]

5. (a) State the different methods for the design of cement concrete mix. What are the features of the design method of cement concrete mix according to IRC:44-2008? 10+10=20
- (b) Write a short note on cement concrete mix design for rural roads according to IRC : SP : 62-2004.
6. Briefly explain the FAA Design procedure for Flexible airport pavements. Also write about the pavement thickness requirements for Flexible airport pavements. 20
7. (a) The specific gravities and weight proportions for aggregate and bitumen are as under for the preparation of Marshall Mix Design. The volume and weight of one Marshall specimen was found to be 550 cc and 1200 cc and 1200 gm. Assuming absorption of bitumen in aggregate is zero, Find V_v , V_b , VMA and VFB : 12+8=20

Item	A-1	A-2	A-3	A-4	Bitumen
Wt.(gm)	850	1110	380	165	145
Sp. Gr	2.63	2.51	2.46	2.43	1.05

- (b) Compare Indian method and superpave system of design of hot bituminous mix design.

8. Briefly explain the AI Design procedure for Flexible highway pavements. Also write about the pavement thickness requirement for Flexible highway pavements. 20