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**23231**

M.Tech. (Civil Engg.) 1st Semester  
Examination, March-2021  
(Transportation Engg.)

**HIGHWAY AND AIRPORT  
PAVEMENT MATERIALS**

Paper-CE-643

*Time : Three Hours ]*

*[ Maximum Marks : 100*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note :- Attempt any five questions. All questions carry equal marks.*

1. (a) Explain the bituminous mix design by Marshall's method with the help of neat sketch.
- (b) What do you understand by Bitumen and Tar ? Write down the classification of Bitumen and Tar. 10,10

2. What are the various non-conventional materials? How are they used in the construction of highways? Explain in detail. 20
3. What are the desirable properties of subgrade soil? Enumerate the identification and classification of various tests performed on soil to identify the suitability of soil. 5,15
4. List the various methods for soil stabilization of soil for any highway construction project. How the soil is stabilized with the help of :
- (a) Mechanical stabilization
  - (b) Soil cement stabilization 20
5. Write a detailed note on the following :
- (a) Los Angeles Abrasion Test
  - (b) Aggregate Crushing Test 20
6. Explain the procedure of the following tests with the help of sketches on bitumen :
- (a) Penetration Test
  - (b) Viscosity Test 20
7. Explain the design ingredients of mixes of stabilized road construction in India. 20
8. Discuss the construction of a cement concrete road. What are the desirable properties of aggregate and cement? List how many cement tests are conducted before using it as a construction material. Explain soundness test. 20