

Register No: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 2024

(2020 SCHEME)

Course Code : 20CET294

Course Name: Pavement Construction and Management

Max. Marks : 100

Duration: 3 Hours

PART A

(Answer all questions. Each question carries 3 marks)

1. Compare rigid and flexible pavement.
2. State the functions of pavement.
3. Define VMA.
4. Enumerate the advantages of using modified bitumen.
5. List the various types of rollers used for compacting soils.
6. Explain how the construction of sub base is done.
7. Discuss the role of dowel bar in concrete pavement.
8. What is the need for providing tie bar in concrete pavement.
9. State the objectives of pavement management system.
10. Explain the need for pavement evaluation.

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Explain the need and procedure of doing abrasion and impact tests for aggregate. (10)
- b) Enumerate the desirable properties of aggregate to be used in pavement construction. (4)

OR

12. a) State the use of bitumen emulsion, cutback and modified bitumen. (8)
- b) Explain grading of bitumen. (6)

MODULE II

13. a) A bitumen mixture contains 60% coarse aggregate, 35% fine aggregate, 5% asphalt (by weight). Determine the unit weight of the mix after compaction with 7% air voids. Specific gravity of (6)

coarse aggregate, fine aggregate and asphalt are 2.72, 2.66, and 1.0 respectively.

- b) The specific gravity and weight proportions for aggregate and bitumen are as under for the preparation of Marshal mix design. The volume and weight of one Marshal specimen was found to be 475 cc and 1100 g. Assume absorption of bitumen in aggregate to be zero. Find VMA and VFA. (8)

Item	A1	A2	A3	A4	A5
Weight (g)	825	1200	325	150	300
Specific gravity	2.63	2.51	2.42.	2.43	1.05

OR

14. a) Explain Marshal method of mix design. (10)
 b) State the advantages and limitations of using Marshal mix design method. (4)

MODULE III

15. a) Draw a neat sketch of flexible pavement and explain the function of each layer. (8)
 b) What are the quality control tests to be conducted during the construction of open graded premix carpet? (6)

OR

16. a) Explain the various steps involved in construction of Wet Mix Macadam and Bituminous Macadam. (10)
 b) How clayey soils can be compacted? (4)

MODULE IV

17. a) Explain the preparation of subgrade for a concrete pavement. (6)
 b) Distinguish different joints in rigid pavements with neat sketch. (8)

OR

18. a) Describe the construction procedure of PCC slab pavement. (6)
 b) Determine the spacing between contraction joints for 3.5m slab width having thickness of 20 cm and $f=1.5$, for following cases: (i) For plain cement concrete, allowable $S_c = 0.8 \text{ kg/cm}^2$ (ii) For reinforced cement concrete, 10mm dia bars at 300 mm spacing. Assume unit weight of cement concrete as 2400 kg/cm^3 . (8)

MODULE V

19. a) Discuss the life cycle cost analysis. (7)
 b) Explain the structure of pavement management system. (7)

OR

20. Explain any one method for functional and structural evaluation of pavement. (14)
