

TRANSPORTATION ENGINEERING-I

Paper Code: ETCE-312

Paper: Transportation Engineering-I

L	T/P	C
3	1	4

INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To learn the fundamentals for alignment and geometric and pavement design of highway, various aspects of traffic engineering, highway construction materials, quality control and maintenance etc.

UNIT I

Highway Development and Alignment: Scope of highway engineering, road development and planning in India, role of NHAI, classification of roads, types of road pattern, Planning and Engineering surveys, Highway alignment, Highway project financing and economics of urban roads, expressways, national and state highways.

Highway geometric design: Cross section, elements, width, camber, gradient, sight distance, requirements and design principles of horizontal and vertical alignment, Alignment and Geometrics of hill roads. Highway safety and safety audit.

[T1,T2][No. of Hours: 11]

UNIT II

Traffic Engineering: Traffic characteristics and operations, Traffic flow, Capacity and level of services for state highway, national highway and expressway, Design of traffic facilities: Intersection, Roundabout, interchanges, parking facilities road signs, Traffic control devices, parking requirements and design, Urban Transportation planning process, Highway lighting, Traffic signal, Traffic planning and Administration, Introduction of transportation demand analysis. Urban Transport systems, planning and design, Urban intersections, Traffic sections.

[T1,T2][No. of Hours: 11]

UNIT III

Highway materials: Properties of sub-grade and pavement component materials, Tests on sub grade soil, aggregates and bituminous materials, Bituminous paving mixes, Marshall Mix design criteria. Use of flyash, concrete and polymers in highway construction

Pavement design: Types of pavement [WBM, RCC, Prestressed CC etc], Factors influencing the design of flexible and rigid pavements, Methods of flexible and rigid pavement design, I.R.C codes and recommendations.

Road side development: Arboriculture, planning plantation of trees, species selection and care of trees.

[T1,T2][No. of Hours: 12]

UNIT IV

Highway construction, technique and quality control: Techniques of construction of rural, urban roads and expressways, Joints in cement concrete pavements, Design and construction of hill roads.

Highway maintenance and Drainage: Causes and types of Pavement failures, Pavement testing, monitoring and evaluation, strengthening of existing pavements, Surface and sub surface drainage, drainage of slopes and erosion control, drainage, maintenance problems on hill roads, road construction in water logged areas.

[T1,T2][No. of Hours: 11]

Text Books:

- [T1] Khanna and Justo, "Highway Engineering", Nem Chand and Bros. Publishers
[T2] Saxena, "Textbook of Highway and Traffic Engineering", CBS Publishers

References:

- [R1] I.S. specifications on concrete, aggregates and bituminous materials
[R2] David Croney, "Design and performance of road pavements", McGraw Hill
[R3] Wright Dixon, "Highway Engineering", Wiley India.
[R4] Dr. L. R. Kadiyali, "Traffic Engineering and Transport Planning", KP.
[R5] James H. Banks "Introduction to Transportation Engineering", McGraw Hill
[R6] R. Srinivasa Kumar, "Textbook of Highway Engineering", University Press.