

TRANSPORTATION ENGINEERING-II

Paper Code: ETCE-405

Paper: Transportation Engineering-II

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 of 12.5 marks

Objective: To learn the fundamentals, planning and design concepts of railways, airways, tunneling, docks and harbours and other minor modes of transportation.

UNIT I

Components and Geometric design of Railways : Requirement and capacity of railway tracks, Various gauges, typical cross sections, Coning of wheels and tilting of rails, Functions and requirements of component parts of a railway track, Wear and tear and creep of rails, Requirement and types of sleepers, rail fixtures, ballast, sub-grade and embankments, Geometric design of railway track, Horizontal curves, radius, super elevation, transition curves, safe speed on curves, different types of gradients, Grade compensation.

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

UNIT II

Railway operation and control : Points and crossings and their design, Track junctions and simple track layouts, details of different types of stations and yards, signaling and interlocking, Various systems for control of train movements.

Railway construction and maintenance: Construction of railway track, earthwork, plate laying and packing, maintenance of track alignment, renewal of component parts and track drainage, modern methods of track maintenance, Classification and causes of accidents and their prevention.

Delhi Metro: Salient features of design, construction, operation and maintenance.

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

UNIT III

Tunneling: Considerations in tunneling, Tunnel alignment and grade, size and shape of a tunnel, methods of tunneling in hard rocks, Methods of tunneling in soft soils, compressed air and shield tunneling, shafts in tunnels, Safety measures, ventilation, lighting and drainage in tunnels

Docks and Harbours : Historical development of ports, harbours and docks, Tides, winds and waves, Causes and impact of Tsunami waves, Types of harbours, Types of docks, Break waters classification and types, Jetties, Landing stages and wharves.

[T2][No. of Hours: 11]

UNIT IV

Airport planning and design: Traffic characteristics and operations, fleet requirements, component parts of airport and site selection, Runway design, Orientation, basic runway length, geometric design, design of taxiways and aprons, terminal area planning, facilities in terminal area and their planning concepts, Environmental requirements for Airport projects, Design of Airport drainage system, Lightening of airport, Specific requirements for design of airport pavements.

[T2][No. of Hours: 12]

Text Books:

- [T1] Saxena and Arora, "A Text Book of Railway Engineering", Dhanpat Rai publications
[T2] Khanna and Arora, "Airport Planning and design", Nemchand and Bros

References Books:

- [R1] Horonjeff, "Planning and design of Airports", TMH
[R2] Mundrey, "Railway Track Engineering", TMH
[R3] Docks and Harbours, Levison Francis, Clarendon press,(2006)
[R4] John O. Bickel, Thomas R. Kuesel, Elwyn H King, "Tunnel Engineering Handbook", CBS Publication.
[R5] Railways, Bridges and Tunnels, Vazirani. V.N, Chandola.S.P, Khanna publications, New Delhi (1997)