

Hall Ticket No.

Question Paper Code: ACE013



INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal, Hyderabad - 500 043

MODEL QUESTION PAPER-II

B.Tech VI Semester End Examinations (Regular), May – 2019

Regulations: IARE-R16

TRANSPORTATION ENGINEERING
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

UNIT-I

1. (a) What is meant by highway alignment? What are the factors controlling highway alignment? [7M]
- (b) Calculate the lengths of National and State highways required in a district with a total area of 7200 km², Developed, Semi-developed & Undeveloped areas being 30,45 &25 percent of the respective district. The no of towns with population over 1.0, 0.5- 1.0, 0.2-0.5 and 0.1-0.2 lakhs are 3,7, 12&20 respectively in a district using second twenty year plan? [7M]
2. (a) Discuss the basic requirements of an ideal alignment? What are the various factors Controlling alignment? [7M]
- (b) Determine the length of different categories of roads in a state in India by the year 2001 using third road development concept, the following data given.
Total area of the state = 80,000 sq.km Total number of towns as per 1981 census =86
Overall road density aimed at= 82 km per 100 sq.km area. [7M]

UNIT-II

3. (a) Explain set back distance and mention various factors influencing set back distance? [7M]
- (b) The speeds of overtaking and over taken vehicle are 70 and 40kmph, respectively on a two way traffic road. If the acceleration of overtaking vehicle is 0.99m/sec². [7M]
 - a) Calculate safe overtaking sight distance
 - b) Mention the minimum length of overtaking zone and
 - c) Draw a neat sketch of overtaking zone and show the position of the sign post.
4. (a) Write about Design of Transition curves in detail? Explain the concept of shift? [7M]
- (b) The radius of horizontal circular curve is 100m. The design speed is 50kmph and the design coefficient of lateral friction is 0.15. [7M]
 - a) Calculate the super elevation required if full lateral friction is assumed to develop
 - b) Calculate the coefficient of friction needed if no superelevation is provided.
 - c) Calculate the equilibrium superelevation if the pressure on inner and outer wheels should be equal.

UNIT-III

5. (a) Describe various types of traffic signs used in traffic control and regulation giving at least two examples for each type. Support your answer with suitable sketches and specifications for the signs [7M]

- (b) A vehicle moving at 40kmph speed was stopped by applying breaks and length of the skid mark was 12.2 m. if average skid resistance of the pavement is known to be 0.70. [7M]
Determine the break efficiency of the test vehicle.
6. (a) What are the basic forms of Intersection and explain each with two types? [7M]
- (b) In a breaking test a vehicle traffic at a speed of 50kmph was stopped by applying breaks fully and skid marks was 6m in length. Determine the average skid resistance. [7M]

UNIT-IV

- 7 (a) List the advantages and disadvantages of rotary intersection? Mention various differences between channelized and un-channelized intersection? [7M]
- (b) Explain in detail about on street parking? Explain in detail about off street parking? [7M]
- 8 (a) Explain the design factors considered in rotary intersection and mention in detail of rotary design? [7M]
- (b) What are various types of at-grade Intersections and explain them with neat sketches? [7M]

UNIT – V

- 9 (a) Explain in detail about highway material characterization in road construction and what is the role of surface dressing in the construction of highway? [7M]
- (b) Explain the construction of cement concrete roads? What are the general causes of pavement failures? [7M]
- 10 (a) What do you mean by surface dressing and what is the role of surface dressing in the construction of highway? [7M]
- (b) Explain the construction of water bound macadam? Mention in detail about various tests on bitumen? [7M]



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COURSE OBJECTIVES:

The course should enable the students to:

I	Understand the importance of highway development of India and classification of roads and road patterns.
II	Design various geometric elements like curves, gradients, super elevation etc.
III	Capable of performing various traffic surveys.
IV	Analyse traffic signals intersections and road markings and their designs.

COURSE OUTCOMES (COs):

CO 1	Understand the importance of highway development of India and classification of roads and road patterns.
CO 2	Design various geometric elements like curves, gradients, super elevation etc.
CO 3	Capable of performing various traffic surveys and study basics of traffic engineering and regulations.
CO 4	Analyse traffic signals intersections and road markings and their designs.
CO 5	Understand construction of cement concrete pavements, construction of joints in cement concrete pavements joint filter.

COURSE LEARNING OUTCOMES (CLOs):

ACE013.01	Understand necessity for highway planning, different road development plans.
ACE013.02	Study Classification of roads, road network patterns, highway alignment.
ACE013.03	Capable of performing various traffic surveys.
ACE013.04	Study factors affecting alignment, engineering surveys, drawing and reports, highway project.
ACE013.05	Understand Importance of geometric design.
ACE013.06	Analyze factors affecting highway geometric design. Design controls and criteria.
ACE013.07	Understand highway cross section elements including shoulder, kerb, carriageway
ACE013.08	Analyze sight distance elements, stopping sight distance, overtaking sight distance and intermediate sight distance.
ACE013.09	Analyze design of horizontal alignment, design of super elevation and extra widening
ACE013.10	Analyze design of transition curves, design of vertical alignment, gradients, and vertical curves.
ACE013.11	Study basics of traffic engineering and regulations.
ACE013.12	Predict basic parameters of traffic, volume, speed and density, traffic volume studies.
ACE013.13	Analyze Parking studies, on street and off street parking, road accidents, causes and preventive measures, accident.
ACE013.14	Study road markings, need for road markings, types of road markings, design of traffic signals, Webster method.
ACE013.15	Explain condition diagram and collision diagrams, traffic signs, types and specifications.

ACE013.16	Understand types of at grade intersections, canalization traffic islands, types of grade separated intersections, rotary intersection.
ACE013.17	Study concept of rotary, design factors of rotary, advantages and limitations of rotary intersections.
ACE013.18	Understand Highway material characterization; sub-grade soil, stone aggregate.
ACE013.19	Explain construction of water bound macadam roads, construction of bituminous pavements.
ACE013.20	Study Surface dressing, bitumen bound macadam, bituminous concrete.
ACE013.21	Study various types of bitumen materials, construction of gravel roads.
ACE013.22	Understand construction of cement concrete pavements, construction of joints in cement concrete pavements joint filter.
ACE013.23	Analyze seal pavement failures, maintenance of highways.

MAPPING OF SEMESTER END EXAMINATION - COURSE OUTCOMES

SEE Question No	Course Learning Outcomes		Course Outcomes	Blooms Taxonomy Level
1	a	ACE013.02 Study Classification of roads, road network patterns, highway alignment..	CO 1	Understand
	b	ACE013.03 Study Classification of roads, road network patterns, highway alignment.	CO 1	Remember
2	a	ACE013.04 Capable of performing various traffic surveys.	CO 1	Understand
	b	ACE013.05 Study factors affecting alignment, engineering surveys, drawing and reports, highway project.	CO 1	Understand
3	a	ACE013.06 Understand Importance of geometric design.	CO 2	Understand
	b	ACE013.07 Analyze factors affecting highway geometric design. Design controls and criteria.	CO 2	Remember
4	a	ACE013.08 Understand highway cross section elements including shoulder, kerb and carriageway.	CO 2	Understand
	b	ACE013.09 Analyze sight distance elements, stopping sight distance, overtaking sight distance and intermediate sight distance.	CO 2	Understand
5	a	ACE013.13 Analyze design of horizontal alignment, design of super elevation and extra widening.	CO 3	Remember
	b	ACE013.15 Analyze design of transition curves, design of vertical alignment, gradients, and vertical curves.	CO 3	Understand
6	a	ACE013.15 Study road markings, need for road markings, types of road markings, design of traffic signals, Webster method.	CO 3	Remember
	b	ACE013.11 Study concept of rotary, design factors of rotary, advantages and limitations of rotary intersections.	CO 3	Understand
7	a	ACE013.12 Understand Highway material characterization; sub-	CO 4	Remember
	b	ACE013.13 Study Surface dressing, bitumen bound macadam, bituminous concrete,	CO 4	Understand

8	a	ACE013.14	Study various types of bitumen materials, construction of gravel roads.	CO 4	Remember
	b	ACE013.19	Understand types of at grade intersections, canalization traffic islands, types of grade separated intersections, rotary intersection	CO 4	Understand
9	a	ACE013.21	Explain construction of water bound macadam roads, construction of bituminous pavements.	CO 5	Understand
	b	ACE013.22	Understand construction of cement concrete pavements, construction of joints in cement concrete pavements joint filter.	CO 5	Remember
10	a	ACE013.23	Understand Highway material characterization; sub-grade soil, stone aggregate.	CO 5	Understand
	b	ACE013.22	Understand construction of cement concrete pavements, construction of joints in cement concrete pavements joint filter.	CO 5	Remember

Signature of Course Coordinator

HOD, CE