

III B.Tech. II Semester Regular Examinations, April/May -2005
TRANSPORT ENGINEERING
(Civil Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Bring out the efforts made in India for a planned development of highway system discussing the salient features of various road plans.
(b) Discuss the general principles that control the highway alignment.
2. (a) What happens if super elevation is not provided on a horizontal curve of a highway? Explain. In the absence of super elevation, how friction becomes an important factor for road safety? Discuss.
(b) A vertical summit curve is formed when an ascending gradient of 1 in 30 meets a descending gradient of 1 in 40. The curve is to be designed to provide overtaking sight distance for a speed of 80 kmph. Calculate the length of summit curve. Assume any data required suitably.
3. (a) What is the importance of O.D. surveys in Transportation planning for urban areas? Discuss. Also explain the method of conducting Origin Destination studies by road side interview.
(b) What factors play a critical role in ensuring road safety? And what measures can reduce the occurrence of road accidents? Discuss.
4. (a) Describe the CBR method of design of flexible pavements. What are the disadvantages of this method?
(b) Explain clearly the construction procedure for a cement concrete pavement.
5. (a) What do you understand by creep of rails? Explain the theories associated with creep.
(b) A curve of 5° is situated on a B.G. track. If the maximum permissible speed on curve is 60 kmph, determine the equilibrium cant. What is the maximum speed that can be permitted allowing maximum cant deficiency?
6. (a) What are the various gradients adopted in the geometric design of a railway track? Explain.
(b) Explain clearly the signaling and interlocking systems for controlling train movements on railway track. What are the principles that govern the interlocking system?
7. (a) Which important factors are to be considered while selecting a site for an airport? Discuss.
(b) What is the basic runway length? What corrections are to be applied to obtain the actual length of runway needed at a given airport.

8. Write short notes on the following:
- (a) Extra widening on a horizontal curve
 - (b) Traffic signs
 - (c) Permanent way components
 - (d) Taxi way geometric design.

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1. (a) Explain the salient features of Nagpur Road Development Plan.
(b) What are the requirements of a good highway alignment? What are the factors influencing the alignment? Explain.
2. (a) Explain the importance of friction offered by road surface. Also discuss about the factors that influence friction.
(b) A horizontal curve of 300 m radius is to be designed on a road with a design speed of 65 kmph. The road is a two lane road and the super elevation is provided by rotating the pavement about center line. The rate of introduction of super elevation is 1 in 200. If the minimum wheel base to be taken for design is 6.2 m, calculate the required length of the transition curve at the location.
3. (a) What are the major causative factors for road accidents? Discuss.
(b) Giving a neat sketch of a rotary intersection, indicate various design elements. Also give the design standards suggested for these elements of a rotary intersection.
4. (a) Explain the need for conducting Origin-Destination Studies for Transportation Planning. Briefly explain the Home Interview survey method.
(b) How are traffic signs classified? Explain. Give the standards for each type of traffic sign.
5. (a) Differentiate between flexible pavements and rigid pavements.
(b) Give the construction procedure for a WBM road in a step by step manner.
6. (a) Derive an equation for computing the super elevation on a railway track. Also explain what is "equilibrium cant" and "cant deficiency".
(b) A curve of 6° branches off from a 4° main curve in a B.G. yard in opposite direction. On branch line, the speed is restricted to 30 kmph and permissible cant deficiency is 7.61 cm. Determine the restricted speed on main line.
7. (a) What are the factors that need consideration while selecting a site for a new airport.
(b) What are the various corrections to be applied to standard runway length to obtain the actual length of a runway for a given location? Explain.
8. Write short notes on the following:

- (a) Stopping sight Distance
- (b) Alternate bay method of CC road construction
- (c) Permanent way of a railway track
- (d) Wind rose diagram.

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1. (a) Describe the important events in the history of highway development in India.
(b) What considerations play a vital role in a new highway route location? Explain.
2. (a) Derive an expression for computing the overtaking sight distance on a two-lane two way road. Give a neat sketch of overtaking process.
(b) A valley curve is formed by a descending grade of 1 in 30 meeting an ascending grade of 1 in 50. If the design speed is 80kmph, design the total length of valley curve required.
3. (a) What are the various traffic signs used in regulation of traffic? Explain.
(b) What engineering measures can help in the reduction of road accidents? Discuss.
4. (a) What is channelisation? Explain with the help of neat diagrams how channelisation can be effectively used to control the traffic movements through at-grade intersections.
(b) What situations justify the requirement of grade separated intersections? Giving a neat sketch of a clover leaf interchange indicate the various movements on the same.
5. (a) Giving a neat sketch of a permanent way show the various components. Also briefly describe the functions of various components of permanent way.
(b) A curve of 6° branches off from a 4° main line in a B.G. yard in the opposite direction. On branch line, the speed is restricted to 30 kmph and permissible cant deficiency is 7.61cm. Determine the restricted speed on main line.
6. (a) Derive an equation for computing the super elevation on a railway track. Explain what is "equilibrium cant" and "cant deficiency".
(b) Briefly explain about the use of fish plates, chairs and keys in a railway track as some of the most important fastenings.
7. (a) While planning an air port terminal, what are the various facilities to be provided? And discuss the general guidelines that influence the layout of a terminal building.
(b) What is a wind rose diagram? Explain how wind rose diagram is used in fixing runway orientation.

8. Write short notes on the following:

- (a) Transition curves in highways
- (b) Coning of wheels
- (c) Creep of rails
- (d) Corrections for runway length.

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1. (a) With the help of neat sketches explain the various road network patterns and the suitable situations for each type.
(b) What are the various engineering surveys required for fixing the final alignment of a highway? Explain.
2. (a) What is super elevation? With the help of a neat diagram, show the various forces acting on a vehicle moving over a horizontal curve with super elevation and derive an equation for equilibrium condition by analyzing the forces.
(b) With a neat diagram show the over taking process on two lane two way road. Derive an expression for computing the overtaking sight distance.
3. (a) Describe the engineering measures that can reduce the number of accidents on roads.
(b) What is the main concept of a rotary intersection. Give the advantages and disadvantages of rotary intersection.
4. (a) What are the various types of traffic signs employed in traffic regulation? Explain by giving the associated design standards for each type.
(b) What is channelisation? Explain how channelisation can be effectively used to regulate the traffic movement through intersections.
5. (a) Why soil is considered as the most important road construction material? Explain. Also explain the CBR Method of design of flexible pavements.
(b) Describe the construction procedure of CC pavements both by alternate bay method and continuous bay method.
6. (a) Define interlocking and explain the principles of interlocking in railways.
(b) Calculate the maximum permissible speed on a curve of a high speed B.G. track having the following particulars:
Degree of the curve = 1°
Amount of superelevation = 8 cm
Length of transition curve = 130 m
Maximum speed of section likely to be sanctioned = 165 kmph.
7. (a) What do you understand by basic runway length? Explain the method of obtaining the actual runway length required for a particular location.

- (b) What is the function of a taxi-way in an air port. Briefly describe the standards given by ICAO for various geometric elements of a taxi-way.
- 8. Write short notes on the following:
 - (a) Nagpur Road Development Plan
 - (b) Vertical alignment of highway
 - (c) Permanent way components.
 - (d) Runway orientation using wind rose diagrams.

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