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Subject	Highway & Traffic engineering
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Section	B
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Q: No: 01 Keeping in view modes of Transportation compare railways with highways.

Ans:

### Highway

- 1) Frequency of Accident is more
- 2) Maintenance cost is less
- 3) Door to Door service is available
- 4) Load carrying capacity is less
- 5) Suitable for any distance

### Railway

- 1) Frequency of Accident is less
- 2) Maintenance cost is more
- 3) Such service is not available
- 4) Load carrying capacity is more.
- 5) Suitable for long distance.

Q1. NO: 02:

You are a transportation Engineer. You have been tasked to conduct office study as a preliminary step for design of new highway. What reference material you will study and what data you will extract.

Ans:

**Data Examination (office study):**

The first phase in any highway location study is the examination of all available data of the area in which the road is to be constructed.

**Data source:**

(National/Provincial departments - transportation, agriculture, geology, hydrology, and mining.)

- Existing engineering reports
- Maps
- Aerial photographs
- Charts.

The type and amount of data collected and examined depend on the type of highway being considered

## Area characteristic covered in data collection:

- Engineering including topography, geology, climate and traffic volume
- Social and demographic, including land use and zoning patterns
- Environmental, including types of wildlife; location of recreational, historic and archeological sites; and the possible effects of air, noise and water pollution

## Preliminary analysis of the data:

any of the specific sites should be excluded from further consideration because of one or more of the above characteristic.

For Example it is found that a site of historic and archeological importance is located within an area being considered for possible route location. It may be immediately decided that any route that traverses that site should be excluded from further consideration.

141

7883

Q: NO: 03

What is importance of vehicle performance in highway design?

Ans: The vehicle's performance in highway design is very important because of following points

- 1) Adequate passing and stopping sight distance.
- 2) Acceleration and deceleration lanes.
- 3) Maximum grades
- 4) Setting speed limits
- 5) Timing of signalized intersection
- 6) Braking characteristic also effects vehicle performance.
- 7) Freeway ramps
- 8) Climbing or passing lane



Q.No: 041 Write short note on directional distribution in design of highways.

Ans: Directional Distribution:

- Highways must be designed to adequately serve the peak-hour traffic volume in the peak direction of flow.
- Total hourly traffic in both direction is used to design two-lane road.
- In the design of highways with more than two lanes roads where important inter section are encountered or where additional lanes are to be provided later, knowledge of the hourly traffic volume for each direction of travel is essential.

**Example:**

- For Example, consider a rural road with a design volume of 4,000 vehicles per hour (VPH) for both direction of travel combined.

Q: No: 05

Explain broad classification of surface distress mode.

Ans: Surface distress mode can be broadly classified into the following three groups:

### 1) Fracture:

This could be in the form of cracking or breaking, generally due to excessive loading, fatigue, thermal change.

### 2) Distortion:

This is in the form of ~~stripping~~ deformation, which can result from such things as excessive loading, densification, consolidation or subgrade issues.

### ~~3) Disintegration~~

### 3) Disintegration:

This is in the form of stripping or raveling or removal of paving material, which can result from such thing as loss of bonding, chemical reactivity, traffic abrasion, aggregate degradation or binder aging.

Q: No: 06

Explain Alligator cracking, block cracking, longitudinal cracking and Transverse cracking.

Ans:

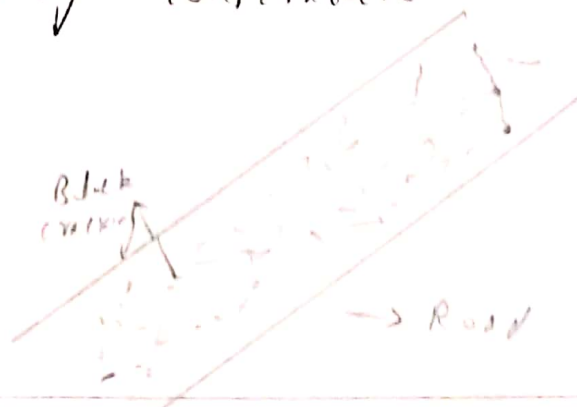
### 1) Alligator cracking:

Alligator or fatigue cracking is a series of interconnecting cracks caused by fatigue failure of the asphalt surface under repeated traffic loading. The cracking initiates at the bottom of the asphalt surface where tensile stresses and strain is highest under a ~~strain~~ wheel load.

### 2) Block cracking:

Block cracks are interconnected cracks that divide the pavement into approximate rectangular pieces.

Blocks range in size 1 by 1 foot to 10 by 10 feet => caused by shrinkage of the asphalt concrete (AC) and daily temperature.

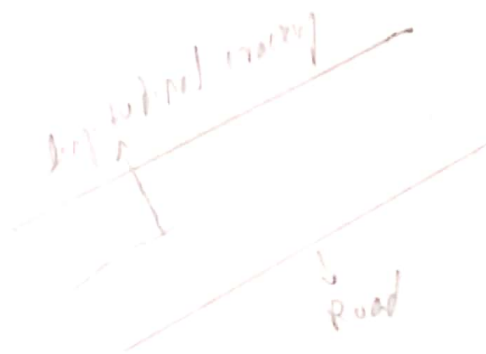




### 3) Longitudinal cracking:

Longitudinal cracks are parallel to the pavements center line or lay down direction. caused by poorly constructed paving lane joint

→ Shrinkage of AC surface due to low temperature of the asphalt



### 4) Transverse cracking:

Transverse cracks extend across the pavement at approximate right angles to the pavement center line or direction of lay down. These type of cracks are not usually load associated.

