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Q No 1 Keeping in view different modes of Transportation compare railways with highways.

### Highway

- ① Suitable for any distance
- ② High degree of accident due to flexibility of movement
- ③ Other modes are depend on it

### Railway

- ⇒ suitable for long distance
- ⇒ Low degree of accident due to less flexibility of movement
- ⇒ it depends upon the road transport (i.e) road could serve as feeder system.

- |   |  |
|---|--|
| ④ Maintenance cost is less                        | ⇒ Maintenance cost is more                         |
| ⑤ Door to door service is available.              | ⇒ Such service is not available.                   |
| ⑥ it saves the time for short distance            | ⇒ it take large time for short distance.           |
| ⑦ it requires small investment for the government | ⇒ it requires large investment for the government. |

Ques 2 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 of 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 or 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 characteristics covered in data collection

⇒ Engineering including topography, geology, climate and traffic volume.

⇒ Social and demography, including land use and seeing patterns.

⇒ Environmental includes type of wildlife, location of recreational, historic and archeological sites and the possible effects of air, noise and water pollution.

Preliminary analysis of the data

⇒ will indicate

whether any of the specific sites should be excluded from further consideration because of one or more of the above characteristics  
For Example ⇒ it is found that a site of

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historic and archaeological 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.

Qno 3 What is importance of vehicle performance in highway design?

Ans The vehicle's performance in highway design is very important because of the following parts.

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

Qno 4 - Write short note on directional distribution in design of highway?

### 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 directions is used to design two-lane roads.
- ⇒ In the design of highways with more than two lanes and on two-lane roads where important intersections are encountered or where additional lanes are to be provided later, knowledge of the hourly traffic volume for each direction of travel is essential. Directional traffic is used for multilane roads and streets.
- ⇒ Typically, one direction contributes by 55-70% in total traffic although occasionally 80% is observed.

### Example

- ⇒ Consider a rural road with a design volume of 4000 vehicles per hour (vph) for both directions of travel combined.
- ⇒ If during the design hour, the directional distribution is equally split, or 2000 vph in one direction, two lanes in each direction may be adequate.

(6)  
Qnos Explain broad classification of surface distance mode?

Ans → Surface distance mode 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 deformation which can result from such thing or excessive loading densification, consolidation or subgrade.

(3) Disintegration

→ This is in the form spalling 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.

Qnos Explain Alligator cracking, block cracking longitudinal cracking and Transverse cracking?

Ans Alligator cracking → Alligator or fatigue cracking as a series of inter-connecting 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 stress and strain is highest under a wheel load.

## ② Block cracking

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

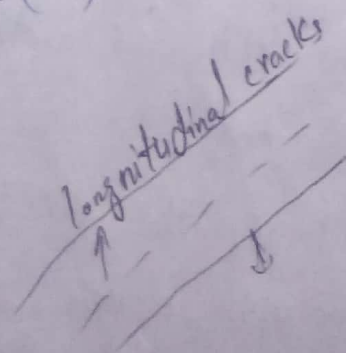
⇒ Blocks range in size 1 by 1 feet to 10 by 10 feet.

⇒ caused by shrinkage of the asphalt concrete (AC) and daily temperature

## ③ Longitudinal cracking

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

⇒ shrinkage of (AC) surface due to low temperature of the Asphalt (A)



#### ④ Transverse cracking

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

