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Section A

Subject Highway and Traffic Eng

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ID 7809

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Question No# 1

Keeping in view different modes of transportation Compare railway with highway.

A Compare Railway with Highway

Highway

Railway

Highway are the only independent mode of transportation as we do not need other mode of transportation.

Railway are dependent mode of mode it depends on highway as one need road to go railway station

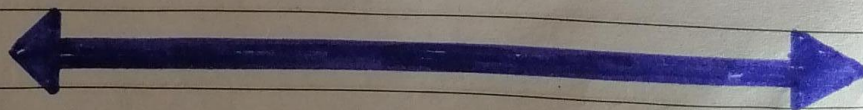
It is suitable for any distance Maintenance cost is less

It is suitable for long distance Maintenance cost is high.

Problem of traffic jamme occure

No such problem

	Highway	Railway
◆→	Load Carrying Capacity is less	Load Carrying capacity is more
◆→	Door to door service is available	Such service is not available
◆→	Speed achieved is 60-100 km/hr	Speed achieved is 100-150 km/hr
◆→	Cost of construction and maintenance is low	Cost of construction and maintenance is high
◆→	Width of right of way is more	width of right of way is small.
◆→	Frequency of accident is more	Frequency of accident is less.



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Question No #2

You are a transportation engineer and you have 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 collect.

A

For design of new highway first of all I will conduct office study as a preliminary step.

→ The office study may include the following factors.

Map Analysis:-

→ In this step we will study in different aspects of map and will select roughly possible route for highway

In map analysis we also study topographic map which help us for selecting possible route for highway.

Already Present Data:

In this step we will study all the Data present in soft and hard form related to the area on which highway is to be constructed.

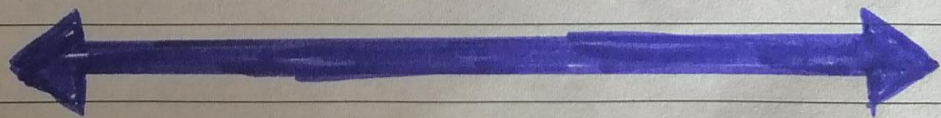
→ "Already present data" include engineering and non engineering aspects of the route.

→ It include soil behaviour, contours, land survey, temperature, environmental aspects and population of peoples.

Collected data after studies

My data collection will include following information.

- ① Soil Behaviour of area.
- ② Religious places or any other important building.
- ③ Geology of area.
- ④ Environment of area.
- ⑤ Population of area.
- ⑥ Rivers, and seas information.
- ⑦ Selected feasible route.



Q Question No# 3

What is the importance of vehicle performance in highway design.

A Vehicle Performance:-

Vehicle performance is the study of the motion of a vehicle which depends upon all the forces and moments that act upon it.

Importance of vehicle performance in Highway design.

→ ↳ while designing a highway the important parameters to be considered are acceleration and deceleration rates of vehicle.

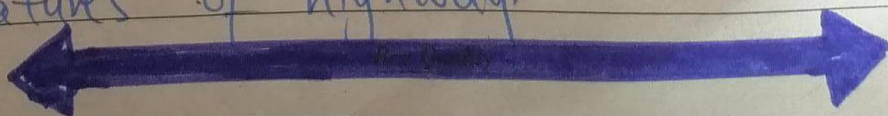
→ Acceleration and deceleration lanes which is related to the speed of the vehicles.

→ It can help us to decide where should we design a freeway ramp, where vehicle comes in and out of the highway.

→ vehicle performance are also important to decide the lanes for slower vehicle (Truck etc) and also lanes for speedy vehicle.

→ It also help us to decide the dimension and position (location) for bus bay or bus turnout.

→ vehicle performance is very important in highway design b/c it help us while designing different features of highway.



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Question No# 4

Write short note on directional distribution in design of highway:

A

Directional Distribution:-

→

The directional distribution is defined as the percentage of heavier volume over the total volume.

→

Use to convert average daily traffic to directional peak hour traffic

Example:-

→

Consider a road with a design volume of ~~4000~~ 8000 vehicles per hour (vph) for both directions of travel combined.

→

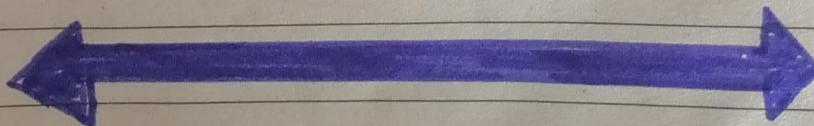
If during the design hour

the directional distribution is equally split or 4000 vph is one direction, two lanes in each direction may be adequate.

→ If 80 percent of the DHV is in one direction at least 3 lane in each direction would be needed for the 6400 vph.

→ Directional distribution -
Directional design hourly volume DDHV - ADTs are converted to a peak hour volume in the peak hour direction of flow.

$$DDHV = AADT \times K(\text{peak hr}) \times D(\text{peak hr-flow})$$



Q

Question No# 5

Explain board classification of surface distress modes.

A

Surface distress modes

can be boardly classified into the following three groups.

- ① Fracture.
- ② Distortion.
- ③ Disintegration.

①

Fracture:-

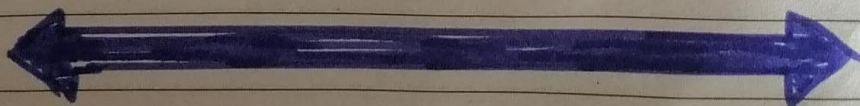
This could be in the form of cracking (in flexible and rigid pavement) or spalling resulting from such things as excessive loading, Fatigue, thermal changes, moisture damage, slippage or contraction.

② Distortion:-

This is in the form of deformation. (eg rutting, corrugation and shoving) which can be result from such things as excessive loading, creep, swelling or frost action.

③ Disintegration:-

This is in the form of stripping raveling or spalling, which can result from such thing as loss of bonding, chemical reactivity, traffic abrasion, poor compaction or binder aging



Q Question No #6

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

A Alligator Cracking:

- It is also called crocodile cracking. Alligator cracking may be considered a combination of fatigue and block cracking.
- It is a series of interconnected cracks of various stages of development.
- Alligator cracking develops into a many-sided pattern that resembles chicken wire or alligator skin.
- Occure in area subjected to repeated traffic loading.

③ Block Cracking:-

- It is a pattern of cracks that divides the pavement into approximately rectangular pieces with sides generally longer than one foot.
- Block cracking may cause due to shrinkage of asphalt.
- Rectangular block range in size is from $(0.1\text{m}^2 \text{ to } 1\text{m}^2)$ generally.

④ Longitudinal Cracking:-

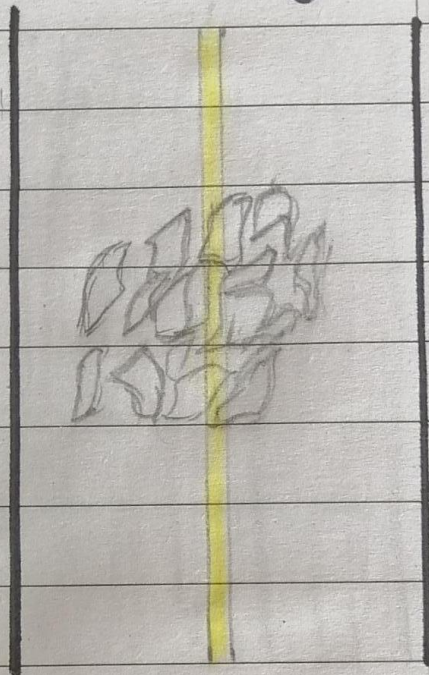
Longitudinal cracks occur parallel to the centre line of the pavement. They can be caused by a poorly constructed joint; shrinkage of the asphalt layer, cracks

reflecting up from an underlying layer and longitudinal segregation due to improper paver operation. These cracks are not load related.

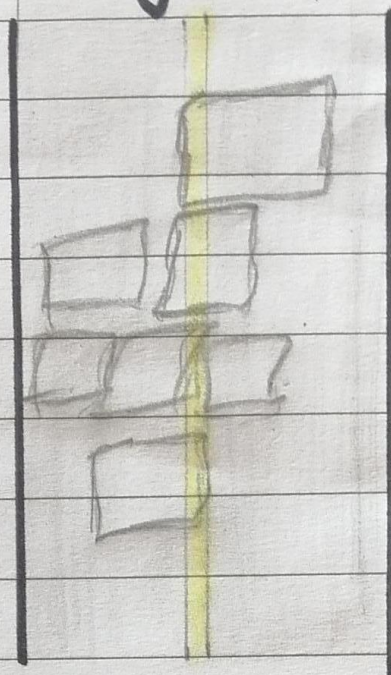
① Transverse Cracking:-

- These cracks are roughly perpendicular to the centre line of the pavement
- These cracks may be caused due to expansion and contraction of pavement material, roadbed settlement, poorly constructed paving joints.

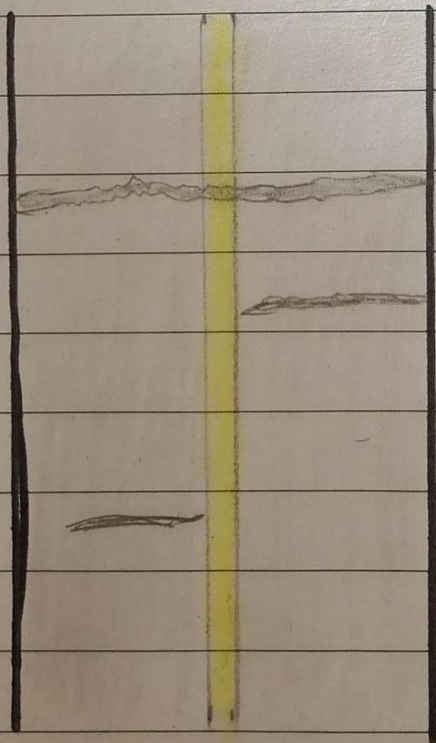
Diagrammatically



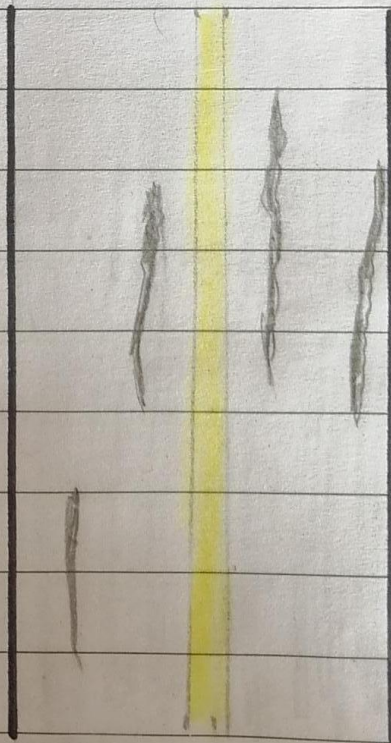
Alligator Cracking



Block Cracking



Transverse Cracking



Longitudinal Cracking

