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Sec :- A

Subject :- Highway & Traffic Engineering

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to

(Q1) Keeping in view modes of transportation
Compare railways with highways -

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Highway :-

- 1) In Highway the frequency of accident are more -
- 2) The maintenance cost is less -
- 3) It is suitable for any distance -
- 4) Door to Door service are available -
- 5) The load carrying capacity is less -

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Railway :-

- 1) In Railway, the frequency of accident is less -
- 2) The maintenance cost is more -
- 3) It is suitable for long distance -
- 4) Door to Door services ~~are~~ ^{is} not available
- 5) The load carrying capacity is more -

Q2) You are a transportation Engineering - 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? (2)

Ans:- Being a transportation engineer I will consider the following steps for office study of highway:

"Data Examination:-"

- It is the first step in which we examine all available data in which the road is to be constructed.
- There is no use of photogrammetric investigation in this phase.

"Data Sources:-"

- The data sources are majorly available with National and Provincial departments.
- Mostly the data is collected in form of;
 - Maps
 - Aerial Photographs
 - Charts
 - CAD visuals
 - Existing engineering projects e.g dams -
- The type of data to be collected is department dependant on the highway type -

"Topography of Data Collection:-"

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- 1) Engineering include geology, climate & traffic volumes.
- 2) Social & Demographic includes land use and zoning pattern.
- 3) Economic including unit cost for construction and the trend of agricultural, commercial and industrial activities.
- 4) Environmental includes type of wildlife, location of recreational & historical sites, effect the air, noise & water pollution.

"Preliminary Analysis of data:-"

- 1) It will indicate if any specific sites should be excluded from consideration.
- 2) At the completion of this phase, the engineer will be able to select generally areas through which highway can transverse.
- 3) In the presence of any historical, archeological sites the routes that transverse it is excluded from further consideration.

Q3 What is the importance of vehicles performance in highway design?

Ans. The vehicle performance in highway design is very important because of following points.

- 1) Adequate passing and stopping sight distance.

- ④
- ③ Acceleration and deceleration lanes
 - ④ Timing of signalized intersection.
 - ⑤ Braking characteristic also affects vehicle performance.
 - ⑥ Climbing or passing lane -
 - ⑦ Freeway ramps -
 - ⑧ setting speed limit -

Q5) Explain broad classification of surface distress modes:-

Ans:- Following are classification of surface distress mode;

1) "Disintegration:-" This is in the form of stripping or removal of paving materials, which can result from such things as loss of bonding and chemical reactivity, traffic abrasion, aggregate degradation or binder aging.

2) "Distortion:-" This is in the form of deformation which can result from such things as excessive loading, densification or subgrade issue -

3) "Fracture :-" This could be in the form of cracking or breaking, generally due to excessive loading and thermal changes.

Q6) Explain Alligator Cracking, block Cracking. (5)
Longitudinal Cracking & Transverse Cracking?

Ans:-

1) Alligator Cracking:-

Alligator Cracking is a series of interconnecting cracks caused by fatigue failure of a asphalt surface under repeated traffic loading. The cracks initiate from the bottom of the asphalt surface where tensile stress and strain is highest under a wheel load.

2) Block Cracking:-

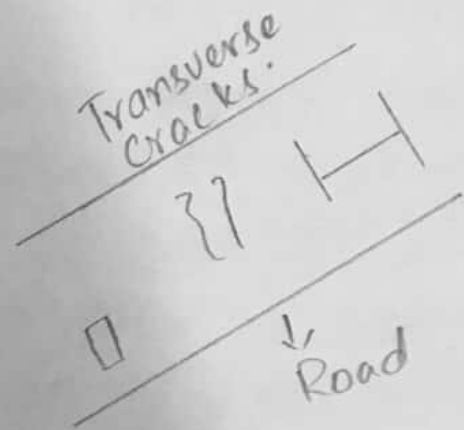
Block cracks are interconnected cracks that divide the pavement into approximate rectangular pieces. Block range in size 1 by 1 foot to 10 by 10 feet. It is caused by shrinkage of the asphalt concrete and dialy temperature.

3) Longitudinal Cracking:-

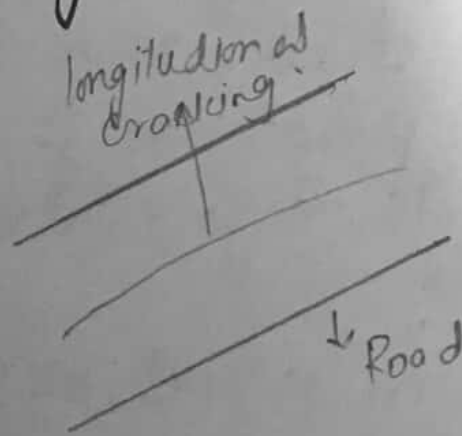
Longitudinal cracks are parallel to the pavements center line or laydown direction caused by poorly constructed paving lane joint. The shrinkage of AC surface due to low temperature of the asphalt.

4) "Transverse Cracking:-"

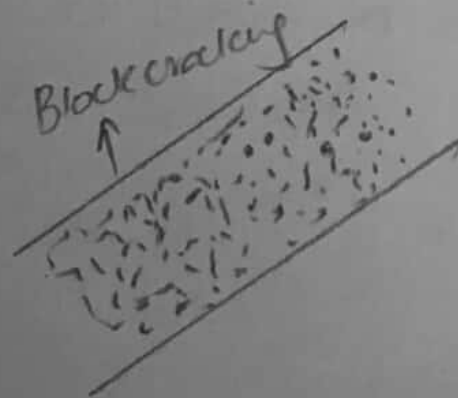
Transverse cracks extend across the pavement at approximate right angles to the pavement center. ~~are not usually~~ line or direction of lay down these type of cracks are not usually load associated.



• Longitudinal Cracking:-



• "Block Cracking:-"



Q4) Write Short Note on Directional Distribution in design of Highway?

"Directional Distribution:-"

Highway must be design to adequate serve the peak-hour traffic volume in the peak direction of flow. In Directional Distribution the total traffic hourly in both directions is used to design two lane roads. In the design of highway with more than two lanes and on two lane roads where important intersection 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:-"

If 80% of the DHV is in one direction at least three lanes in each direction would be needed for the 3200 vph.