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SECTION : B

SEMESTER : 6th

SUBJECT : Highway And Traffic Engineering

SUBMITTED TO : Dr. ENGR NADEEM

MID EXAM

QUESTION 01:

Keeping in view different modes of transportation compare railways with Highways.

RAILWAY :

- The transportation along the railway track could be advantageous by railways between the stations both for the passengers and goods particularly for long distance.
- It depends upon the road transport.
- It is safe than that of other modes
- Maintenance cost is more
- Suitable for long Distance.

HIGHWAY:

- It require small investment for the government means the maintenance cost is less.
 - Save time for short distance.
 - Other mode depend on it.
 - It provide door to door service.
 - It give the maximum service to one and all.
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QUESTION 02

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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?

ANSWER:

As an transportation engineer I will consider the following steps for office study of a new highway.

Data Examination:

In this step we will examine the data which is available of that site. We will study it in office.

- In this step there is no use of maps, charts or engineering reports.

Data Sources:

- The Data is collected from national departments, transportation, agriculture, geology and hydrology departments.
- The data which is collected from these departments are in the form of maps, charts, engineering reports and aerial photographs.

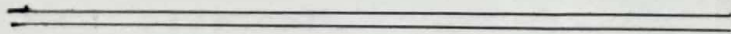
Area characteristics Covered in Data Collection:

- Topography include geology, climatic condition and traffic volume.
- Environmental ~~evaluation~~ include wildlife, historic and recreation centres, air, noise pollution.
- Economic ~~evaluation~~ of each alternative route is carried out to determine the future effect of investing the resources necessary to construct the highway.
- Factors considered in economic ~~evaluation~~
 - Maintenance cost.
 - Road cost
 - Road benefits

Preliminary Analysis Of Data:

It include the examination of site or indication of a specific area that should be excluded or included

- In this phase the engineer select the general areas for a highway.



QUESTION 03

What is importance of vehicle performance in highway design?

ANSWER :

The vehicle performance in highway design is very important. due to the following characteristics.

- Static
- Dynamic
- Kinematics.

Static Characteristics:

The weight and size of vehicle is important in determine the physical component of highway such as.

- Lane width
- Shoulder width
- Length of vertical curve
- Pavement depth.

Kinametic Characteristics:

• Primary element is the acceleration capability of vehicle.

- It involve the study how acceleration rate influence the elements of motion such as velocity, distance and time.

Dynamic Characteristics:

Forces that act on a vehicle while it is in motion are.

- Air resistance
 - Grade resistance
 - Rolling resistance
 - Curve resistance.
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QUESTION 04

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Write short note on directional distribution in design of highways.

DIRECTIONAL DISTRIBUTION:

Highway 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.
- Typically, one direction contributes by 55-70% in total traffic although occasionally 80% is observed.

For Example :

- Consider a rural road with a design volume of 4,000 vehicles per hour for both directions of travel combined.
 - If during the design hour, the directional distribution is equally split or 2,000 vph in one direction then two lane must be adopted in each direction.
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QUESTION 05

Explain broad classification of surface distress modes

SURFACE DISTRESS:

Any indication of poor or unfavorable pavement performance or sign of impending failure or unsatisfactory performance of pavement is known as surface distress.

CLASSIFICATION:

Surface distress modes can be broadly classified into the following three groups

- Fracture
- Distortion
- Disintegration.

1) FRACTURE:

This could be in the form of cracking in flexible and rigid pavements or spalling resulting from such things as excessive loading, fatigue, thermal changes, moisture damage, slippage or contraction

DISTORTION :

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This is in the form of deformation which can result from such things as creep, densification, consolidation, swelling.

DISINTEGRATION:

This is in the form of stripping, raveling or spalling, which can result from such things as loss of bonding, chemical reactivity, traffic abrasion, aggregate degradation, poor consolidation or binder aging.

QUESTION 06

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

ANSWER

1) ALLIGATOR CRACKING:

Alligator cracking, also referred to as fatigue or crocodile cracking, refers to a pattern of asphalt damage that resembles the scales on an alligator's skin. The cracks form co-joined, irregular "blocks" that are often four sided, such as rectangles, but they can also have more sides and on occasion, as few as three sides.

2) BLOCK CRACKING:

Block cracking is a series of large (typically one foot or more), rectangular cracks on an asphalt pavement surface. This type of cracking typically covers large areas and may occur in areas where there is no traffic. Block cracking is typically caused by shrinkage of the asphalt pavement due to temperature cycles.

3) LONGITUDINAL CRACKING

Longitudinal cracks occur parallel to the centreline 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.

4) TRANSVERSE CRACKING:

Transverse cracking or cracks occur roughly perpendicular to the centreline of the pavement. They can be caused by shrinkage of the asphalt layer or reflection from an existing crack. They are not load-related.

