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Mid Examination

QNO 1

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

Railway

1. Passenger and Goods (freight train)
2. It depends on road service
3. Energy required to drag unit load is $\frac{1}{5}$ of that required by road
4. maximum safety i.e. minimum crash rate
5. It require high investment
6. Rail is dependant on road service

Highway

Car, Bus, Truck etc

It provide door to door service

Fuel consumption for unit load is high.

high degree of accident due to flexibility of movement

It require small investment

other modes depends on it

Q NO 2

You are transportation engineer. You have been tasked to conduct office study as a Preliminary step for design of new highway. What reference material will you study and what will you extract from it?

ANSWER :

OFFICE STUDY OF EXISTING INFORMATION

DATA EXAMINATION :

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

REFERENCE MATERIAL TO BE STUDIED :

- Existing engineering reports
- Maps
- Aerial photographs
charts

→ The type and amount of data collected and examined depend on the type of highway being constructed.

CHARACTERISTICS OF AREA:

- Engineering including topography, geology, climate and traffic volumes.
- Social and demographic, including land uses and patterns.
- Economic, including unit cost for construction and the trend of agricultural, commercial, and industrial activities.

EXTRACTION OF DATA:

I will extract following data from it.

- Any specific site should be excluded from further consideration.

For example, if it is found that a site of historic and archeological importance within an area being considered for possible route location.

- Deforestation should be avoided.
- Those route will be selected for which cost is minimum.
- Routes which give facility to more people will be adopted.

QNO 3

What is the importance of vehicle performance in highway design?

Vehicle performance is important in highway design because of

- Acceleration and deceleration
- Climbing or passing lane
- Maximum grades
- Freeway lamps
- Setting Speed limit
- Adequate passing and stopping sight distance.

QNO 4

Write short note on Directional distribution in a design of highways.

ANSWER:

Directional Distribution:

- Total hourly traffic in both direction is used to design two lane road.
- Highways must be design to adequately save the peak hour traffic volume in the peak direction of flow.

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- Directional traffic is used for multi lane roads and streets.

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

Example :

Consider rural road with design volume of 4000 vehicles per hour for both direction of travelling

- 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.

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

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

QNO 5

Explain broad classification of surface distress modes?

Surface distress is "any indication of poor or unfavorable pavement performance or sign of impending failure, any unsatisfactory performance of a pavement short failure."

Surface distress can be broadly classified into following three groups:

- i) Fracture
- ii) Distortion
- iii) Disintegration

QNO 6

Explain the following:

1) Alligator Cracking:

chicken wire cracking, spider web cracking, map cracking etc.

- Alligator cracking may be considered a combination of fatigue and block cracking.
- Occur in area subjected to repeated traffic loading.
- It is series of interconnected cracks of various stages of development.

2) Block Cracking:

- A pattern of cracks that divide the pavement into approximately rectangular pieces with sides generally longer than one foot.
- Rectangular block range in size from approximately 0.1 m² to 10 m²

3) Longitudinal Cracking:

Possible Causes:

- Expansion and contraction of pavement material
- road bed settlement poorly constructed joints.

4) Transverse Cracking:

Causes:

Slab longer than required
Excessive thermal stresses.

Cures:

- Crack Sealing
- Dowel bar retrofit
- Full depth rigid repair