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Q NO 2.

Modes of transportation:

→ Transport modes are the means by which passengers and freight achieves access and mobility between origin and destination. They fall into one of three basic categories depending over what median is used to travel upon.

Highways :-

1) It gives the maximum service to one and all.

2) It gives maximum flexibility for travel with reference to route, choice direction, time and traveling speed.

3) It provide door to door service.

4) Other modes are depend on it.

5) It require small investment for the government.

6) Motor vehicles are cheaper than other carriers like rail engines.

7) It saves the time for short distance.

8) High degree of accident due to flexibility of movement.

Railways:-

1) The transportation along the railways track could be advantageous by railways between the stations both for

the passengers and goods particularly for long distance.

2) It depends upon the road transport i.e road could serve as a feeder system.

3) Energy required to drag a unit load through unit distance by the railway is only 1/4 to 1/5 of that required by road.

4) Safety (minimum crash rate if handled carefully else sever crash can occur)

Railway	Highway
Faster than road transport	Less capital outlay
Suitable for bulky goods	Way to door services
Economical for long distance	Adaptable to service
Full protection to goods	Appropriate for short distance
Regularity	Less Packing cost
Huge investment	Fast speed
Less Coverage	Less cost
High overhead cost	Private owned vehicles.
Lacks door to door service.	

Q NO 2.

Office study of existing information:

→ Data Examination:

The first phase in 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/ 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 volumes.

- Social and demographic, including land use and zoning patterns.

- Enviromental, including type wild life; location of recreational, historic and archeological sites; and the possible effects of air, noise and water pollution.

- Economic, including unit costs for construction and the trend of agricultural, commercial, and industrial activities.

→ 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, if it is found that a site of historic and archeological importance is located within an area being considered for possible route location, it may be immediately decided

that any route that traverse that site should be excluded from further consideration.

- At the completion of this phase of the study, the engineer will be able to select general areas through which the highway can traverse.

→ Reconnaissance Survey:

→ The object of this phase of the study is to identify several feasible routes, each within a band of a limited width of a few hundred feet.

- Preliminary Location Survey:

- During this phase of the

study. the positions of the feasible routes are set as closely as possible by:

1) Establishing all the control points.
2) Determining preliminary vertical and horizontal alignments for each.

→ Preliminary alignment are used to evaluate the economic and environmental feasibility of the alternative routes.

Economic Evaluations:

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.

- Road user costs
- Construction costs
- Maintenance costs
- Road user benefits
- Road user dis-benefits - such as adverse impacts due to dislocation of families, businesses and so forth.

→ Results of economic evaluation of the feasible routes:

- Provide information on the economic resources that will be gained or lost if a particular location is selected is selected
- Aid the policy maker in determining whether the highway should be built, and if so, what

type of highway it should be.

→ **Environmental Evaluation:**

- Highway construction at any location - significant impact on surroundings.

- A highway - an integral part of the local environment.
- Environment includes, plant, animal, and human communities and encompasses social, physical, natural, and man made variables.

- These variables are interrelated in a manner that maintains equilibrium and sustains the lifestyle of the different communities.

- The construction of highway at a given location may result in significant changes in one or more variables, which in turn may offset the equilibrium and result in significant adverse effects on the environment.

- This may lead to a reduction of the quality of the life of the animal and/or human communities.

- Essential to evaluate environmental impact of alignment selected.

- In cases environmental impact study (EIS) is required, it is conducted at this stage to determine

the environmental impact of each alternative route.

Q NO 3.

Vehicle Performance:

→ Acceleration and deceleration rates of vehicles are often critical parameters in determining highway design.

→ These rates often govern the dimensions of such design features:

- Freeway ramps
- Climbing or passing lanes
- Turnout bays for buses
- Acceleration and deceleration lanes.
- Highway alignment
- Determine the need for truck climbing lanes (steep grade)

Design Vehicle:

→ A design vehicle is selected to represent all vehicles on the highway.

→ For purposes of geometric design, each design vehicle has larger physical dimensions and a larger minimum turning radius than most vehicles in its class.

→ The vehicle type selected as the design vehicle is the largest that is likely to use the highway with considerable frequency.

Q NO 4.

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.

Directional Distribution Example:

→ For example, consider a rural road with a design volume of 4,000 vehicles per hour (vph) for both directions of travel combined.

→ If during the design hour, the directional distribution is equally split, or 2,000 vph is one direction, two lanes in each direction may be adequate.

→ If 80 percent of the DHV is in one direction, at least three lanes in each direction would be needed for 3,200 vph.