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Section

"A"

Paper Subject

Transportation Engineering - II

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Mid Exam

Question : 1

Keeping in view different modes of transportation compare railways with highways?

Mode of Transportation

Railways:

The transportation along the railways track could be advantageous by railway for the stations both for the passengers and goods, particularly for long distance.

It depends upon the roads transport; i.e. road could serve as a feeder system.

Energy required to drag a unit load through unit distance by the railways is only $\frac{1}{4}$ to $\frac{1}{5}$ of that required by road.

• Safety (minimum crash rate if handled carefully else severe crash can occur)

Highway

• It gives the maximum service to one all.

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

- It provide door to door service.
 - Other modes are depend on it.
 - It requires small investment for the govt.
 - Motor vehicles are cheaper than other carrier like rail engines.
 - It saves the time for short distance.
 - High degree of accident due to flexibility of movement.
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Question: 2

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?

exms: 2

Office study is the first phase in designing a new highway.

It is the examination of all available data of the area of proposed highway. By taking help from several source

Such as maps, Charts, Photographs etc, the area is investigated.

Preliminary Analysis of Data

- This step is usually done by taking the help from the several data sources eg:- Small-Scale research project and from other secondary sources.

- The extracted data help in indicating whether any specific site we should exclude for further consideration or not.

In Preliminary analysis

following data with area characteristics are collected:

Engineering Include

- The topography of the area.
- Geology of area
- Climate and traffic volume of area.

Social and Demographic Includes

- Land use and zoning pattern.

Environmental Include

- Type of Wildlife exists.
- Location of archeological historic sites.
- Possible effects of Pollution (air, noise, water)

Economic Include

- Unit construction cost and trend of agriculture, Industrial activities.
- After the analysis of all of the above data, a transportation engineer become able to select the general area of proposed area.

• After that, Preliminary location survey is conducted in which following evaluations are done.

Economic Evaluation

For determining the possible future effects of utilizing the resource during the construction period, this evaluation is conducted for each alternative route.

During this evaluation following factors are considered:

- Road user cost
- Construction Cost
- Maintenance Cost
- Road user benefit and dis-benefit.

Environmental Evaluation

For determining the significant effect of the construction on surrounding, this evaluation is done:

Following are the causes that badly affects the presence of living and non-living organisms:

- Plants are badly effected.

- Deforestation

- Noise, air & water pollution that causes headaches and other problems to the nearby residents.

- In short, it disturbs

the equilibrium and leaves
significance impact on
the environment.

Question: 4

Write a short note
on directional distribution
in design of highway?

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 direction is used to design two-lane roads.

• In the design of highway 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.

Question: 3

What is importance of vehicle performance in highway design?

Acceleration and deceleration rate of veh vehicles are often critical parameters in determine highway

These rates often govern the distribution dimension of such design feature:

- Freeway ramps
- Climbing or passing Lanes.
- Turnout bays for buses.
- Acceleration and

deacceleration Lanes.

- Highway alignment (adequate passing and stopping sight distance).

- Determine the need for truck climbing Lanes (steep grade).

Question: 6

Explain Alligator cracking, block cracking, longitudinal cracking and transverse cracking?

Ans: 6

Alligator Cracking

- Chicken-wire cracking, Spider web cracking, map cracking, etc.
- Indicative of fatigue failure of pavement due to repeated traffic loads.
- 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.
- > Occur in areas subjected to repeated traffic loading.

Block Cracking

- > A pattern of cracks that divides the pavement into approximately rectangular pieces, with sides generally longer than one foot.

- Rectangular blocks range in size from approximately 0.1 m^2 to 10 m^2
- Possible cause; Shrinkage of asphalt.

Longitudinal Cracking

- Cracks predominantly parallel to pavement centerline with in lane is significant.

- Possible causes:
Expansion and contraction of pavement material,
roadbed settlement,
poorly constructed paving joints.

Transverse Cracking

Causes:

- Slab Longer than

required.

- Excessive Thermal stresses.

~~Recess:~~

- Baking sealing
- Full-depth rigid repair
- Dowel bar retrofit.

Question: 5

Explain the broad
Classification of surface
distress modes?

Distress Surface

The surface distress is any indication of poor or unfavorable pavement performance or signs of impending failure; any unsatisfactory performance of a pavement start of failure.

Classification :-

Fracture :-

Fracture is the separation of an object or material into two or more pieces under the action of stress.

Distortion:-

The distortion is the alteration of the original shape of something.

In communications and electronics it means the alternation of the wave form of an information-bearing signal such as an audio signal.

Disintegration:-

The disintegration process: through loosening and even fragmenting the internal psychic environment. Through conflicts with in the internal environment and with external environment is the ground for the birth and development.