Mid Term Exam

Highway And Traffic Engg

ID # 7794

section A.

QNO.1):

Ans: Modes of Transportation:

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

1- Land (Road, rail and piplines)
2- Water (Shipping)
3- Air (Aircrafts)

Highways: Cars, Bus, Truck, non-motorized etc.

Railways: Passenger and Goods (Freight trains)

Airways: Aircrafts, Helicopters and Hot-air ballon

Waterways: Ships, boats, submarine etc

Continuous Flow systems: Pipelines, belts, elevator

Ropeway etc.

Airways:
- → Faster among all other modes.
- → More comfortable
- → Time Saving
- → Uneconomical.

2. Waterways:
- → Slowest among all other ways.
- → It needs minimum energy to drag unit load through unit distance
- → This can be possible between ports

on the sea routes or along the river.
→ Economical.

3- Railways:
. The transportation along the railways 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 i-e road could serve as a feeder system.
. 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.
. safety (minimum crash rate it handled carefully elsesever crash can occur).

Highways:
. It gives the maximum service to one and all.
. It gives maximum flexibility for travel with reference to 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 government.
. Motor vehicles are cheaper than other carries like rail engines.
. It save time for short distance.
. High degree of accident due to flexibility movement

QNO.2):

Ans. Office study for Designing New Highway: For a new highway the following materials and data can be extracted.

→ Data Examination (office study): The first phase is any highway location study is the examination of all available data of the area in which the road is to be constructed.

→ This phase is usually carried out prior to any field or photogrammetric investigation.

Data sources: (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 characteristic covered In data Collection:

- Engineering, including topography, geology, climate and traffic volumes.
- Social and demographic including land use and zoning patterns.

- Environmental, including types of wildlife location of recreational, historic and archeological sites and possible effect of air, noise and water pollution.
- Economic, including unit costs for construction and trend of agricultural, commercial and industrial activities.

Preliminary Analysis of 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 traverses 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.

QNO 5):

Ans: Vehicle Performance:

→ Acceleration and deceleration rates of vehicles are often critical parameters in determing 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 (adequate passing and stopping sight distance)
- Determine the need for truck climbing lanes (steep grade).

QNO.4):

Ans: Directional Distribution In Design Highway: → Highway must be designed to adequately serve the peak-hour traffic volume in 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.

Example:

→ Consider a rural road with a design volume of 4000 vechicles 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 DHV is in one direction, at least three lanes in each direction would be needed for 3200 vph.

Directional Design Hourly volumes

DDHV = AADT * K(peak hr) * D(peak dir - flow)

→ For design the K factor often represents the proportion of ADT occuring during the 30th peak hour of year.

Q No. 5):

Ans: Surface Distress Modes:

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

→ Fractures:

This could be in the form of cracking or breaking, generally due to excessive loading, fatigue, thermal changes.

→ Distortion:

This is in the form of deformation, which can result from such things an excessive loading densification, consolidation or subgrade issues.

→ Disintegration:

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

Q No 6):

Ans: Alligator cracking:

→ 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.

→ occurs in areas subjected to repeated traffic loadings.

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.

Logitudinal Cracking:

→ Cracks predominantly parallel to pavement centerline. Location within the lane (wheel path versus non-wheel path) is significant.

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

Causes: subsoil settelment.

Cures: • Joint sealing • Full Depth replacement.
• subsurface stabilization.

Transverse Cracking:

→ Cracking across the centerline, not due to reflection cracking.

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

Causes:

→ Slab longer than required.

→ Excessive thermal stresses.

Cures:

→ Crack sealing

→ Full depth rigid repair.

→ Dowel bar retrofit