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Subject: Transportation & Highway
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Question no 1

i) Compare railway & highway

Railway	Highways
→ Passenger & Goods are transported	→ Cars, buses, trucks etc move & transport goods & passengers
→ Depends upon road service Is not accessible from home door to your destination	→ Provides door to door service.
→ It is economical as it transfer more passenger and less cost about 1/5 of road	→ It is expensive & cost's more.
→ It is safe, minimum chances of crash.	→ It have highest possibility of accidents
→ Dependant upon roads	→ Independant
→ high Investment	→ Small Investment

Day: M T W T F S S

Question 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? what will you extract?

Answer: Office study of existing Information

Data Examination:

The first phase in any highway location study is to examine all available data before. The availble data can help us out about all the information of area where road is to be constructed.

Reference material:

- Existing engineering reports.
- Maps
- Aerial Photographs
- Charts
- Tests if already performed any
- Area measurements.

Data is collected on basis of road that is to be constructed.

Characteristics of Area:

It includes

- Topography
- Geology
- Climate & traffic volumes

→ Social & demographic, including land uses patterns

→ Economic, including unit cost for construction and the trend of agricultural, commercial, and industrial activities

Extraction of DATA:

I will extract following data,

- 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 gives facility to more people will be adopted

Question no 3

What is the importance of vehicle performance in highway design?

Answer:

Vehicle Performance is important in highway design because

- Acceleration & ~~dete~~ deacceleration
- Climbing or passing lane
- Maximum grades
- Freeway lamps
- Setting speed limit
- Adequate passing and stopping sight distance

Question no 4

Q Write short note on directional distribution in a design of highways.

Directional Distribution:

- Total hourly traffic in both direction is used to design two lane road.
- Highway must be design to adequately serve the peak hour traffic volume in the peak direction of flow
- Directional Traffic is used for multilane roads & street

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

Example:

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

In during the design hour, the directional distribution is equally split or 2000 VPH is one direction. Two lanes in each direction many 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 × k (Peak hour) × D (Peak dir - flow)

Question no 5

Q Explain broad classification of surface distress modes

Answer: Surface distress is "Any indication of poor or infavorable 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

1) Fracture
2) Distortion
3) Disintegration

Question no 6

Q Explain the following

Alligator cracking:

- Chicken wire cracking, spider web cracking, map cracking etc.
- Alligator cracking may be considered a combination of fatigue and block cracking.
- Occure in area subjected to repeated traffic loading.
- It is series of interconnected cracks of varies of various stages of development

Block cracking:

- A pattern of cracks that divide the pavement into approximately rectangular pieces with sides generally longer then one foot
- Rectangular block range in size from approximately $0.1\ m^2$ to $10m^2$

Longitudinal cracking:

∴ Possible causes:

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

Transverse cracking:

Causes

→ Slb longer than required

→ Excessive thermal stresses

Cures:

→ Crack sealing

→ Dowel bar retrofit

→ full depth rigid repair