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B

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6<sup>th</sup>

SUBJECT :-

HIGHWAY AND TRAFFIC ENGG.

INSTRUCTOR :-

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## QUISTION- 1

### MODES OF TRANSPORTATION.

Following are the modes of transportation

Highways

Railways

Air ways

Water ways.

Continuous flow system.

### COMPARING HIGHWAY AND RAILWAY

#### RAILWAYS:-

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

↳ It depends upon the road transport as road serves as a feeder system.

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

↳ Safety is higher compared to roads if handled carefully.

## HIGHWAY:

↳ Gives maximum service to one and all.

↳ Gives maximum flexibility for travel with reference to route, choice direction, time and traveling speed.

↳ It provide door to door service.

↳ Other modes depends on it.

↳ Requires small investment for government.

↳ Motor vehicles are cheaper than railways.

↳ It saves time for short distance.

↳ High degree of accident due to flexibility of moment.

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## QUESTION- 2

Following are the things which are to be studied and extract as an engineer while if tasked to conduct office study.

### OFFICE STUDY OF EXISTING INFO-

#### DATA EXAMINATION:-

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

#### REFERENCE MATERIAL:-

Following are the reference materials which are to be studied as an engineer.

- ↳ Existing engineering reports
- ↳ Maps
- ↳ Aerial photographs
- ↳ Charts.

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The type and amount of data collected and examined depends 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 trends of agriculture commercial and industrial activities.

## EXTRACTION OF DATA:

Following are the things that are to be extracted as an engineer.

Specific site (Historical, Archeological, or other important site to be extracted for

further consideration.

Long and difficult routes are extracted.

Costly roads are extracted

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### QUESTION- 3

Because of the following points vehical performance in highway design is very important.

Adequate Passing and Sloping site.

Free way lamps.  
Climbing or passing lanes

Maximum grades

Setting speed limit

Timing of signalized intersection

Acceleration and de acceleration

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## QUESTION - 4

### DIRECTIONAL DISTRIBUTION:-

Highway must be designed to adequately serve the peak hours traffic volumes in the peak direction of flow.

Total hourly traffic in both direction is used to design two lanes road.

In the design of the highway with more than two lanes and on two lanes road where important interchanges are encountered or where additional lanes are to be provided later, knowledge of the hourly traffic volume for each direction of traffic is used for multilane roads and streets.

One directional contributes by 55 to 70% in total traffic although occasionally 80% is observed.

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For example Consider a road with a design volume of 8000 Vehicals per hour for both direction of travel combined.

if during the design hour the directional distribution is equally split 4000 vph is at each direction.

if 80% of DHV is at one direction at least three lanes at each direction would be required for 6400 Vehicals.

Directional distribution directional design hourly volumes, DDHV + ADTs are converted to a peak hour volume in a peak direction of flow.

$$DDHV = ADT \times K (\text{Peak hr}) \times D (\text{Peak dir})$$



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## QUESTION- 5

### SURFACE DISTRESS:-

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

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

- 1- Fracture
- 2- Distortion
- 3- Disintegration

### FRACTURE:

This could be in the form of cracking or spalling resulting from such things as excessive loading, fatigue, thermal changes, moisture damage, slipping or contraction.

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## DISTORTION:-

Distortion is in the form of deformation (notting, corrosion, and shoving) which can result from such things as excessive loading, creep, densification, consolidation, swelling or frost action.

## DISINTEGRATION:-

Disintegration is in the form of stripping, raveling or spalling which can result from such things as loss of bonding, chemical reactivity, traffic abrasion, aggregate degradation, poor consolidation, compaction or binder aging.

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## QUESTION - 6

### ALLIGATOR CRACKING:

Cracking may be considered a combination of fatigue and block cracking. Alligator

It is a series of interconnected cracks of various stages of development.

It develops into many sided pattern that resemble chicken wire or alligator skin.

### 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  $0.1 \text{ m}^2$  -  $10 \text{ m}^2$ .

Possible cause is shrinkage of asphalt.

## LONGITUDINAL CRACKING:

Cracks predominantly parallel to pavement center line. Location with the lane is significant.

Possible cause of longitudinal cracking is expansion and contraction of pavement material, load bed settlement, poorly constructed paving joints.

## TRANSVERSE CRACKING:

Transverse cracking is caused due to slab longer than required or excessive thermal stresses.

It can be cured by crack sealing, full depth repair, and dowel bar retrofit.