

# Mid Term Exam ONLINE

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Section

"A"

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Subject

Highway & Traffic Engineering

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Keeping in view different mode of Transportation compare railway with Highway.

## Railway

- ① Railway are the steel tracks established on the ground
- ② The Transportation along the railway track could be advantageous by railway b/w the station.
- ③ Railways are best in case of longer distance.
- ④ Railway do not provide door to door service
- ⑤ Railway are depend upon road transport.
- ⑥ Total cost of railways are higher
- ⑦ The land capacity of Railway is higher

## Highway

- ① Highway are the mode of Transportation on land.
- ② Highway gives maximum flexibility for Travel with reference of its route choice direction, time and speed.
- ③ Highway are best in case of shorter distance.
- ④ Highway provide door to door service.
- ⑤ Other mode are depend on it.
- ⑥ Total cost less than that of railway.
- ⑦ Highways are not good for more loads.

Question No = 02:

You have a Transportation Engineer. you have been tasked to conduct office study as a Preliminary step for the design of New highway what reference material you will study and what data you will extract.

Answer: As a Transportation engineer, I will study that following materials and will extract important data from them as I have been given a task to conduct office study as a Preliminary step for design of new highway.

① Study of Pre existing information:

I will study the information which is already collected about the people, places of the area where the highway is to be constructed.

② Map study:

I will study the map and will suggest alternative possible routes.

I will study the Topographic map of the area which will help me to know the natural or artificial things or places in that area so that I can avoid route from them.

### ③ Traffic Volume :-

I will study the ~~for~~ traffic volume or frequency of the area which can help me to decide the width of the road and the numbers of lanes.

I will also study about the type of soil of the area.

### Data to be collected by studies :-

I will study different materials and will try to extract the following data from my study.

- Religious place or any other permanent structure of the area.
- Valleys, ponds, lakes, Hills etc.
- High Flood level of the area
- Soil Characteristics.
- Geological feature.

What is importance of vehicle performance in highway design?

### Vehicle Performance :-

Vehicle performance is the study of the motion of a vehicles which depends upon all the forces and moments that act upon it.

### Importance of Vehicle Performance in Highway Design :-

While designing a highways, the important parameters to be considered are Acceleration and deceleration rates of vehicles.

These parameters can help us to decide or choose the dimension of the following Highway design features:

- ① It can help us to decide where should we design a freeway ramp, where vehicles comes in and out of the highway
- ② Acceleration or deceleration lanes which is related to the speed of the vehicles.

- ③ Vehicle performance are also important to decide the lanes for slower vehicles and also lanes for speedy vehicles.
- 4) It also help us to decide the dimension and position or location for bus bay or bus turnout
- 5) Having an idea about the vehicle performance can help us in highway alignment so that to have enough passing and stopping sight distance.
- ⑥ Vehicle performance is very important in highway design because it help us while designing different design feature of highways.

Question = 04

Write short note on Directional distribution in design of highways.

Directional Distribution:-

Directional distribution is the factor reflecting the proportional of Peak-hour traffic traveling in the peak direction.

Directional distribution in design Highway

Consideration of directional distribution in the design of highway is every much important as ~~much~~ we see most of the time there is much more traffic in direction than the other.

- It can help us in choosing the number of lanes in the highway.
- Highways should be designed to adequately serve the peak hour traffic volume in the Peak direction of flow.
- For Rural and Sub-urban area road. The directional distribution factor should range from 55 to 80 percent.

Question = 05

Explain broad classification of surface distress mode.

Surface Distress :-

Surface distress is actually the indication or sign of poor performance of pavement and the indication of failure of pavement.

Classification of Surface Distress mode

Surface distress mode can be classified into the following three categories.

- ★ Fracture
- ★ Distortion
- ★ Disintegration.

1) Fracture :- This type of surface distress could be possible in the form of cracking. It can occur both in flexible and rigid pavements.

This can occur due to excess of the loading, fatigue, slippage or contraction etc.



## 2) Distortion :-

Another type of surface distress is distortion which occurs in the form of deformation.

This distortion can occur due to excessive loading, creep, consolidation, swell or frost action.

## 3) Disintegration :-

As clear from its name this type of surface distressing is in the form of stripping, ravelling or spalling.

This type of surface disintegration occurs due to weakness in bonding, chemical reactivity, traffic abrasion, degradation of aggregate, poor or weak compaction etc.

Question = 06

Explain Alligator Cracking, block cracking, longitudinal cracking and transverse cracking.

### ★ Alligator Cracking :-

Alligator cracking is also called Corcodile Cracking as the pattern form by this type of cracking is like a Corcodile skin.

- ⇒ This is one of the most common way that asphalt pavement can decline over time
- ⇒ This is one of the serious problem that an asphalt surface can produce.
- ⇒ This type of cracking occurs due to over loading.

★ Block Cracking :- This type of cracking in the pavement is found more commonly in low volume road pavement, residential driveways and parking spaces etc.

- ⇒ Block cracking is extremely rough and as it worsens, it leaves that area unfit for transportation use.
- ⇒ This type of cracking does not occur due to excess of load but due to the asphalt binding agent.

- ⇒ When the binder becomes older, it becomes hard and the pavement starts contracting slightly and the pavement is not able to flex like it was before.
- ⇒ This type of cracking can also occur due to the poor asphalt binder in the mix design.
- ⇒ Larger blocks are normally classified as longitudinal and transverse cracking.
- ⇒ Block range in size from almost  $0.1\text{m}^2$  to  $9\text{m}^2$ .

### Longitudinal Cracking :-

- ⇒ This type of cracking occurs parallel to the center line of the pavement road.
- ⇒ These can be mostly caused by a poorly constructed joint or shrinkage of the asphalt layer.
- ⇒ These cracks are also not due to over loading.

## Transverse Cracking :-

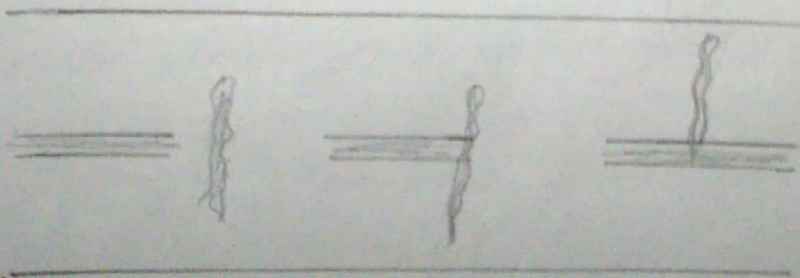
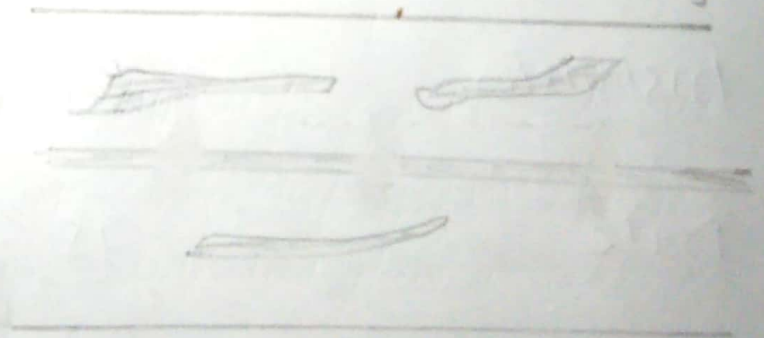
Unlike of the longitudinal cracking, this type of cracking occur almost perpendicular to the centerline of the pavement.

- ⇒ These types of cracks cannot be produced due to overloading.
- ⇒ Transverse cracking may produce due to the ~~stri~~ shrinkage of the asphalt layer.
- ⇒ These cracks can also occur from the reflection of an existing crack.

Alligator Cracking



Longitudinal Cracking



Transverse Cracking