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Section B

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Subject "Highway and Traffic Engineering"

Submitted To,

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Q.1 Compare railway and Highway with respect to different modes of transportation.

Railway

Highway

① The transportation along the railways track could be advantageous by railways b/w the station both for passengers and goods.

① It gives maximum service to one and all and flexibility is maximum for travel with reference to route, direction, time and speed travel.

① It depend upon the road transport

① Other modes are depend on it.

① It does not provide door to door service

① It provide door to door service.

① Rail locomotives are expensive

① Motor vehicles are cheaper

① It required large investment from government

① It required small investment from government.

⊙ Minimum Crash Rate due to no flexibility of movement.

⊙ High degree of accident due to flexibility of movement

⊙ Save time For long distance

⊙ Save time For short distance.

Q.2

"Preliminary Survey For design of new High"

As a transportation Engineer I have been design a new highway and I will study the following materials and I will extract the data as a preliminary step for office study.

① The position of the feasible routes are set as closely as possible by

- (i) Establishing all control point.
- (ii) Determine preliminary vertical and horizontal for each.

Economic Evaluation :-

economic evaluation of each alternative route is carried out.

① The following factors should be considered in each economic evaluation.

- ① Road user costs
- ① Maintenance cost.
- ① Road user benefits.

① Construction cost.

② =

Environmental Evaluation :-

Highways Construction is significant impact on surrounding at any location.

① The construction of a highway at a given location may result significant change in one or more variable.

② Essential to evaluate environmental of alignment selected.

③ In case environmental Impact Study (EIS) is Required it is conducted at this stage determine the environmental impact of each alternative route.

④ (EIS) will determine the (-tive) or (+tive) effect. The highway facility will have no ev environment.

Q.3 Importance of vehicles performance in Highway design are;

- ⊙ Static
- ⊙ Dynamic
- ⊙ Kinematics

⊙ Static :-

The weight and size of vehicles is important in determine the physical component of highway such as;

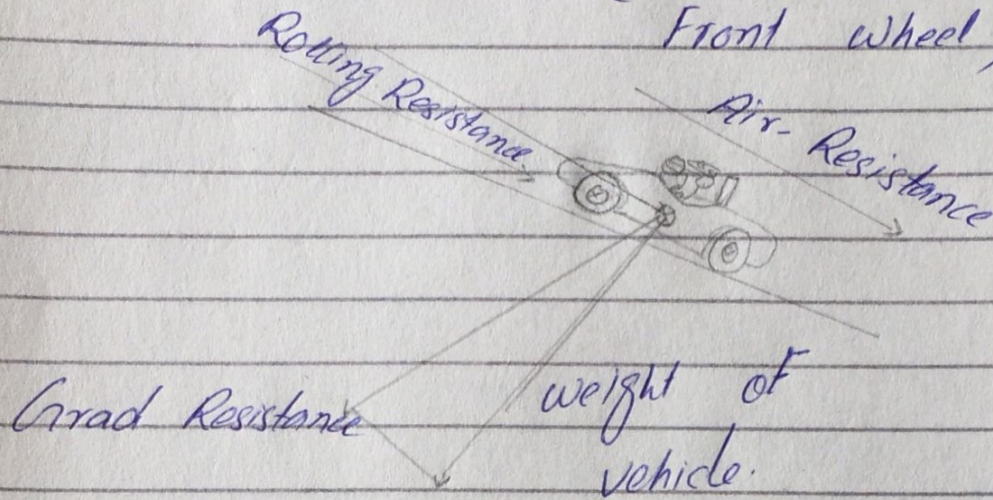
- ⊙ Lane width
- ⊙ Shoulder width
- ⊙ length and width of parking bays.
- ⊙ Length of vehicles curve
- ⊙ pavement depth.

⊙ Dynamic :-

The Forces that are act on a vehicles while it is motion are;

- ⊙ Air Resistance - (Front of vehicles)
- ⊙ Grade Resistance - (opposit Forces acting on grade to move the vehicles)

- ⊙ Rolling Resistance - (Frictional slip)
- ⊙ Curve Resistance - (external force on front wheel)



Kinematics :-

Primary element is the acceleration capability of vehicle.

- ⊙ Acceleration is important in operation of passing maneuver and gap acceptance.
- ⊙ Dimension of highway also determine through acceleration capability.
- ⊙ In determining forces that causes motion.
- ⊙ Involve the study how acceleration rates influence the element of motion such as velocity, distance and time.

Q.4 Directional Distribution :-

Directional Distribution can be define as;

The percentage of heavier volume over the total highway volume.

① Directional distribution divided total traffic volume into two opposite direction of traffic flow.

② Highways must be design to adequate serve the peak hour traffic volume in peak direction of flow.

③ Two line road design for total hourly traffic in both direction.

④ In the design of highway with more than two line where importance intersection are encountered or where additional lines are to be provided later.

① Directional traffic is to be used for multiplane road or streets.

② Mostly the one direction contributes by 55-70% in total traffic through. Occasionally 80% observed.

③ It is important to use for converting average daily traffic to directional peak hour traffic.

Q.5

Classification of Surface Distress mode :-

Surface distress mode can be classified broadly into three group.

- (1) Fracture
- (2) Distortion
- (3) Disintegration

(1) Fracture :-

Fracture is occurring in the form of cracking or breaking.

It occur generally due to high loading, Fatigue and Thermal changes or environment

The repair depends on the types of crack.

(2) Distortion :-

It is occur in the form of ~~stripping~~ ^{deformation} of paving materials.

It is caused due to the instability of asphalt mix or weakness of the base or sub-grade layers.

These distress may include rutting, shoving, depressions, swelling and patch failures.

(3) Disintegration :-

Disintegration occurring in the form of stripping or removal of paving material. (lost bonding, chemical reactivity) etc.

Disintegration is the breakup of a pavement into small pieces that are lost with time and traffic.

Raveling and potholes are the most common type of disintegration.

Q.6

Alligator Cracking:-

It is also known as map cracking or crocodile cracking or Fatigue Failure. Since it appears similar as alligator skin so it is called as alligator cracks.

⊙ Alligator cracks is in the series of interconnected cracks at various stages of development.

⊙ The failure can be due to weakness in the surface, base, or sub grade: a surface or base that is too thin: poor drainage or the combination of three.

⊙ Alligator crack is one of the most serious issue that effect on asphalt surface in Austin.

⊙ The main reason of this types of failure is the repetitive application of heavy movement of traffic.

Block Cracking :-

⊙ Block cracks look like large interconnected rectangles (roughly)

⊙ The size of the rectangle block is from approximately 0.1m^2 to 10m^2

⊙ Generally it is caused by shrinkage of the asphalt pavement due to an inability of asphalt binder to expand and contract with temperature cycles.

⊙ This can be because the mix was mixed and placed too dry.

⊙ They spread over a larger area of ground.

⊙ Mainly occur due to shrinkage of asphalt.

Longitudinal Cracking:-

① Longitudinal cracks are individual and run parallel to centerline.

② This distress can be considered as either a structural or an environmental distress.

③ These can be a result of both pavement fatigue, reflective cracking, and/or poor joint construction.

④ Cases of the longitudinal cracks mainly expansion and contraction of pavement material, road bed settlement, poorly constructed paving joints.

Transverse Cracking:-

- ① Transverse Cracks are single cracks perpendicular to the pavement's centerline or laydown direction.
- ② Transverse Cracks can be caused by reflective cracks from an underlying layer, daily temperature cycle and poor construction due to improper.