QUESTION BANK

CE 6006 TRAFFIC ENGINEERING AND MANAGEMENT

UNIT V TRAFFIC MANAGEMENT

2 MARKS

1. What are the traffic management measures?

Some of the well-known traffic management measures are:

a) Restrictions on turning movements

b) One - way streets

c) Tidal - flow operations

d) Exclusive bus lanes

e) Closing side streets

2. What is Transportation System Management (TSM)?

Transportation System Management (TSM) is a package of short term measures to make the most productive and cost - effective use of existing transportation facilities, services and modes.

3. List out the various types of Travel Demand Management (TDM) techniques.

The following are some of the techniques of Travel Demand Management (TDM):

a) Car pooling and other ride-sharing programmes

b) Peripheral parking schemes

c) Road pricing

d) Entry fee

e) Priority for buses in traffic.

f) Restriction on entry of trucks during day time

4. What is period of forecasting?

Since the traffic forecasting is needed for transport plans, the design period selected for transport plans should be sufficient for traffic forecasting. In general, transport plans are for a period of about 5 to 10 years in detail and an additional five years in less detail. In U.K., it is customary to forecast traffic for a design period of 15 years when dealing with rural roads. In India, National Highways are designed for 15 years after completion of work.

5. What is Aggregate and Disaggregate Models in Traffic Forecasting?

Aggregate models deal with the estimation of travel of a group of travellers. Disaggregate models deal with the smallest decision making unit, the individual traveller.

6. What is the purpose of one - way streets?

One-way streets provide the most immediate and the least expensive method of controlling the traffic conditions in a busy area. In combination with other methods such as banned turning movements, installation of signals and restrictions on loading and waiting, the one-way street system is able to achieve great improvement in traffic congested areas.

7. What are the disadvantages of one - way streets?

The disadvantages of one - way streets are:

a) Although the journey times and delays are reduced, the actual distances to be covered by drivers increases

b) Where buses operate on the streets, the stops will have to be relocated and in many instances the passengers will have to walk extra distances

c) In the initial stages of introduction of one-way streets, confusion is likely to be created amongst motorists and pedestrians

8. Write any two advantages of closing side streets.

The advantages of closing side streets are:

a) Since interference from the traffic from side streets is eliminated, the speed increases, journey time reduces and accidents reduces

b) The side - streets which are closed can be utilised for parking of vehicles, if there is an acute shortage of parking space in the area

9. What is meant by traffic regulations?

The traffic regulations should cover all aspects of control of vehicles, driver and all other road users. The regulations should be rational. Traffic regulations and laws give legal coverage for strict enforcement.

Traffic regulations and laws cover the following four phases:

a) Driver controls

b) Vehicle controls

c) Flow regulations

d) General controls

10. Define - Traffic Calming

Traffic calming consists of physical design and other measures for the intention of reducing the motor vehicle speed as well as to improve the safety of pedestrians and cyclists. Traffic calming includes the engineering measures such as:

a) Narrowing traffic lanes

b) Speed bumps

c) Speed humps

d) Speed cushions

e) Speed tables

11. What is meant by tidal flow operation in Traffic Management?

The morning peak results in a heavy attraction of flow towards the city centre, whereas the evening peak brings in heavier flow away from the city centre. In either case, the street space provided for the opposing traffic will be found to be in excess. This phenomenon is called as 'Tidal flow'. One method of dealing with the problem of tidal flow is to allot more than half the lanes for one direction during peak hours. This system is known as 'Tidal flow operation', or 'Reverse flow operation'.

12. What is meant by Exclusive Bus Lanes?

Exclusive bus lane is provided by reserving a lane of the carriageway exclusively for bus traffic. This is possible only in situations where the carriageway is of adequate width and a lane can be easily spared for the buses. This implies that there should be atleast 3 lanes in each direction. For reasons of convenience of alighting and embarking passengers at the curb, the exclusive bus lane has to be adjacent to the curb.

13. What are the uses of exclusive bus lanes in road traffic?

The following are some of the uses of exclusive bus lanes in road traffic:

a) The journey time of buses can be considerably reduced

b) Bus journey can be made more attractive

c) Regularity of buses can be improved

14. Define – ITS

Intelligent Transport Systems (ITS), also known as Transport Telematics, are transport systems that apply modern information technologies to improve the operation of transport networks.

The ITS acquires vast volume of data on various aspects of transport operation (such as traffic volume, speed, headway), process them and apply the result to guide traffic, improve operations, enhance safety and transport costs.

15. List out the uses of ITS in traffic engineering.

ITS can cover a wide variety of application such as:

a) Monitoring traffic flow

b) Monitoring incidents on the road

c) Traffic control on urban roads

d) Public Transport Management Systems

e) Electronic collection of toll

f) Electronic Road Pricing System

16 MARKS

1.Write In Detail About Intelligent Transport Systems And Their Applications

ITS is the application of computer technology to the transport sector. ITS systems gather data about the transport system, process it, and then use the processed data to improve the management of the transport system, and/or to provide the transport user with more and better information on which to base their transport decisions.

ITS can help transport planners to achieve policy objectives in many different ways. It can help to tackle congestion, pollution, poor accessibility and even social exclusion. It can also help to reduce journey times and improve reliability – either in actuality, or simply by changing people's perceptions. And it can improve the efficiency with which transport systems function. In certain circumstances – for example, parking guidance systems – it can help to support economic and retail vitality. When thinking about ITS it is vitally important to consider it, not as an end in itself, but as a means to achieve your (transport) policy objectives. It is possible that in some circumstances ITS may not be the best means of achieving transport policy objectives, but in other circumstances, it will. The trick is to select it for the latter situation, not the former.

ITS applications

There are many ways to group ITS applications, and one possible way is as

follows:

(a) Traveler information

Pre-trip information

On-trip driver information

On-trip public transport information

Personal information services

Route guidance and navigation

(b) Traffic Management

Transportation planning support

Traffic control

Incident management

Demand management

Policing/enforcing traffic regulations

Infrastructure maintenance management

(c) Vehicle

Vision enhancement

Automated vehicle operation

Longitudinal collision avoidance

Lateral collision avoidance

Safety readiness

Pre-crash restraint deployment

(d) Commercial Vehicle

Commercial vehicle pre-clearance

Commercial vehicle administrative processes

Automated roadside safety inspection

Commercial vehicle on-board safety monitoring

Commercial vehicle fleet management

Automated Diagnostic Systems

(e) Public Transport

Public transport management

Demand responsive transport management

Shared transport management

(f) Emergency

Emergency notification and personal security

Emergency vehicle management

Hazardous materials and incident notification

(g) Electronic Payment

Electronic financial transactions

(h) Safety

Public travel security

Safety enhancement for vulnerable road users

Intelligent junctions

Most of the above applications can be grouped into the following goals:

(a) Safety

(b) Mobility

(c) Management and revenue collection

(d) Energy and Environment

2.write in detail about Transportation Demand Management

Transportation Demand Management (TDM) is a strategy to reduce demand for single occupancy vehicle use on the regional transportation network. As a regional strategy to improve transportation system performance, TDM can reduce highway congestion and traveler delay; improve air quality; and improve access to jobs, schools, and other opportunities.

TDM strategies can be broken down into the following categories:

Traveler Information – coordinated regional multi-modal traveler information/511 services, itinerary route and transit planning assistance, awareness campaigns, construction congestion-mitigation.

Employer and Campus Transportation Demand Management – support for employer, campus, TMA, and other site-specific TDM programs

Auxiliary Transit Services. Emergency ride home programs, carpool and vanpool development programs, car sharing, rail shuttles.

Market and Financial Incentives – tax incentives for commuters and employers, commuter rewards programs, pay-as-you-drive insurance and taxation.

Travel Demand Management (TDM) is a broad term to describe interventions designed to better manage the demand for travel. Such interventions generally exclude the provision of major infrastructure and aim to modify travel decisions so that the adverse impacts of travel can be reduced.

TDM strategies can generally be grouped into one of four areas: improved asset utilisation (e.g. high occupancy vehicle lanes), traffic restraint (e.g. car parking supply restrictions), pricing (e.g. road/cordon pricing) and urban and social changes (e.g. land use changes, travel behaviour change programs).

This research area is relatively broad and covers the development, appraisal and evaluation of TDM initiatives, modelling of road pricing impacts, land use and travel behaviour interactions, car and bicycle parking policies, and travel behaviour change programs.

Benefits of TDM

- Reduced traffic congestion
- Reduced infrastructure investment costs (parking spaces, road maintenance, etc)
- Improved air quality
- Improved overall community health
- Improved travel options for the economically disadvantaged
- Less dependence on fossil fuels
- Reduced overall cost of parking, gasoline, insurance and wear/tear on automobiles
- Reduced greenhouse gas emissions
- Improved access to jobs
- Increased worker productivity

Road Pricing

In dense urban cities, the space for road construction is usually quite limited, thus new construction of road infrastructure is not a sustainable solution for the development of transport systems. In view of the expanding population and car ownership in urban areas, how to satisfy the people's travel desires becomes a big challenge. Hence, traffic demand management is a sound solution for congestion mitigation: diverting traffic demand from congested areas to uncongested roads, so as to achieve a reasonable use of network resources. By reasonably setting toll charges in congested areas, drivers with lower value-of-time and low trip emergency would detour on the less congested or un-tolled roads. Our study on urban congestion pricing focuses on the determination of optimal charging locations as well as the optimal toll rate, with the aim of minimising congestion level on the entire transport network.

Road Pricing means that motorists pay directly for driving on a particular roadway or in a particular area. Value Pricing is a marketing term which emphasizes that road pricing can directly benefit motorists through reduced congestion or improved roadways. Managed Lanes is

a general term for various roadway management strategies, including HOV, HOT, and congestion priced lanes.

Economists have long advocated Road Pricing as an efficient and equitable way to Finance Roads other Transportation Programs, and encourage more efficient transportation. Road Pricing has two general objectives: revenue generation and congestion management.

3.Write short notes on travel demand management techniques

Exclusive bus lane

Exclusive bus lane is provided by reserving a lane of the carriageway exclusively for bus traffic. This is possible only in situations where the carriageway is of adequate width and a lane can be easily spared for the buses. This implies that there should be atleast 3 lanes in each direction. For reasons of convenience of alighting and embarking passengers at the curb, the exclusive bus lane has to be adjacent to the curb.

One-Way Street

A **one-way street** is a **street** either facilitating only **one-way** traffic, or designed to direct vehicles to move in **one** direction. **One-way streets** typically result in higher traffic flow as **drivers** may avoid encountering oncoming traffic or turns through oncoming traffic.

Advantages

1. A reduction in the points of conflict
2. Increased capacity
3. Increased speed
4. Improvement in parking facilities
5. Eliminatio88elimination of head on collision

Disadvantages

1. Although the journey time and delays are reduced ,the actual distances to be covered by drivers increase
2. The bus stops will have to be relocated and in many instances the passengers will have to walk extra distances

Traffic calming

Traffic calming consists of physical design and other measures for the intention of reducing the motor vehicle speed as well as to improve the safety of pedestrians and cyclists. Traffic calming includes the engineering measures such as:

a) Narrowing traffic lanes

b) Speed bumps

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Tidal Flow Operation

The morning peak results in a heavy attraction of flow towards the city centre, whereas the evening peak brings in heavier flow away from the city centre. In either case, the street space provided for the opposing traffic will be found to be in excess. This phenomenon is called as 'Tidal flow'. One method of dealing with the problem of tidal flow is to allot more than half the lanes for one direction during peak hours. This system is known as 'Tidal flow operation', or 'Reverse flow operation'.

Restrictions of turning movements

At a junction ,the turning includes left-turners and right-turners .Left turning traffic does not usually obstruct traffic flows through the junctions ,but right turning traffic can cause serious loss of capacity .

At times ,right turning traffic can lock the flow and bring the entire flow to a halt.One way of dealing with heavy right turning phase in the signal scheme ,or to introduce an early cut off or late start arrangement.These schemes have their limitations and result in a long signal cycle .

1. Prohibited right turning movement
2. Prohibited left turning movement

Closing side streets

A main street may have a number of side streets where the traffic maybe very light .In such situations ,it maybe possible to close some of these side streets without affecting adversely the traffic and yet reap a number of benefits .

Advantages

1. The traffic from side streets is eliminated ,the speed increases ad journey time reduces
2. The accident get reduced

Disadvantages

1. Closure of a number of cross streets may increase the flow to and from the remaining cross roads .This may necessitate signal control and other measures at these junctions.
2. When a number of side streets are closed ,the immediate effects is an increase in the parking of vehicles on the main street itself .It leads to delays and lower speeds .