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Internal Assesment Test – 3

Sub: Urban Transport planning				Code: 10CV843
Date: 27/5/2017	Duration: 90 mins	Max Marks: 50	Sem: 8th	Branch (sections): civil (A,B,)

Answer any three questions from PartA & two from Part B

		Marks	OBE	
			CO	RBT
	PART A			
1.	Explain with flow diagram of system approach to transport planning.	[10]	CIV804.1	L4
2	Explain advantages and disadvantages of pre distribution and post distribution modal split.	[10]	CIV804.1	L4
3	List the various types of transport survey that are to be carried out. Explain any two in details.	[10]	CIV804.2	L1, L4
4	Explain post distribution modal split with the help of flow diagram.	[10]	CIV804.3	L4

PART B

4. The trip rate(y) corresponding household sizes (x) from a sample are shown in table below. Fit a linear equation relating trip rate and household sizes.

[10] CIV804.1 L3

Household(x)	1	2	3	4
Trips per day (Y)	1	2	4	6
	2	4	5	7
	2	3	3	4

5. Utility function for a travel pattern in a medium city by Automobile, bus & local as follows. $U=a-0.004X_1-0.09X_2$. Where X_1 and X_2 cost of travel and travel time Respectively . Calculate modal split for the given value.

[10] CIV804.2 L3

Mode	a	X_1	X_2
Automobile	-0.35	130	32
Bus	-0.40	25	50
Local train	-0.45	65	45

CI   CCI   HOD

Question no-1

System approach to transport planning:

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                    ┌─────────────────────────────┐
                    │  Decision to make planning  │
                    └─────────────────────────────┘
                                   │
                                   ▼
    ┌──────────────────────────────────────────────────────┐
┌──▶│ Problem defination & formulation of goal             │
│   └──────────────────────────────────────────────────────┘
│                              │
│                              ▼
│            ┌─────────────────────────────┐
├───────────▶│     Solution generation     │
│            └─────────────────────────────┘
│                              │
│                              ▼
│            ┌─────────────────────────────┐
│    Ev      │      Solution analysis      │
│            └─────────────────────────────┘
│                              │
│                              ▼
│   ┌──────────────────────────────────────────────────┐
│   │   Evaluation of alternative solutions            │
│   └──────────────────────────────────────────────────┘
│                              │
│                              ▼
│            ┌─────────────────────────────┐
│            │        Implementation       │
│            └─────────────────────────────┘
│                              │
│                              ▼
│            ┌─────────────────────────────┐
│            │          Operation          │
│            └─────────────────────────────┘
│                              │
│                              ▼
│   ┌──────────────────────────────────────────────────┐
└───│       Performance assessment                     │
    └──────────────────────────────────────────────────┘
```
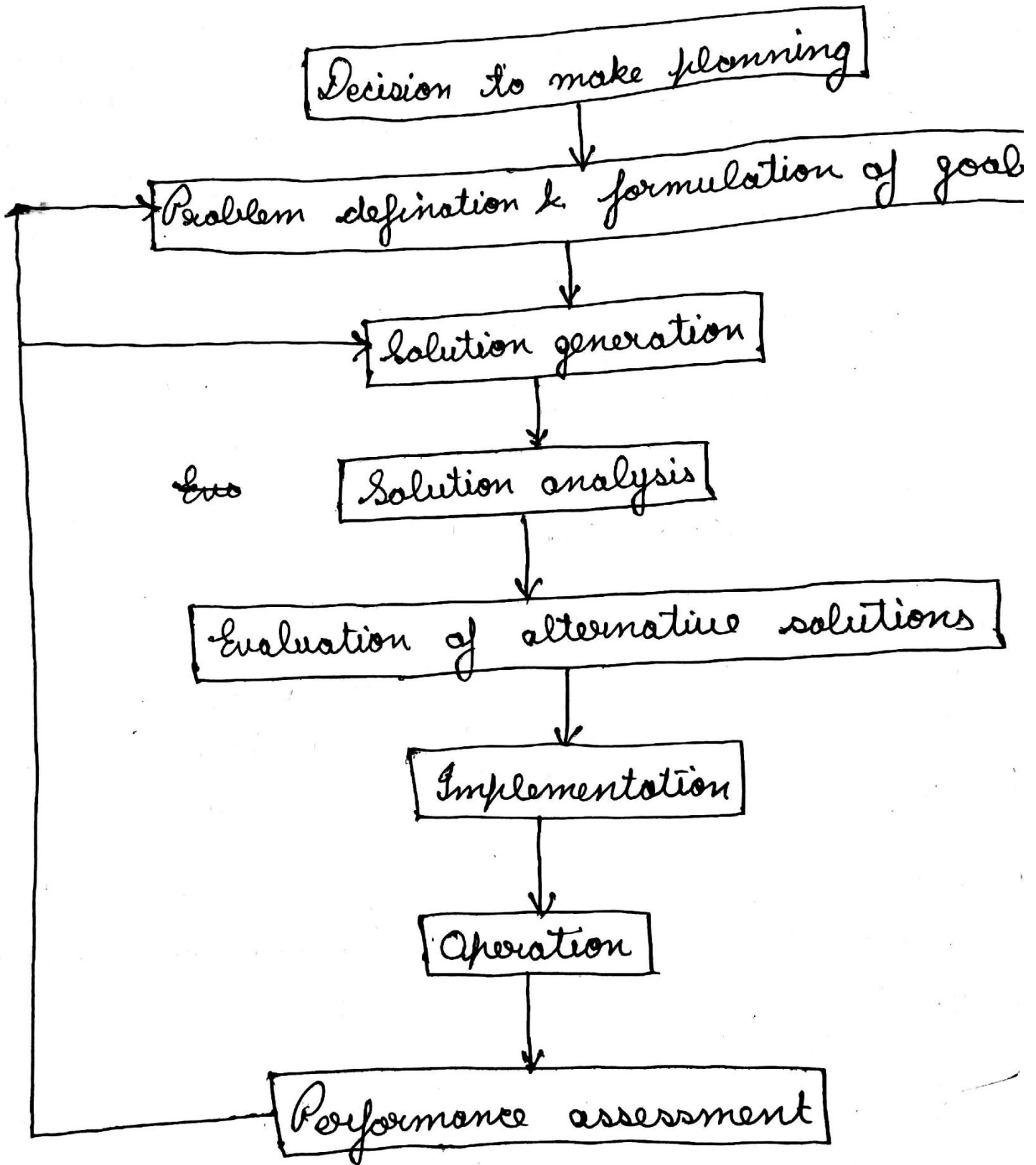
Forecasting of the population and economic development of the area under consideration.

Allotment of the landuse characteristic on the basis of the area.

The problem should be find out ultimate goal should be noted.

Different solutions should be generated and should be analysed properly.

Now the evaluation of different solution based on the feasibility, economic, household characteristic is done and one solution is selected.
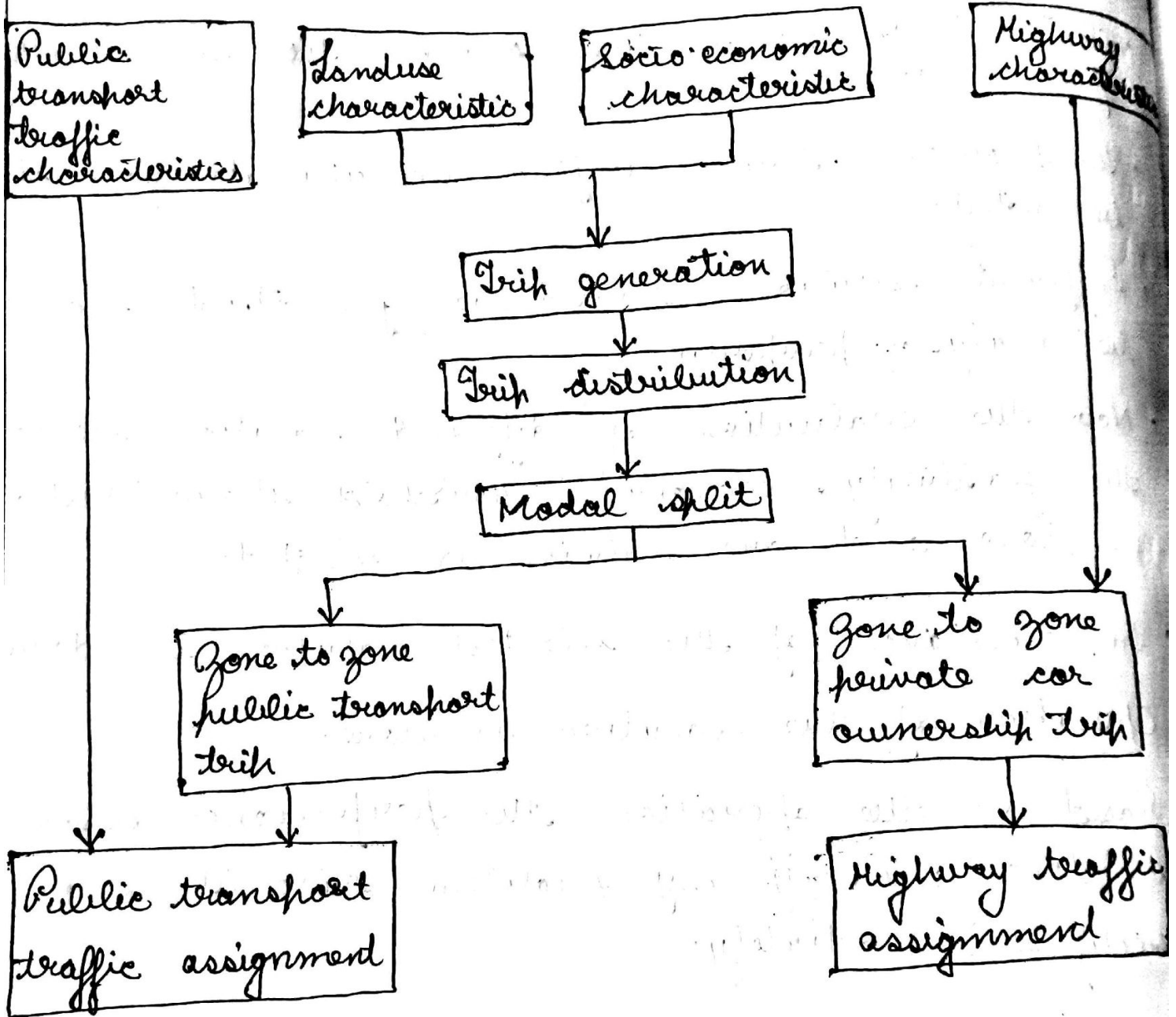
Implementation of the selected solution is done.

Operation of the solution is done.

Based on the operation the performance assessment is done and if any problem arise it should be rectified immediately.

Question no - 4

Post distribution modal split :

```
┌──────────────┐     ┌──────────────┐   ┌──────────────┐          ┌──────────────┐
│ Public       │     │ Landuse      │   │ Socio-economic│         │ Highway      │
│ transport    │     │ characteristic│  │ characteristic│         │ characteristic│
│ traffic      │     └──────┬───────┘   └──────┬───────┘          └──────┬───────┘
│ characteristics│          │                  │                         │
└──────┬───────┘            └────────┐         │                         │
       │                             ▼         ▼                         │
       │                       ┌──────────────────┐                      │
       │                       │  Trip generation  │                     │
       │                       └─────────┬────────┘                      │
       │                                 ▼                               │
       │                       ┌──────────────────┐                      │
       │                       │  Trip distribution│                     │
       │                       └─────────┬────────┘                      │
       │                                 ▼                               │
       │                       ┌──────────────┐                          │
       │                       │  Modal split  │                         │
       │                       └──┬────────┬──┘                          │
       │                          │        │                             │
       │              ┌───────────┘        └──────────────┐              │
       │              ▼                                    ▼              ▼
       │       ┌──────────────┐                     ┌──────────────────┐
       │       │ Zone to zone │                     │ Zone to zone     │
       │       │ public transport│                  │ private car      │
       │       │ trip         │                     │ ownership Trip   │
       │       └──────┬───────┘                     └─────────┬────────┘
       │              │                                       │
       ▼              ▼                                       ▼
┌──────────────────────┐                            ┌──────────────────┐
│ Public transport     │                            │ Highway traffic  │
│ traffic assignment   │                            │ assignment       │
└──────────────────────┘                            └──────────────────┘
```

In this procedure the modal split is done after the trip distribution. It is very useful for public transport traffic assignment. In this method, zone-to-zone characteristic is analysed precisely. It is complex and costlier than pre distribution

<u>Question no - 3</u>

Various types of transport survey :
- Home interview survey
- Postcard questionaire
- Public transport survey
- Roadside interview survey
- Taxi survey
- Commercial vehicle survey
- Tag on vehicle survey
- Registration number plate survey.

<u>Roadside interview survey</u> :
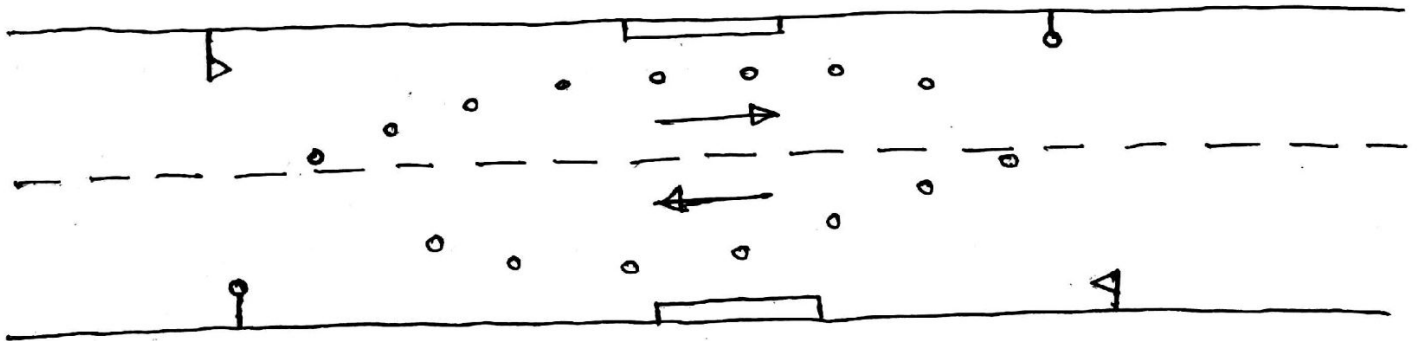
- ₱ - roadside interview ahead please co-operate
- ▭ - helpdesk or interview point.
- → - movement of the traffic
- ₽ - end of survey, thankyou for co operation

- In this survey, the vehicles are slowed down at the interview point and one traffic police should be present.

- Post should be there to indicate survey ahead or end of survey.

- Basic questions that should be asked are about the no. of trips they made, how safe the road is, how convinent the road is.

- The one major disadvantage is that traffic conjection at that point.

- The advantage is that all the necessary data is collected and is the most reliable.

Post card questionaire :

In this method, a postcard containing all the necessary questions is given the to public, the public should fill the postcard and has to post it.

The advantage of this survey is that there is no traffic conjection and a large no. of survey can be done within short frame of time.

The disadvantage is that the public will not fill proper data or the public will not even bother to post it. Hence, it is not reliable.

Household (x)	1	2	3	4
Trips per day (y)	1	2	4	6
	2	4	5	7
	2	3	3	4

$y = a + bx$

$b = \dfrac{n \sum xy - \sum x \sum y}{n \sum x^2 - (\sum x)^2}$

$a = \bar{y} - b\bar{x}$

$\sum x = (1 \times 3) + (2 \times 3) + (3 \times 3) + (4 \times 3)$
   $= 30$

$\sum x^2 = (1^2 \times 3) + (2^2 \times 3) + (3^2 \times 3) + (4^2 \times 3)$
   $= 90$

$\sum y = 1 + 2 + 2 + 2 + 4 + 3 + 4 + 5 + 3 + 6 + 7 + 4$
   $= 43$

$\sum xy = (1 \times 1) + (1 \times 2) + (1 \times 2) + (2 \times 2) + (2 \times 4) + (2 \times 3) + (3 \times 4) + (3 \times 5) + (3 \times 3) + (4 \times 6) + (4 \times 7) + (4 \times 4)$
   $= 127.$

n = no. y samples

$$= 3 \times 4$$
$$= 12.$$

$$\bar{y} = \frac{\Sigma y}{n} = \frac{43}{12} = 3.58$$

$$\bar{x} = \frac{\Sigma x}{n} = \frac{30}{12} = 2.5$$

$$b = \frac{12 \times 127 - 30 \times 43}{12 \times 90 - 30^2} = 1.3$$

$$a = \bar{y} - b\bar{x}$$
$$= 3.58 - 1.3 \times 2.5$$
$$= 0.33.$$

Linear equation,
$$y = 0.33 - 1.3x$$

Mode	a	X_1	X_2
automobile	−0.35	130	32
bus	−0.40	25	50
local train	−0.45	65	45

$$u = a - 0.004 X_1 - 0.09 X_2$$

automobile, $u = -0.35 - 0.004 \times 130 - 0.09 \times 32$

$$= -3.75$$

bus, $u = -0.40 - 0.004 \times 25 - 0.09 \times 50$

$$= -5$$

local train $= -0.45 - 0.004 \times 65 - 0.09 \times 45$

$$= -4.76$$

Mode	u	e^u	P_j	% P
automobile	−3.75	0.0235	0.6058	60.58%
bus	−5	6.73×10^{-3}	0.1734	17.34%
local train	−4.76	8.56×10^{-3}	0.2206	22.06%