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REG NO 14374



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TRANSPOTATION PLANNING AND MANAGEMENT

QUESTION NO 4

Using the net present value

1. CNG bus

$$(25\text{uspwf}(7\%,11)-60-(16.048+7.99)\text{uspwf}(7\%,11)+7.04\text{sppwf}(7\%,11))=-49.44$$

2. BUS RAPID TRANSIT

$$27\text{uspwf}(7\%,12)-50-(19.589+12.116)\text{uspwf}(7\%,12)+11\text{sppwf}(7\%,12)=-82.49$$

3. LIGHT RAIL

$$29\text{uspwf}(5\%,12)-66-(19.554+16)\text{uspwf}(5\%,12)+14\text{sppwf}(5\%,12)=-116.294$$

4. FAST TRAIN

$$45\text{uspwf}(8\%,14)-95-(31.132+19.345)\text{uspwf}(8\%,14)+17\text{sppwf}(8\%,14)=-134.367$$

5. METRO

$$35\text{uspwf}(6\%,18)-70-(25+19.535)\text{uspwf}(6\%,18)+16\text{sppwf}(6\%,18)=-167.64$$

CONCLUSION:

I will recommend CNG Bus for the government.

QUESTION NO 2

Finding utilities for all roads

1) AUTOS

$$\begin{aligned}U(\text{autos}) &= 3.2 - 0.85c - 0.015A - 0.5W - 0.035R \\ &= 3.2 - 0.85(300) - 0.015(4) - 0.035(25)\end{aligned}$$

$$U(\text{autos}) = -254.765$$

2) Light circular rail

$$\begin{aligned}U(\text{L.CR}) &= 1.0 - 0.35C - 0.025A - 0.7W - 0.055R \\ &= 1.0 - 0.35(70) - 0.025(7) - 0.7(10) - 0.055(30)\end{aligned}$$

$$U(\text{L.CR}) = -32.325$$

3) Local buses

$$\begin{aligned}U(\text{L.B}) &= 1.7 - 0.15C - 0.75A - 0.9W - 0.075R \\ &= 1.7 - 0.15(50) - 0.75(10) - 0.9(15) - 0.075(40)\end{aligned}$$

$$U(\text{L.B}) = -23.05$$

4) RIDING BIKES

$$\begin{aligned}U(\text{R.B}) &= 11.3 - 0.17C - 0.012A - 0.0W - 0.045R \\ &= 1.3 - 765 - 0.012 - 109\end{aligned}$$

$$U(\text{R.B}) = -8.26$$

5) RAPID RAIL

$$\begin{aligned}U(\text{R.R}) &= 1.5 - 0.25C - 0.095A - 0.6W - 0.025R \\ &= 1.5 - 0.25(90) - 0.095(5) - 0.6(20) - 0.025(15)\end{aligned}$$

$$U(\text{R.R}) = -33.85$$

AS WE KNOW THAT

$$P(X) = E^{VA} / \text{SUM OF } E^{VA}_n$$

$$\text{Autos} = P(\text{autos}) = E^{VA} / \text{SUM OF } E^{VA}_n$$

$$P(\text{AUTO}) = e^{-254.765} / (e^{-254.765} + e^{-32.325} + e^{-23.05} + e^{-8.262} + e^{-33.85})$$

$$e^{-254.765} = 0$$

QUESTION NO 3

Finding the array and mini impedance tree from zone A

Stang N	Link		compute new path impedance			compare to tree table N-1	Decision
	i	j					
A		1	0	4	4	4 < Infinity	accepted
	1	2	4	3	7	7 < Infinity	accepted
	1	4	4	3	7	7 < Infinity	accepted
	2	3	7	4	11	11 < Infinity	accepted
	2	5	7	4	11	11 < Infinity	accepted
	3	B	11	3	14	14 < Infinity	accepted
	3	6	11	12	23	23 > 18	rejected
	4	5	7	5	12	12 > 11	rejected
	4	7	7	7	14	14 < Infinity	accepted
	5	6	11	7	18	18 < Infinity	accepted
	5	8	11	8	19	19 < Infinity	accepted
	6	9	18	9	27	27 < Infinity	accepted
	7	C	14	5	19	19 < Infinity	accepted
	7	8	14	10	24	24 > 19	rejected
	8	9	19	12	31	31 > 37	rejected
	9	D	27	4	31	31 < Infinity	accepted

Stang N	Link		compute new path impedance			compare to tree table N-1	Decision
	i	j					
A		1	0	4	4	4 < Infinity	accepted
	1	2	4	3	7	7 < Infinity	accepted
	1	4	4	3	7	7 < Infinity	accepted
	2	3	7	4	11	11 < Infinity	accepted
	2	5	7	4	11	11 < Infinity	accepted
	3	B	11	3	14	14 < Infinity	accepted
	4	7	7	7	14	14 < Infinity	accepted
	5	6	11	7	18	18 < Infinity	accepted
	5	8	11	8	19	19 < Infinity	accepted
	6	9	18	9	27	27 < Infinity	accepted
	7	C	14	5	19	19 < Infinity	accepted
	9	D	27	4	31	31 < Infinity	accepted

QUESTION NO 1

Trip distribution of 8-zones

T_{ij} Trips produced at zone i & attracted to zone j

P_i Trips produced from zone i

A_j Trips attracted to zone j

W_{ij} Interzonal impedance

i Origin zone

W_{ij} Impedance for interchange ij

C Exponent of impedance term, 3

A_i Attractiveness

j Destination Zone

J	A_j	$F_{1j}=1/W_{1j}^C$	K_{1j}	$A_j F_{1j} K_{1j}$	P_{1j}
1	45	0.000010	1	0.00045	0.130
2	30	0.000037	1	0.0011	0.319
3	45	0.000010	1	0.00045	0.130
4	37	0.000019	1	0.00070	0.2030
5	60	0.0000046	1	0.000276	0.080
6	240	0.000000072	1	0.00001728	0.0050
7	45	0.000010	1	0.00045	0.130
8	480	0.0000000090	1	0.00000432	0.0012
				$\Sigma=0.00344$	$\Sigma=0.9987\sim 1$

This table will be use for whole question

Using above table for calculation, we find

PESHAWAR	CHARSADD A	MARDAN	NOWSHEH RA	SWABI	ABBOTTAB AD	KOHAT	D.I.KHAN
$Q_{IJ}=67000^*$ P_{IJ}	$Q_{IJ}=63300^*$ P_{IJ}	$Q_{IJ}=59400^*$ P_{IJ}	$Q_{IJ}=56200^*$ P_{IJ}	$Q_{IJ}=53100^*$ P_{IJ}	$Q_{IJ}=50300^*$ P_{IJ}	$Q_{IJ}=47800^*$ P_{IJ}	$Q_{IJ}=51500^*$ P_{IJ}
8710	8229	7722	7306	6903	6539	6214	6695
21373	20192	18948	17927	16939	16045	15248	16428
8710	8229	7722	7306	6903	6539	6214	6695
13601	12849	12058	11408	10779	10210	9703	10454
5360	5064	4752	4496	9248	4024	3824	4120
335	316	297	281	265	251	239	257
8710	8229	7722	7306	6903	6539	6214	6695
80.4	76	71	68	63	60	57	62

Using table

$$A1 = 8710 + 8229 + 7722 + 7306 + 6903 + 6539 + 6214 + 6695 = 58318$$

$$A2 = 21373 + 20192 + 18948 + 17927 + 16939 + 16045 + 15248 + 16428 = 143100$$

$$A3 = 8710 + 8229 + 7722 + 7306 + 6903 + 6539 + 6214 + 6695 = 58318$$

$$A4 = 13601 + 12849 + 12058 + 11408 + 10779 + 10210 + 9703 + 10454 = 91062$$

$$A5 = 5360 + 5064 + 4752 + 4496 + 9248 + 4024 + 3824 + 4120 = 40888$$

$$A6 = 335 + 316 + 297 + 281 + 265 + 251 + 239 + 257 = 2241$$

$$A7 = 8710 + 8229 + 7722 + 7306 + 6903 + 6539 + 6214 + 6695 = 58318$$

$$A8 = 81 + 76 + 71 + 68 + 63 + 60 + 57 + 62 = 538$$