Final Term Examination

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Subject:- Transportation planning & Management

Registration No: 15574

Descipline: Civil Engineering

Submitted To: Sir Engineer Majid Naem

Q1

For Peshawer

for $i = 1$ $P1 = 67000$

j		aj	F_{1j}	K_{1j}	$aj F_{1j} K_{1j}$	P_{1j}	Q_{1j}
1	Peshawar	45	1.09739E-05	1	0.0004938	0.163354	10945
2	CharSada	37	4E-05	1	0.0013704	0.453308	28694
3	Mardan	24	1E-05	1	0.00002634	0.087122	5175
4	Nowshera	28	2E-05	1	0.0005528	0.182855	10276
5	Swabi	24	5E-06	1	0.0001111	0.036755	1952
6	Abbotabad	14	7E-08	1	0.0000010	0.000335	17
7	Kohat	21	1E-05	1	0.0000705	0.076232	3644
8	Di Khan	13	9E-09	1	0.0000001	3.89E-05	2
	Total	=			0.0030	1	60705

for $i = 2$ $P_3 = 63300$

j		aj	F_{3j}	K_{3j}	$aj F_{3j} K_{3j}$	P_{3j}	Q_{3j}
1	Peshawar	45	3.7037E-05	1	0.00166667	0.279076	17666
2	charSada	37	3.7037E-05	1	0.00137037	0.229462	13630
3	Mardan	24	0.000064	1	0.001536	0.257196	14454
4	Nowshera	28	3.7037E-05	1	0.00103703	0.173647	9221
5	Swabi	24	1.09739E-05	1	0.00026337	0.044101	2218
6	Abbotabad	14	9.39144E-08	1	1.3148E-06	0.00022	11
7	Kohat	21	4.62963E-06	1	9.72222E-05	0.016279	838
8	Di Khan	13	0.00000008	1	0.00000104	1.74E-05	1
	Total	=			0.00597209		

for i=3 P_3 = 59400

j		aj	F_{3j}	K_{3j}	$a_j F_{3j} K_{3j}$	P_{3j}	Q_{3j}
1	Peshawar	45	1.097-05	1	0.0004938	0.03806	2261.26
2	charsada	37	0.000064	1	0.002368	0.182546	10843.24
3	Mardan	24	3.703-05	1	0.0008888	0.068523	4070.28
4	Nowshera	28	0.00029629	1	0.0008296	0.639551	37989.31
5	Swabi	24	3.70-05	1	0.00088888	0.68523	4070.2
6	Abbotabad	14	1.34864-07	1	1.8881-06	0.000146	8.645724
7	Kohat	21	1.628-06	1	3.4195-05	0.002636	156.5812
8	Di Khan	13	6.5308-09	1	8.489-08	6.546-06	0.38874
	Total		=		0.012972069		

for i=4 P_4 = 56200

j		aj	F_{3j}	K_{3j}	$a_j F_{3j} K_{3j}$	P_{3j}	Q_{3j}
1	Peshawar	45	1.974-05	1	0.0008883	0.07359	4136.05
2	charsada	37	3.703-05	1	0.00137037	0.11352	6379.9
3	Mardan	24	0.000296	1	0.007111	0.58908	33106.7
4	Nowshera	28	0.000064	1	0.001792	0.14845	8342.9
5	Swabi	24	3.703-05	1	0.00088889	0.0736	4138.34
6	Abbotabad	14	1.71-07	1	2.4005-06	0.0000199	11.17
7	Kohat	21	8.63-07	1	1.814-05	0.001503	84.456
8	Di Khan	13	6.1099-09	1	7.942-08	6.58-06	0.36979
			total =		0.012071		

for i = 5 $P_5 = 53100$

j		a_j	F_{3j}	K_{3j}	$a_j F_{3j} K_{3j}$	P_{3j}	Q_{3j}
1	Peshawar	45	4.62963E-06	1	0.00020833	0.067119	3564.25
2	CharSada	37	1.09739-05	1	0.00040636	0.130813	6946.18
3	Mardan	24	3.7037-05	1	0.00048888	0.286375	15206.5
4	Nowshera	28	3.703E-05	1	0.001037037	0.334104	17740.92
5	Swabi	24	2.33236-05	1	0.00055976	0.180341	9576.109
6	Abbatabad	14	2.03542-07	1	2.84958-06	0.000918	48.748
7	Kohat	21	4.55539-08	1	9.56633-07	0.00038	16.36
8	Di Khan	13	5.12526-09	1	6.66284-08	2.15-05	1.139
	Total	=			0.003103935		

for i = 6 $P_6 = 50300$

j	~~Peshawar~~	a_j	F_{3j}	K_{3j}	$a_j F_{3j} K_{3j}$	P_{3j}	Q_{3j}
1	CharSada	37	0.000000007	1	0.0000003	0.0044	223
2	Mardan	24	0.000000009	1	0.0000003	0.0047	239
3	NowShera	28	0.00000001	1	0.0000003	0.0044	222
4	Swabi	24	0.00000001	1	0.0000004	0.0065	330
5	Abbatabod	14	0.00000002	1	0.0000004	0.0066	335
6	Kohat	21	0.000005	1	0.00071	0.9707	48830
7	Peshawar	45	0.000000008	1	0.0000001	0.0023	118
8	Di Khan	13	0.000000002	1	0.000000003	0.00004	2
	Total	=			0.000732687		

for i = 7 P7 = 478090

j		aj	F3j	K3j	aj F3j K3j	P3j	Q3j
1	Peshawar	45	0.000001	1	0.00049	0.324	15502
2	Charsada	37	0.0000004	1	0.00017	0.1124	5377
3	Mardan	24	0.0000001	1	0.000003	0.02566	1227
4	Nowshera	28	0.00000008	1	0.000002	0.01588	759
5	Swabi	24	0.00000006	1	0.000001	0.01036	495
6	Abbatabad	14	0.000000004	1	0.00000006	0.0004	20
7	Kohat	21	0.000003	1	000077	0.5107	24415
8	Di Khan	13	0.00000009	1	0.00000001	0.0001	5
		Total =			0.001522739	0.	

for i = 8 P8 = 51500

j		aj	F3j	K3j	aj F3j K3j	P3j	Q3j
1	Peshawar	45	9.04225E-09	1	0.000000006	0.0004	25
2	Charsada	37	0.000000008	1	0.000002	0.0003	18
3	Mardan	24	0.0000000006	1	0.00000001	0.0001	10
4	Nowshera	28	0.0000000006	1	0.00000001	0.0002	11
5	Swabi	24	0.00000000005	1	0.00000001	0.0001	8
6	Abbatabad	14	0.0000000002	1	0.000000003	0.000004	2
7	Kohat	21	0.000000001	1	0.00000002	0.0002	15
8	Di Khan	13	0.00006	1	00008	0.9982	51411
		Total =			0.000833437		

P.T.O

$A_1 = 54322$

$A_2 = 72128$

$A_3 = 34472$

$A_4 = 84670$

$A_5 = 22793$

$A_6 = 48948$

$A_7 = 29288$

$A_8 = 51423$

QNo#02 Given data take from question

(a) utility function

$U(A)\ 3.2 - 0.85(300) - 0.015(60) - 05(4) - 0.035(25)$

$U(A) = \boxed{-254.765}$

$U(LcR) = 1.0 - 0.35(70) - 0.025(7) - 0.7(10) - 0.05(30)$

$U(LcR) = \boxed{-32.32}$

$U(LB) = 1.7 - 0.15(50) - 0.075(10) - 0.09(15) - 0.075(40)$

$U(LB) = \boxed{-23.5}$

$U(RB) = 1.3 - 0.17(45) - 0.012(1) - 0.0(0) - 0.095(20)$

$U(RB) = \boxed{-7.3}$

$U(RR) = 1.5 - 0.25 - 0.95(2) - 0.6(4) - 0.025(2)$

$U(RR) = -33.85$

As we know that

$P(K) = e^{UK} / E\ x e^{UX}$

$P(A) = \dfrac{e^{-254.745}}{e^{-25476} + e^{-26.9} + e^{-23.5} + e^{-7.3} + e^{-3385}} = \boxed{0}$

$$P(L+R) = \frac{e^{-32.9}}{6.75 \times 10^{-4}} = 3.077$$

$$P(LB) = \frac{e^{-23.5}}{6.75 \times 10^{-4}} = 0$$

$$P(RB) = \frac{e^{-7.3}}{6.75 \times 10^{-4}} = 0$$

$$P(R\ Rail) = \frac{e^{-33.85}}{6.75 \times 10^{-4}} = 0$$

Part (B) utility function for Autos **when 30 subsidy**

$$= 3.2 - 085c - 0.015A - 0.5w - 0.035R$$

Do.

putting the values

$$3.2 - 0.85(2/0) - 0.015(49) - 0.05(4) - 0.035(25)$$

$$= -177.16$$

$U(LRail) = 1.0 - 0.35C - 0.025A - 0.7W - 0.05R$

$= 1.0 - 0.35(49) - 0.025(10) - 0.7(10) - 0.05(30)$

$= \boxed{-25.05}$

$U(Local\ Bus) = 1.7 - 0.15C - 0.075A - 0.09W - 0.075R$

$= 1.7 - 0.15 \times 35 - 0.075(10) - 0.09(10) - 0.075(40)$

$= \boxed{-20.8}$

$U(Riding\ bikes) = 1.3 - 0.17(31.5) - 0.012R - 0.0X0 - 0.0095(20)$

$= \boxed{-5.964}$

$U(R\ Rail) = 1.5 + 25(83) - 0.05(30) - 0.6 \times 20 - 0.025 \times 15$

$= -27.1$

$As\ per\ final\ PL = \frac{UK}{\sum e^{UK}}$

$P(Auto) = \frac{e^{-177.16}}{e^{-177.16} + e^{-25.05} + e^{-20.8} + e^{5.964} + e^{-27.1}}$

$= 0$

Part(C) A Subway Bus

$U = 1.2 - 0.22c - 0.65w - 0.05R$

$c = 80$, $A = 4$, $w = 5$ and $R = 10$

$U(Auto) = -293.85$

$U(LoR) = -46.805$

$URT = -37.1$

$URB = -62.65$

$U(subbus) = -69.78$

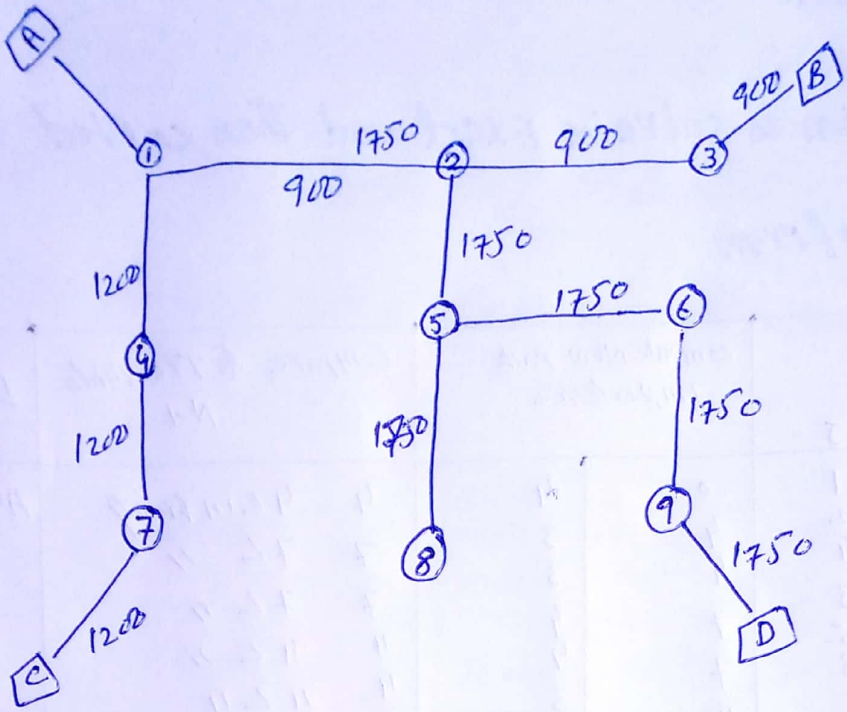
QNo# 03

Solution:-

Question is solve in Excel and Then copied to written form

Starting N	Link I	Link J	compute New path Impedence		compare to Tree Table N-1		Decision
A	1	1	0	4	4	4 < Infinity	Accepted
	1	2	4	3	7	7 < //	//
	2	4	4	3	7	7 < //	//
	2	3	7	4	11	11 < //	//
	3	5	7	4	11	11 < //	//
	4	6	11	3	14	14 < //	//
	4	5	11	12	23	23 > 18	//
	5	7	7	5	12	12 > //	Rejected
	5	6	7	7	14	14 < //	Rejected
	6	8	11	7	18	18 < //	//
	7	9	11	8	19	19 < //	//
	7	C	18	9	27	27 < //	//
	8	9	14	5	19	19 < //	Rejected
	9	D	14	10	24	24 > //	Rejected
			19	12	31	31 < //	//
			27	4	31	31 < //	

Starting N	Link I	Link j	compute New path Impedence		compare to Tree Table N-1		Decision
A	1	1	0	4	4	4 < Infinity	Accepted
	1	2	4	3	7	7 < //	//
	2	4	4	3	7	7 < //	//
	2	3	7	4	11	11 < //	//
	3	5	7	4	11	11 < //	//
	4	6	11	3	14	14 < //	//
	5	B	7	7	14	18 < //	//
	5	7	7	8	18	18 < //	//
	6	8	11	9	19	19 < //	//
	7	9	11	5	27	27 < //	//
	9	C	18	4	19	19 < //	//
		D	14		31	31 < //	
			27				



the Above diagram shows Link Array which is drawn

QNO:4 The city goverment wants to start a Transit service b/w three city A, B and C. the Alternatives are having the following Attributes:-

S.No	Alternative x	Initial cost Million	Anual cost Million	Anual Maintance cost	Anual salvage value	Anual Revenue generation	useful life	Interest Rate i
1	CNG Bus	60	16.048	7.99	7.04	25	11	7
2	BRT	50	19.589	12.116	11	27	12	7
3	Light Rail	66	19.554	16	14	29	12	5
4	Fast Train	95	31.132	19.345	17	45	14	8
5	Metro	70	25	19.535	16	35	18	6

FOR CNG

using formula

$$NPV = \text{initial cost} + A_C(P/A_{\cdot}\ 7\%\cdot 11) - A_R(P/A_R\ 7\%\cdot 11)$$

putting the value

$$NPV = 60 + 24.038(7.499) - 32.04(7.499)$$

$$NPV = 60 + 180.260 - 240.267$$

$$\boxed{NPV = 0.007}$$

For BRT

$NPV = 50 + 31.705(7.943) - 38(7.943)$

$NPV = 50 + 251.8 - 301.8$

$NPV = 0 = 0.001185$ Ans

For Light Rail:

$NPV = 66 + 35.554(8.863) - 403(8.863)$

$NPV = 0 = 0.006102$ Ans

For Fast Train:-

$NPV = 95 + 50.477(8.244) - 57(8.244)$

$NPV = 41.22$

For Metro:-

$NPV = 70 + 44.535(10.828) - 51(10.828)$

$NPV = 0.00302$

Conculsion:- According to the observation the fast Train is more expensive the Rest of the Alternatives and the other NPV are zero but I Recommmed BRT.