

Assignment 4 Discrete

1. a) $\{A, 1, B, 5, C, 6, D, 9, F, 11, G, 10, D, 7, E, 8, G, 12, H, 14, I, 13, H, 4, A, 2, K, 3, J, 15, I\}$

$\{A, 4, H, 13, I, 14, H, 12, G, 8, E, 7, D, 10, G, 11, F, 9, D, G, C, 5, B, 1, A, 2, K, 3, J, 15, I\}$

$\{A, 2, K, 3, J, 15, I, 14, H, 12, G, 8, E, 7, D, 10, G, 11, F, 9, D, G, C, 5, B, 1, A, 4, H, 13, I\}$

f

The guard won't be able to end the inspection at the guard house without repeating a street

b) No because intersection F cannot be visited without repeating an edge and an intersection to form a circuit.

$\{A, 2, K, 3, J, 15, I, 13, H, 12, G, 8, E, 7, D, 9, F, 9, D, G, C, 5, B, 1, A\}$
vertex D and edge 9 is visited more than once.

c

2.	No.	S	N	L(B)	L(A)	L(C)	L(D)	L(E)	L(F)
a)	0	{}	{A, B, C, D, E, F}	0	∞	∞	∞	∞	∞
	1	{B}	{A, C, D, E, F}		3	(1)	6	∞	∞
	2	{B, C}	{A, D, E, F}		(3)		5	5	∞
	3	{B, C, A}	{D, E, F}				(5)	5	8
	4	{B, C, D}	{E, F}					(5)	8
	5	{B, C, D, E}	{F}						(7)
	6	{B, C, D, E, F}	{}						

b) shortest path: B \rightarrow C \rightarrow E \rightarrow F

$$1 + 4 + 2 = 7 \text{ hours}$$

3. a) a, d, i, n, p

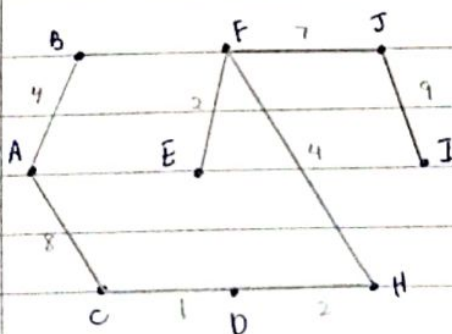
b) k, e, l, b, a, f, c, m, g, h, d, p, n, i, o, j

4- a) It creates a circuit

b)

edge	weight	circuit	select
CD	1	no	yes
BH	2	no	yes
EF	2	no	yes
AB	4	no	yes
FH	4	no	yes
ED	6	yes	no
CE	7	yes	no
FJ	7	no	yes
BF	8	yes	no
AC	8	no	yes
JI	9	no	yes
HI	10	yes	no
BC	11	yes	no
JH	14	yes	no

minimum network =



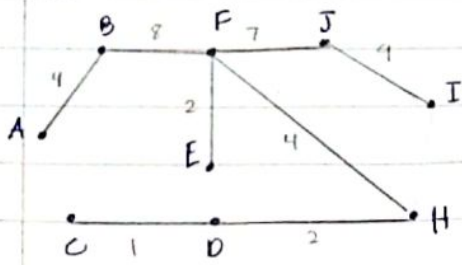
$$\text{length} = 4 + 8 + 1 + 2 + 4 + 2 + 7 + 9$$

$$= 37 \text{ m}$$

$$\text{total cost} = 37 \times 100$$

$$= \text{RM } 3700$$

c) yes

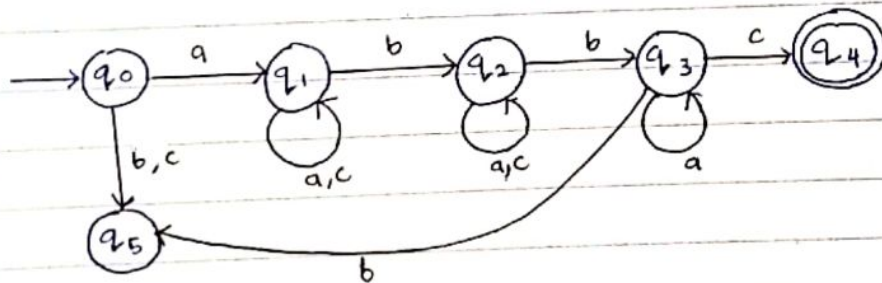
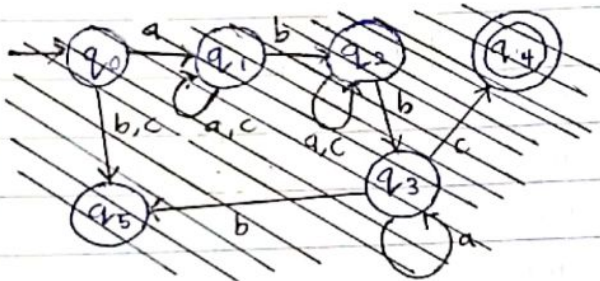


5. $\{a, b, c\} = \text{string}$

begin with a

end with c

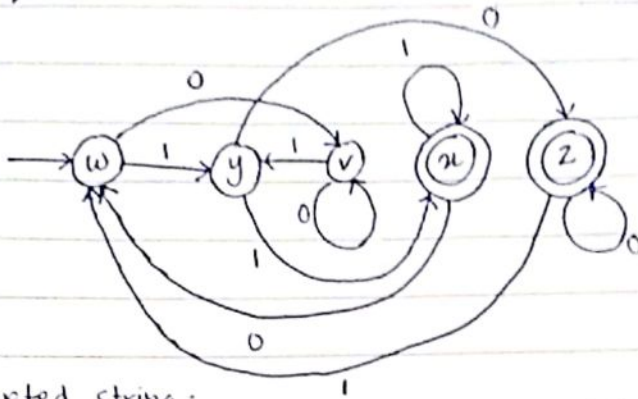
contain two b



6. a) $S = \{v, w, x, y, z\}$

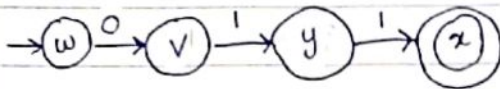
$q_0 = w$

b)



accepted string:

0111



7. $q_0 = q_0$

$S = \{q_0, q_1, q_2\}$

$I = \{0, 1, 2\}$

q_0 = ground floor

q_1 = first floor

q_2 = second floor

a = nothing happen

b = goes up

c = goes down

State	Input, f_i			Output, f_o		
	0	1	2	0	1	2
q_0	q_0	q_1	q_2	a	b	b
q_1	q_0	q_1	q_2	c	a	b
q_2	q_0	q_1	q_2	c	c	a

