



# **ASSIGNMENT 4**

## **DISCRETE STRUCTURE**

### **(SECI1013)**

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## Question 1

a) A, B, C, D, F, G, D, E, G, H, A, K, J, I, H, I

No, the guard will not be back at the guard house at the end of the inspection. Because there are ~~two~~ two vertices have odd number of degree which is vertex A and I

b) No, it is not possible. Because the graph does not possess ~~which is~~ a Hamiltonian ~~Circuit~~ circuit which is a path that visits each vertex ~~exactly~~ exactly once and ends at the starting point. When <sup>security</sup> guard go to D or G, security guard cannot go to E and F ~~without~~ without repeating same vertices.



## Question 2

a)

No	S	N	L(B)	L(A)	L(C)	L(D)	L(E)	L(F)
0	$\{ \}$	<del><math>\{A, A, C\}</math></del> $\{B, A, C, D, E, F\}$	0	$\infty$	$\infty$	$\infty$	$\infty$	$\infty$
1	$\{B\}$	$\{A, C, D, E, F\}$		3	1	6	$\infty$	$\infty$
2	$\{B, C\}$	$\{A, D, E, F\}$		3	1	5	5	$\infty$
3	$\{B, C, A\}$	$\{D, E, F\}$		3		5	5	8
4	$\{B, C, A, D\}$	<del><math>\{E, F\}</math></del> $\{E, F\}$				5	5	8
5	$\{B, C, A, D, E\}$	$\{F\}$					5	7
6	$\{B, C, A, D, E, F\}$	$\{ \}$						7

b) Shortest path : ~~B, C, F~~ B - C - E - F

Lengths : 1 + 4 + 2 = 7 hours

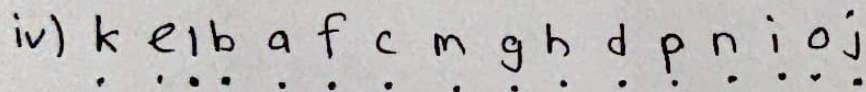
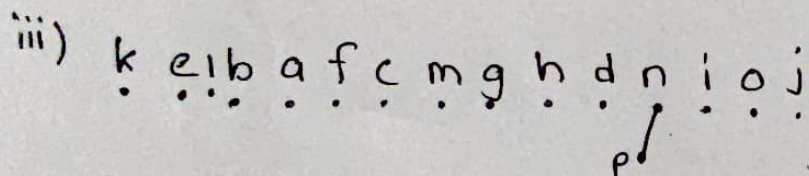
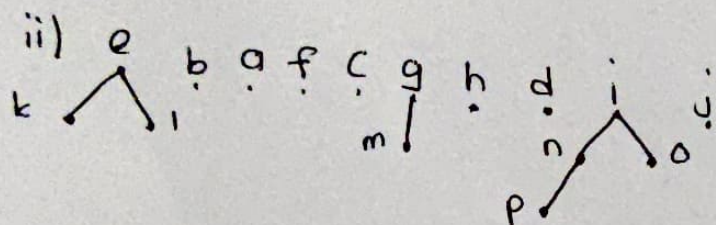
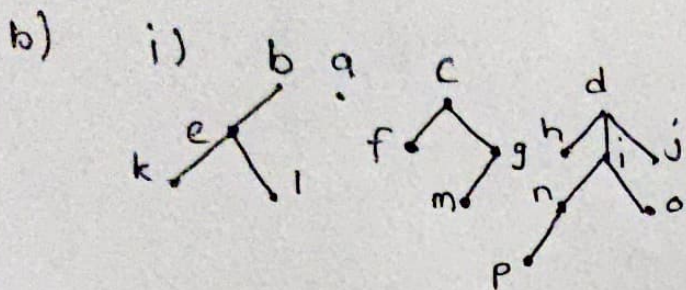
minimum  
hours

~~///~~



# Question 3

a) n, i, d, a

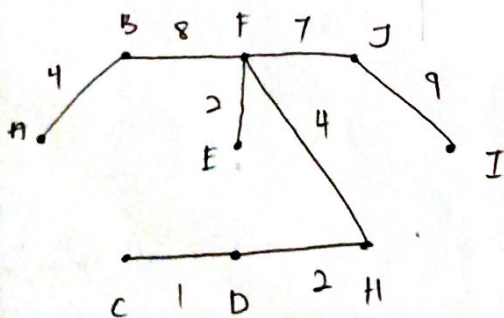


# Question 4

a) Because vertex I does not have any edge to connect with and also the Kruskal's algorithm cannot have a circuit in it.

b)

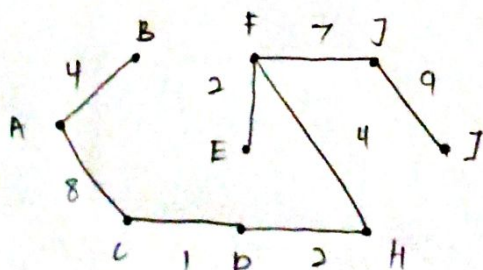
Edge	length	will adding edge make a <del>new</del> circuit	action taken	cumulative
$e_1 = (C, D)$	1	no	added	1
$e_2 = (D, H)$	2	no	added	3
$e_3 = (E, F)$	2	no	added	5
$e_4 = (F, H)$	4	no	added	9
$e_5 = (A, B)$	4	no	added	13
$e_6 = (E, D)$	6	Yes	not added	13
$e_7 = (E, C)$	7	Yes	not added	13
$e_8 = (F, J)$	7	no	added	20
$e_9 = (B, F)$	8	no	added	28
$e_{10} = (A, C)$	8	Yes	not added	28
$e_{11} = (J, I)$	9	no	added	37
$e_{12} = (J, H)$	10	Yes	not added	37



Length = 37 m

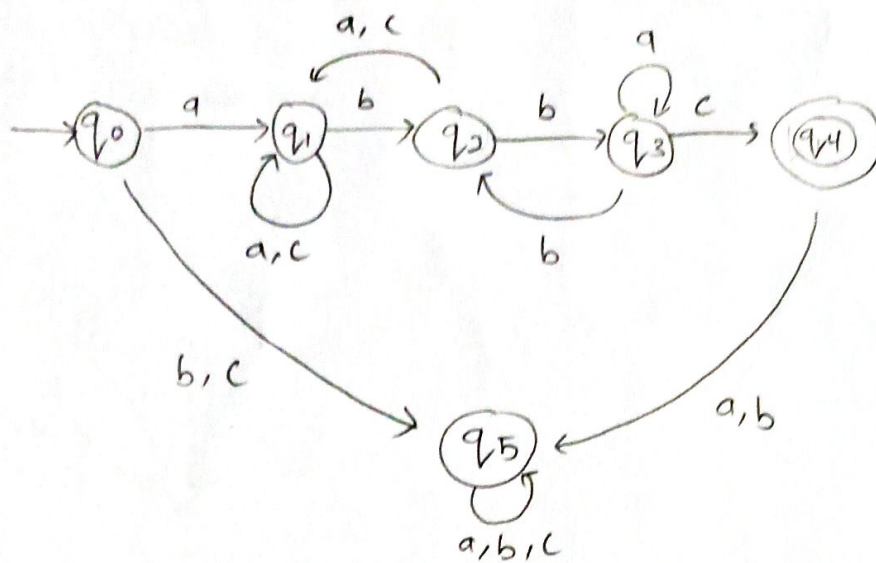
total cost = RM 3700

c) Yes, there are two edges that have the same length which are edge (B,F) and (A,C) and also both of the edges does not making a circuit if ~~we~~ we choose either one.





### Question 5

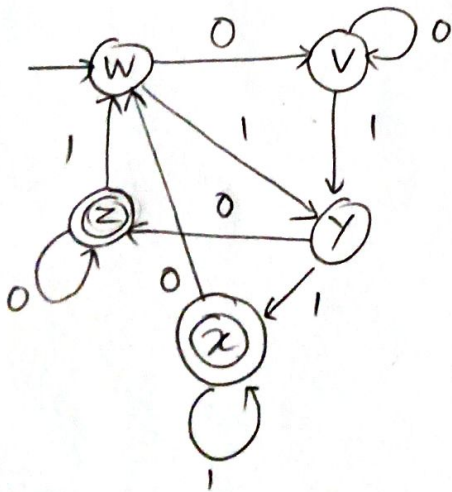


### Question 6

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

initial state =  $\{w\}$

b)



$w \xrightarrow{0} v$	$v \xrightarrow{0} v$	$v \xrightarrow{1} y$	$y \xrightarrow{1} x$
$w \xrightarrow{0} v$	$v \xrightarrow{1} y$	$y \xrightarrow{1} x$	$x \xrightarrow{1} x$
$w \xrightarrow{0} v$	$v \xrightarrow{0} v$	$v \xrightarrow{1} y$	$y \xrightarrow{0} z$
$w \xrightarrow{0} v$	$v \xrightarrow{1} y$	$y \xrightarrow{0} z$	$z \xrightarrow{0} z$

## Question 7

G = Ground floor

F1 = First floor

F2 = Second floor

