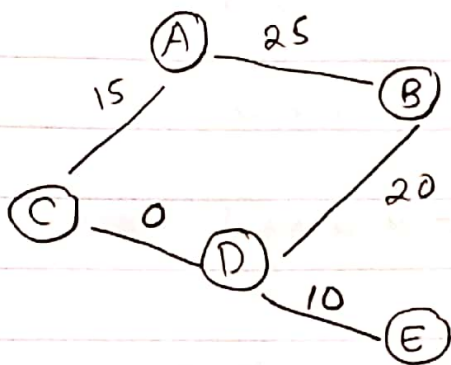


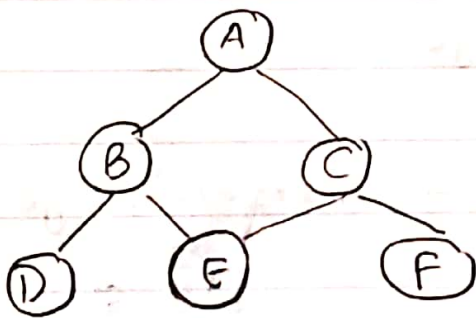
Question-1

a) No
(explained in canvas)

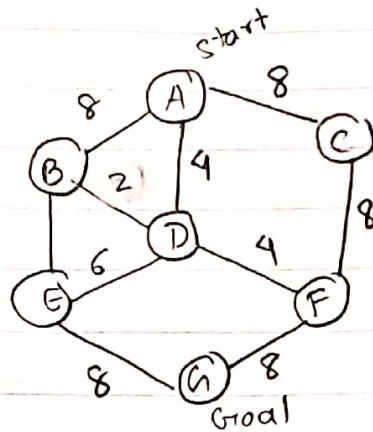
b)



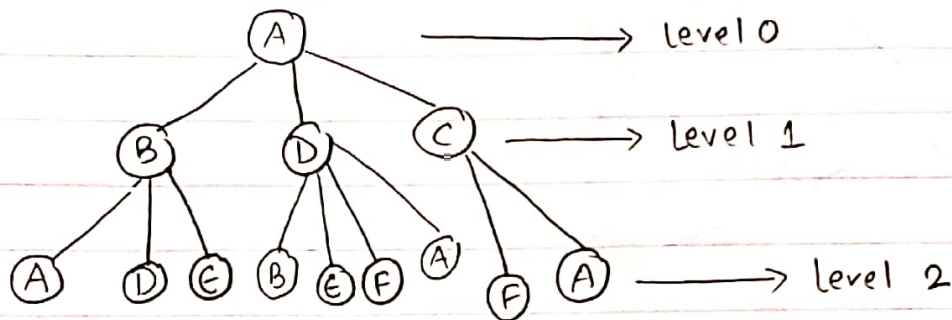
c)



Question-2



a)



b)

$(A/0)$ → Added to the fringe

→ Expand $(A/0)$:

Nodes Added: $(D/4)$ $(B/8)$ $(C/8)$ → Add to the fringe and sort

closed form: $\{A\}$

→ Expand $(D/4)$:

Nodes Added: $(B/6)$ $(A/8)$ $(F/8)$ $(E/10)$ → Add to the fringe & sort

closed form: $\{A, D\}$

→ Expand $(B/6)$:

Nodes Added: $(D/8)$ $(A/14)$ $(E/14)$ → Add to the fringe & sort

closed form: $\{A, D, B\}$

→ Expand $\left(\frac{A}{8}\right)$:

No new nodes added to the fringe.

Closed form: $\{A, D, B\}$

→ Expand $\left(\frac{D}{8}\right)$:

No new nodes added to the fringe.

Closed form: $\{A, D, B\}$

→ Expand $\left(\frac{B}{8}\right)$:

No new nodes added to the fringe.

Closed form: $\{A, D, B\}$

→ Expand $\left(\frac{C}{8}\right)$:

Nodes Added: $\left(\frac{A}{16}\right) \left(\frac{F}{16}\right) \leftarrow$ Add to the fringe & sort

Closed form: $\{A, D, B, C\}$

→ Expand $\left(\frac{F}{8}\right)$:

Nodes Added: $\left(\frac{D}{12}\right) \left(\frac{G}{16}\right) \left(\frac{C}{16}\right) \leftarrow$ Add to the fringe & sort

Closed form: $\{A, D, B, C, F\}$

→ Expand $\left(\frac{E}{10}\right)$:

Nodes added: $\left(\frac{D}{16}\right) \left(\frac{B}{18}\right) \left(\frac{G}{16}\right) \leftarrow$ Add to the fringe & sort

Closed form: $\{A, D, B, C, F, E\}$

→ Expand $\left(\frac{D}{12}\right)$:

No new nodes added.

Closed form: $\{A, D, B, C, F, E\}$

→ Expand $(A/14)$:

No new nodes added.

Closed form: $\{A, D, B, C, F, E\}$

→ Expand $(E/14)$:

No new nodes added.

Closed form: $\{A, D, B, C, F, E\}$

→ Expand $(A/16)$:

No new nodes added.

Closed form: $\{A, D, B, C, F, E\}$

→ Expand $(D/16)$:

No new nodes added.

Closed form: $\{A, D, B, C, F, E\}$

→ Expand $(F/16)$:

No new nodes added.

Closed form: $\{A, D, B, C, F, E\}$

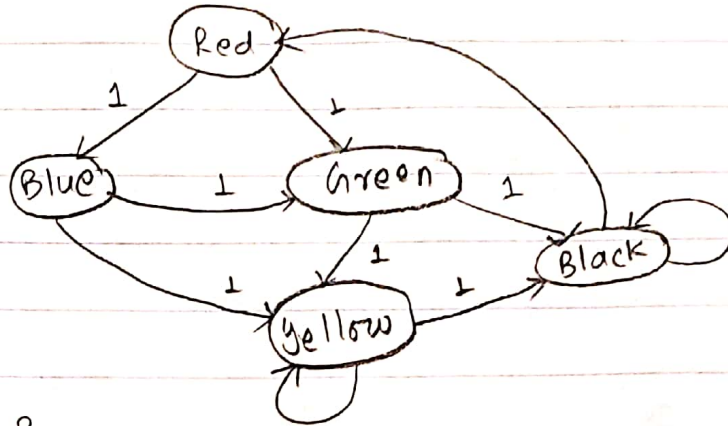
→ Expand $(G/16)$:

Goal state Reached. $(A \rightarrow D \rightarrow F \rightarrow G)$

c) The length of the optimal path is $4 + 4 + 8 = 16$

Question 3 & 4 are done in canvas.

Question- 5



$$H(\text{Red}) = 2$$

$$H(\text{Green}) = 1$$

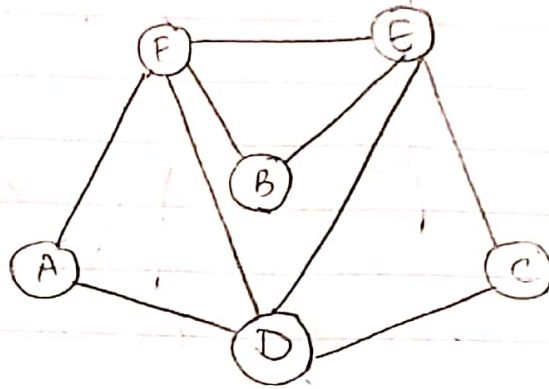
$$H(\text{Yellow}) = 1$$

$$H(\text{Blue}) = 2$$

$$H(\text{Black}) = 0$$

Question-6

a) The graph:



b) Using MRV and degree heuristic:

level	states	MRV	Degree heuristic
0	D	3	4
1	F	2	3
2	E	1	2
3	B	1	0
4	A	1	0
5	C	1	0

c) D: RGB, F: RGB, E: RGB, B: RGB, A: RGB, C: RGB

level 0 assign → D: R, F: GB, E: GB, B: RGB, A: GB, C: GB
D = R

level 1 assign → D: R, F: G, E: B, B: R, A: B, C: G
F = G & E = B

then check accordingly.

Using forward checking.

Final Solution :

