1) No, CNF can't have one state and one alphabet like 0A or 1B

It should be transferred to

$S \rightarrow AB$

$A \rightarrow CA \mid 0$

$B \rightarrow DB \mid 1$

$C \rightarrow 0$

$D \rightarrow 1$

2) a)

C has no terminal string , B derives
C and no terminal string. In addition,
S → C . So S has no terminal string
S, C and B derive nothing

b)

S → AB | CD

A → BC | a

B → AC | C✗

C → AB | CD

D → AC | d

⟹ (red) B → C is unit production

S → AB | CD | AC

A → BC | a | CC✗

B → AC✗

C → AB | CD | AC ✗

D → AC✗ | d

⟹ (red)
C doesn't have
terminal string

S → AB✗

A → a

⟹ s derives
nothing and
the language is
empty

3)

  a)

$S \rightarrow 0A0 \mid 1B1 \mid BB$

$A \rightarrow C$

$B \rightarrow S \mid A$

$C \rightarrow S \mid \varepsilon^{x}$

$\Longrightarrow$

eliminate

$C \rightarrow \varepsilon$

$S \rightarrow 0A0 \mid 1B1 \mid BB$

$A \rightarrow C \mid \varepsilon^{x}$

$B \rightarrow S \mid A$

$C \rightarrow S$

$\Longrightarrow$

eliminate

$A \rightarrow \varepsilon$

$S \rightarrow 0A0 \mid 1B1 \mid BB \mid 00$

$A \rightarrow C$

$B \rightarrow S \mid A \mid \varepsilon$

$C \rightarrow S$

$\Longrightarrow$

eliminate

$B \rightarrow \varepsilon$

$S \rightarrow 0A0 \mid 1B1 \mid BB \mid 00 \mid 11 \mid B$

$A \rightarrow C$

$B \rightarrow S \mid A$

$C \rightarrow S$

b)   S→ 0A0 | 1B1 | BB | 00 | 11 | B
     A→ C
     B → S | A
     C → S

⟹   S→ 0A0 | 1B1 | BB | 00 | 11 | B

B→S   A→ 0A0 | 1B1 | BB | 001 | 11 | B
C→S
A→C   B→ 0A0 | 1B1 | BB | 00 | 11 | B | A

          C→ 0A0 | 1B1 | BB | 00 | 11 | B

⟹   S→ 0A0 | 1B1 | BB | 00 | 11
eliminate
S→B   A→ 0A0 | 1B1 | BB | 001 | 11
A→B
C→B   B→ 0A0 | 1B1 | BB | 00 | 11
B→A
               C→ 0A0 | 1B1 | BB | 00 | 11

c) S→ 0A0 | 1B1 | BB | 00 | 11

     A→ 0A0 | 1B1 | BB | 001 | 11

     B→ 0A0 | 1B1 | BB | 00 | 11

     C→ 0A0 | 1B1 | BB | 00 | 11

D   E (labels above first line)

⇒

     S→ D0 | E1 | BB | 00 | 11

     A→ D0 | E1 | BB | 001 | 11

     B→ D0 | E1 | BB | 00 | 11

     C→ D0 | E1 | BB | 00 | 11

     D→ 0A

     E → 1B

F   G (labels above S line)

S→ DF | EG | BB | FF | GG

A→ DF | EG | BB | FF | GG X

B→ DF | EG | BB | FF | GG

C→ DF | EG | BB | FF | GG X

D→ FA

E →GB

F → O

G → I

S→ DF | EG | BB | FF | GG

B→ DF | EG | BB | FF | GG

D→ FA

E →GB

F → O

G → I

d)

$S \rightarrow DF| EG| BB |FF| GG$

$B \rightarrow DF| EG| BB|FF|GG$

$D \rightarrow FA$

$E \rightarrow GB$

$F \rightarrow 0$

$G \rightarrow 1$