Esercitazione II

CLASSIFICAZIONE DI UNA GRAMMATICA

Classificare le seguenti grammatiche:

1.
   S→ 0AB1
   A→ 0A | 0
   B→ B1 | 1
2.
   S→ 1A | 0B
   A→ S0 | S0S | 0S | 0
   B→ S1 | S1S | 1S | 1
3.
   S→ (A+A) | (A-A)
   A→ (A+A) | (A-A)|I
   I→ 0J | 1J | ... | 9J
   J→ I | 0 | 1 | ... | 9
4.
   S→ abc | aSBc
   cB→ Bc
   bB→ bb
5.
   S→ ABS | ε
   BA→ AB
   BS→ b
   Bb→ bb
   Ab→ ab
   Aa→ aa
6.
   S→ aS | bC | b
   C→ cC | c
7.
   S→ aA | a
   A→ Sb

Classificare i seguenti linguaggi. In particolare, fornire una grammatica generatrice del tipo appropriato:

8. $\{a^n b^m c^n \mid n,m>0\}$
9. $\{a^n b\ (a \mid b)^m \mid n, m >=0\}$
10. $\{a^n b^n c^m d^m e^p f^p \mid n, m >=0 , p > 0\}$
11. $\{a^n\ b^m\ c^p\ d^{n+m} \mid n, m, p> 0\}$
12. $\{a^n b^p c^{n+m} d^q e^m \mid n, q >= 0, m,p >0\}$
13. $\{(ab)^n bca^m \mid n >=0, m>0\}$

SOLUZIONI

1.
S→ 0AB1
A→ 0A|0
B→ B1|1 Tipo 2

2.
S→ 1A|0B
A→ S0|S0S|0S|0
B→ S1|S1S|1S|1 Tipo 2

3.
S→ (A+A)|(A-A)
A→ (A+A)|(A-A)|I
I→ 0J|1J|...|9J
J→ I|0|1|...|9 Tipo 2

4.
S→ abc | aSBc
cB→ Bc
bB→ bb Tipo 1

5.
S→ ABS | ε
BA→ AB
BS→ b
Bb→ bb
Ab→ ab
Aa→ aa Tipo 0

6.
S→ aS | bC | b
C→ cC|c Tipo 3

7.
S→ aA | a
A→ Sb Tipo 2

8. $\{a^n b^m c^n \mid n,m>0\}$

   S→ aSc | aBc
   B→ bB| b Tipo 2

9. $\{a^n b\ (a \mid b)^m \mid n, m >=0\}$

   S→ aS | b | bA
   A→ aA | a | bA | b Tipo 3

10. $\{a^n b^n c^m d^m e^p f^p \mid n, m >=0 , p > 0\}$

    S→ ACE | CE | AE | E
    A→ aAb | ab
    C→ cCd | cd
    E→ eEf | ef Tipo 2

11. $\{a^n b^m c^p d^{n+m} \mid n, m, p> 0\}$

    S→ aSd | aBd
    B→ bBd | bCd
    C→ cC | c Tipo 2

12. $\{a^n b^p c^{n+m} d^q e^m \mid n, q >= 0, m,p >0\}$

    S→ AE
    A→ aAc | B
    B→ bB | b
    E→ cEe | cDe | ce
    D→ dD | d Tipo 2

13. $\{(ab)^n bca^m \mid n >=0, m>0\}$

    S→ aB | bC
    B→ bS
    C→ cA
    A→ aA | a Tipo 3