Q1:- CFG to CNF

A → BAB | B | ε
B → 00 | ε.

(i) Initial state:

S → A
A → BAB | B | ε
B → 00 | ε

(ii) Removing Null production:

∴ A → ε ∴ B → ε.

S → A
A → BAB | B | ε | BA | AB
B → 00. | BB | A

∴ A → ε.

S → A | ε
A → BAB | B | BA | AB | BA | BB
B → 00.

(iii) Removing Unit production

S → A., A → B, A → A..

Q / Part No.

Rough Work

~~S → A~~

~~S → BAB | B. |~~ A → A. removed.

~~A → B~~

~~S → A | ε~~

∴ S → A. ∴ A → B.

S → BAB | 00 | AB | BA | BB. | ε
A → BAB | 00 | AB | BA | BB
B → 00.

(iv) No useless state. ✓

~~(IV) No useless to remove.~~

CNF :-

(v) S → YB | XX | AB | BA | BB | ε.
A → YB | XX | AB | BA | BB
B → XX
X → 0
Y → BA.

Ans

5

Q / Part No.

Rough Work

Q2:- $L = \{ a^i b^j : i, j \geq 0 \text{ and } 2i = 3j + 1 \}$

$2i = 3j + 1$

$7/2$

ε

Possible strings:-

$j=1, i=2$ — aab

~~$j=2, i=7/2$~~

$j=3, i=5$ — aaaabbb

$j=4, i=13/2$

$=6$ — aaaaaabbbbb

i	j
2	1
3	2
5	3
6	4
8	5

$i=8, j=5$

$i=5, j=3$

$S \rightarrow aaXb$

$X \rightarrow aaaXbbb \mid \varepsilon$

Ans.

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