Q.1

The production rules are:

- S → aS

- S → ab

The rule S → aS can be applied any number of times (including zero times) that will generate the form an where n ≥ 0.

Then we can apply the rule S → ba as a suffix to any number of strings generated in the previous step.

Therefore, any string generated by this CFG will be of the form a\*ba.

Q.2

The CFGs for the language with all words that do not have the substring ‘ab’:

S → bS | aA

A → aA | ε

Q.3

Q.4

Converted to CNF:

S → AX | YB

X → MN | a

Y → b | BY | B

Z → a

A → a

B → b

M → ZX

N → ZY

Q.5