

QUIZ 1

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NLP

Q:- Draw the CNF and Parse Tree
For the given language.

① with a telescope they observed the stars in the sky.

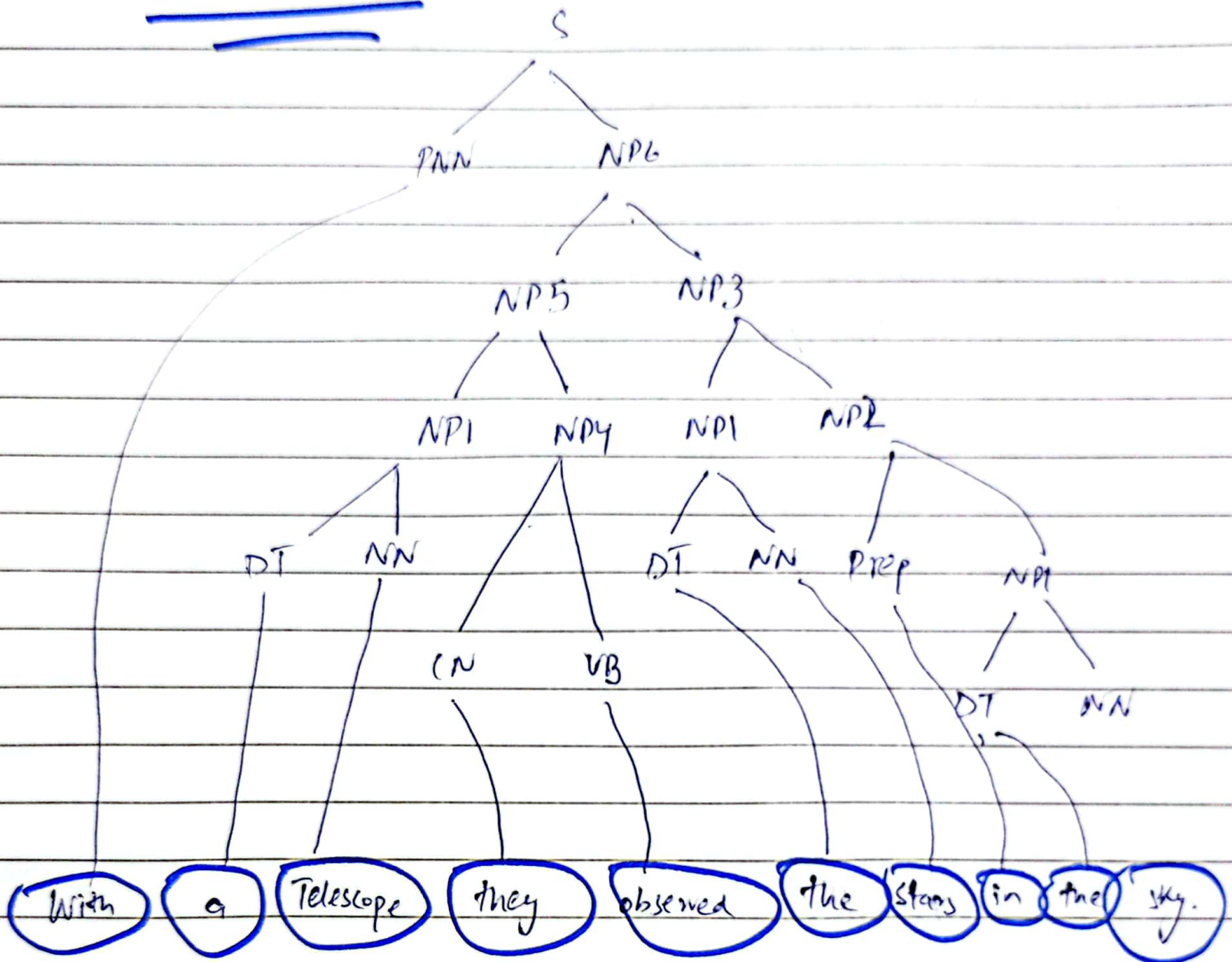
① Ex. Grammar in Chomsky Normal Form will be :

$S \rightarrow PNN \quad NP_6$
 $NP_6 \rightarrow NP_5 \quad NP_3$
 $NP_5 \rightarrow NP_1 \quad NP_4$
 $NP_3 \rightarrow NP_1 \quad NP_2$
 $NP_2 \rightarrow Prep \quad NP_1$
 $NP_1 \rightarrow DT \quad NN$
 $NP_4 \rightarrow CN \quad VB$

$CN \rightarrow \text{"they"}$
 $NN \rightarrow \text{"telescope"} \mid \text{"stars"} \mid \text{"sky"}$

$Prep \rightarrow \text{"in"}$
 $PNN \rightarrow \text{"with"}$
 $DT \rightarrow \text{"a"} \mid \text{"the"}$
 $VB \rightarrow \text{"observed"}$

Parse Tree



R. W

with (PNN)

a (DT)

telescope (NN)

they (CN)

observed (VB)

the (DT)

stars (NN)

in (Preposition)

the (DT)

sky (NN)

Step 1:-

S → PNN $\overbrace{\text{DT NN}}^{\text{Prep}}$ CN VB $\overbrace{\text{DT NN}}$

Step 2:-

S → PNN NPI CN VB NPI $\underbrace{\text{Prep NPI}}$

NPI → DT NN

Step 3:-

$S \rightarrow PNN \quad NPI \quad CN \quad VB \quad \underline{NPI \quad NP2}$

$NP2 \rightarrow \text{Prep} \quad NPI$

$NPI \rightarrow DT \quad NN$

Step 4:-

$S \rightarrow PNN \quad NPI \quad \underline{CN \quad VB} \quad NP3$

$NP3 \rightarrow NPI \quad NP2$

$NP2 \rightarrow \text{Prep} \quad NPI$

$NPI \rightarrow DT \quad NN$

Step 6:-

$S \rightarrow PNN \quad NPI \quad NP4 \quad NP3$

$NP4 \rightarrow CN \quad VB$

$NP3 \rightarrow NPI \quad NP2$

$NP2 \rightarrow \text{Prep} \quad NPI$

$NPI \rightarrow DT \quad NN$

Step 7 ✓

$S \rightarrow PNN \quad NP5 \quad NP3$

$NP5 \rightarrow \quad NP1 \quad NP4$

$NP4 \rightarrow \quad CN \quad VB$

$NP3 \rightarrow \quad NP1 \quad NP2$

$NP2 \rightarrow \quad Prep \quad NP1$

$NP1 \rightarrow \quad DT \quad NN$

Step 8:-

$S \rightarrow PNN \quad NP6$

$NP6 \rightarrow NP5 \quad NP3$

$NP5 \rightarrow NP1 \quad NP4$

$NP3 \rightarrow NP1 \quad NP2$

$NP2 \rightarrow Prep \quad NP1$

$NP1 \rightarrow DT \quad NN$

$NP4 \rightarrow CN \quad VB$

$PNN \quad NP6$

$PNN \quad NP5 \quad NP3$

$PNN \quad NP1 \quad NP4 \quad NP3$

$PNN \quad DT \quad NN \quad CN \quad VB \quad NP3$

$PNN, DT, NN, CN, VB, NP1 \quad NP2$

$PNN, DT, NN, CN, VB, DT, NN, Prep, NP1$

~~$PNN, DT, NN, CN, VB, DT, NP1, Prep, DT, NN$~~

with a telescope they observed the stars in the sky. ✓

telescope, they observed the
telescope they, observed the
telescope they observed, the

~~NP~~ ~~NP~~

they, observed the stars
they observed, the stars
they observed the, stars

NP NP ~~NP~~
NP4 NP1 ~~NP~~
- ~~NP~~

observed, the stars in
observed the, stars in
observed the stars, in

~~NP~~ VB NP1