CSO322-Quiz 2

CFG and PDA

1

Roll No. *

19075083

2

Which is not true for the current configuration (also called Instantaneous Description) of Turing Machine: *
(1 Point)

- (●) It remembers the cell currently being scanned by the read write head.
- ( ) The contents of all the cells of the tape.
- ( ) The content of the cell on which the head previously be in.
- ( ) It remembers the state of the machine.

3

Which is true for the CFG? *
(1 Point)

$S \rightarrow aA|\epsilon, \ A \rightarrow bA|a.$

- *Null production cannot be removed.*
- *Null production can be removed.*

4

True or False: Every decidable (recursive) language is recursively enumerable. * (1 Point)

- True
- Maybe
- False

5

A grammar is called ambiguous if * (1 Point)

- it generates more than one string
- it generates both Left and Right most derivation for a given string
- it generates more than one parse tree for a given string
- it fulfils the above two statements

6

Which of the following is not possible algorithmically: * (1 Point)

- *NFA to DFA*

- *CFG to PDA*
- *RE to CFG*
- *NPDA to DPDA*

7

In a PDA the transition function is defined as *
(1 Point)

- $Q \times \Gamma \rightarrow Q \times \Sigma$
- $Q \times (\Sigma \cup \epsilon) \times \Gamma \rightarrow Q \times \Gamma$
- $Q \times \Sigma \rightarrow Q \times \Gamma$
- $Q \times \Sigma \times \Gamma \rightarrow Q \times \Sigma$

8

Which is not true for ambiguous grammar? *
(1 Point)

- Some ambiguity can be removed.
- Inherent ambiguity cannot be removed.
- All ambiguity can be removed.
- Ambiguity creates problem in generating language from a given grammar.

9

Which of the following cannot be designed by a PDA? *
(1 Point)

- [ ] $L = c^m\, a^n\, b^n,\ where\ m, n\ >\ 0.$
- [x] $L = a^n\, c^m\, b^n,\ where\ m, n\ >\ 0.$
- [ ] $L = a^n\, b^n c^n\ ,\ where\ n\ >\ 0.$
- [ ] $L = a^n\, b^n c^m\ ,\ where\ m, n\ >\ 0.$

10

Which is not true for the diagram of a PDA *
(1 Point)

- [ ] PDA contains a stack.
- [ ] The head moves from left to right.
- [ ] There are two ways to declare a string accepted by a PDA .
- [x] The head reads as well as writes.

11

(Non-anonymous question ⓘ) *
(6 Points)

Upload your answer as a single pdf file.

Answer each part of the following context free grammar G.

$$\begin{aligned} R &\rightarrow XRX|S \\ S &\rightarrow aTb|bTa \\ T &\rightarrow XTX|X|\epsilon \\ X &\rightarrow a|b \end{aligned}$$

(a) Which is the start variable, variables and terminals of G.
(b) Give three strings belonging to L(G) and
(c) Give three strings not belonging to L(G).
(d) Give the description of L(G) in English
(e) True or False: $T \Rightarrow^* T$. Justify your answer.
(f) True or False: True or false: $X \Rightarrow^* aba$. Justify your answer.

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