No:

Adı-Soyadı (Name-Surname):

KBÜ BİLGİSAYAR MÜHENDİSLİĞİ BÖLÜMÜ
BLM323 OTOMATA TEORİSİ
YAZ OKULU FİNAL SINAV SORULARI

Q1) S1) Prove that the following language L is not regular.
Aşağıdaki L dilinin düzenli olmadığını ispatlayınız.

$$L=\{\alpha^{2^{n}} \mid n \geq 0\}$$

$$L = \{a, a^2, a^4, a^8, a^{16}, \dots \}$$

$$x = uvw$$

$$|uv| \leq n$$

$$|v| \geq 1$$

$$|u| = k \quad |v| = l \quad |w| = m$$

$$k + l + m = 2^n$$

$$\underline{i = 2}$$

$$x = uv^2w$$

$$|x| = k + 2l + m$$

$$x \in L \; ?$$

$$L = \{a^{2^n}, a^{2^{n+1}}, a^{2^{n+2}}, \dots \}$$

$\triangle \quad k + 2l + m < 2^{n+1}$

$x \notin L \quad$ so $\quad L$ is not regular.

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Q2) S2) Convert the following context free grammar into Chomsky Normal Form. Show all steps during conversion. Aşağıdaki Bağlamdan Bağımsız Grameri Chomsky Normal Form'a çeviriniz. Tüm adımları gösteriniz.
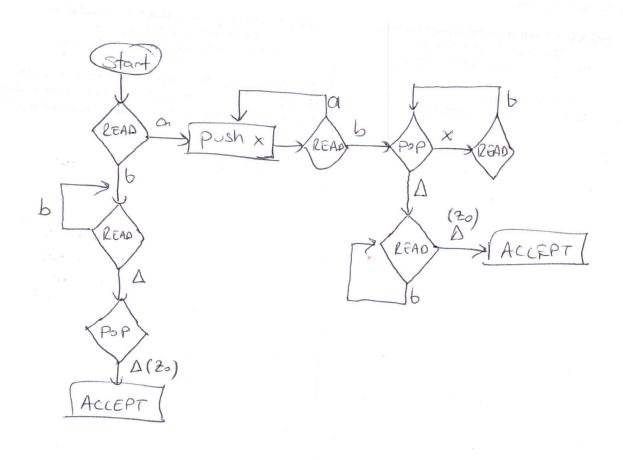
$$S \rightarrow aSb \mid \lambda$$

① $S_0 \rightarrow S$
$\quad S \rightarrow aSb \mid \lambda$

② $S_0 \rightarrow S \mid \lambda$
$\quad S \rightarrow aSb \mid ab$

③ $S_0 \rightarrow aSb \mid ab \mid \lambda$
$\quad S \rightarrow aSb \mid ab$

④ $S_0 \rightarrow XB \mid AB \mid \lambda$
$\quad S \rightarrow XB \mid AB$
$\quad X \rightarrow AS$
$\quad A \rightarrow a$
$\quad B \rightarrow b$

Q3) S3) Construct a Push Down Automata for language L. / L dili için bir PDA tasarlayınız.

$$L = \{a^m b^n \mid m \geq 0, m < n\}$$

Q4) S4) Construct a Turing Machine for language L. / L dili için ir Turing Makinesi tasarlayınız.

$$L = \{a^n w b^n w c^{2n} \mid n \geq 0\}$$