SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

ROLL NO | | | | | | | | | | | | | :Total number of pages:[01]

Total number of questions:06

B.Tech. –CSE 5th Sem

Theory of Computation

Subject Code:BTCS-504A

Paper ID :

Time allowed: 3 Hrs

Max Marks:60

Important Instructions:

- All questions are compulsory

PART A (10 x 2 marks)

Q. 1. Answer in brief:

a. Define finite automata.
b. Define Moore machine.
c. Design deterministic finite automata over input alphabets (0,1) that starts with 0 and end with 1.
d. What do you mean by Context Sensitive Language?
e. What is need of regular expression?
f. What do you mean by universal Turing Machine?
g. State Pumping Lemma.
h. Briefly explain concept of NULL production.
i. What is Turing machine halting problem?
j. Write down formal definition of push down automata.

PART B (5×8 marks)

2. Define automata with the help of its block diagram. What are its various characteristics?

OR

Explain Moore and Mealy Machine with a suitable example. CO1

3. Prove $(1+00^*1)+(1+00^*1)(0+10^*1)^*(0+10^*1)=0^*1(0+10^*1)^*$

OR

Find an FA equivalent to the regular expression$(0+1)^*(00+11)(0+1)^*$ CO2

4. Design a Pushdown Automata that accepts the language $\{0^n1^{2n} \mid n>0\}$.

OR

Design a Turing machine M to recognize the language $\{1^n2^n3^n \mid n>=1\}$. CO4

5. Find a grammar in Chomsky normal form equivalent to S→aAbB, A→aA|a, B→bB|b.

OR

Write down different steps involved in converting a grammar into GNF. CO3

6. Construct a grammar G generating $\{a^nb^nc^n \mid n\geq 1\}$.

OR

What do you mean by ambiguity in expression? Also show that the grammar S→a|abSb|aAb, A→bS|aAAb is ambiguous. CO3