

B.Sc. (I. T.) Sem. - V (CBCS - 2015 Course) : WINTER - 2018

SUBJECT: THEORY OF COMPILERS

Day: Monday
Date: 03/12/2018

W-2018-1084

Time: 10.00 a.m. to 01.00 p.m.
Max Marks: 60

N.B:

- 1) Attempt **ANY SIX** questions
- 2) Figures to the right indicate **FULL** marks
- 3) Draw appropriate diagram wherever **necessary**

Q.1 What are the different phases of a compiler? Draw and explain it with an example. (10)

Q.2 Using the following transition table, convert NFA to DFA. (10)

States/Input Symbols	A	B	C
q ₀	{q ₀ ,q ₁ }	q ₁
q ₁	{q ₂ }	q ₀
q ₂	q ₀	{q ₀ ,q ₂ }	q ₂

q₀ is the final state.

Q.3 Consider the following grammar: (10)

$$S \rightarrow A * B \mid * A$$

$$A \rightarrow \# B \mid B \#$$

$$B \rightarrow * A \mid \#$$

For the string “#####” Find:

- i) Leftmost Derivation
- ii) Rightmost Derivation
- iii) Parse Tree

Q.4 Give the Regular Expressions for input symbols: a, b. (10)

- i) All the strings starts with ‘a’ and ends with ‘b’.
- ii) All the strings that have even number of b’s and odd number of a’s.
- iii) All the strings that do not contain a single occurrence of ‘aa’.
- iv) All the strings that have ‘a’ somewhere.

Q.5 What is a type checking? What are different types of attributes? Explain it with an example of each. (10)

Q.6 Explain code optimization techniques in details. (10)

Q.7 Describe the rules for constructing FIRST and FOLLOW. Give an example of each using the rules. (10)

Q.8 Define the following: (2*5)

- i) Regular Language
- ii) FIRST
- iii) Positive Closure
- iv) Sentential Form
- v) Handle

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