Sanjay Ghodawat University, Kolhapur 2019-20

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Year and Program:2019-20 **School of Technology** **Department of TY B.Tech**

Course Code: CST305 **Course Title: Compiler Design** **Semester – V**

Day and Date Thursday 21/11/19 **End Semester Examination (ESE)** **Time:** 3hrs **Max Marks: 100** 10:30am to 1:30 pm.

Instructions: 1) All questions are compulsory.
2) Assume suitable data wherever necessary.
3) Figures to the right indicate full marks.

			Marks	Bloom's Level	CO
Q.1		**Solve any Two**			
	a)	Explain various compiler construction tools	08	L_2	CO1
		OR			
	a)	Discuss the role of a lexical analyzer	08	L_2	CO1
	b)	Describe to specify and recognize the tokens	07	L_2	CO1
		OR			
	b)	Explain input buffering technique in scanner.	07	L_2	CO2
Q.2		**Solve any Two**			
	a)	Describe Program Relocation algorithm of linker.	07	L_2	CO2
		OR			
	a)	Illustrate Program Linking algorithm of linker	07	L_3	CO2
	b)	Construct the Canonical LR Parser Table for the given grammar. $S \rightarrow AA$; $A \rightarrow aA \mid b$	08	L_3	CO2
		OR			
	b)	Consider the following CFG grammar over the non-terminals {X,Y,Z} and terminals {a,c,d} with the productions below and start symbol Z. $X \rightarrow a$ $X \rightarrow Y$ $Z \rightarrow d$ $Z \rightarrow X\ Y\ Z$ $Y \rightarrow c$ $Y \rightarrow \varepsilon$	08	L_3	CO2

ESE

For this grammar compute the FIRST and FOLLOW sets of every non-terminal

Q.3 **Solve any Two**

a) Consider the following Context-Free Grammar 08 L_3 CO3

G = ({S,A,B},S,{a,b},P) where P is

S →AaAb

S → Bb

A → ε

B → ε

(a) Compute the FIRST sets for A, B, and S.

(b) Compute the FOLLOW sets for A, B and S.

(c) Is the CFG G LL(1)? Justify

b) G = {bexpr, {bexpr, bterm,bfactor},{not, or, and, (,), true, false}, P } with P given below. 08 L_3 CO3

bexpr → bexpr or bterm | bterm

bterm → bterm and bfactor | bfactor

bfactor → not bfactor | (bexpr) | true | false

For this grammar answer the following questions:

(A) Remove left recursion from G.

(B) Left factor the resulting grammar in (A).

c) Given the CFG G = {S, {S, U,V, W}, {a, b,c,d}, P } with P given as shown below: 08 L_3 CO3

S→ UVW

U → (S) | aSb | d

V → aV | e

W → cW | e

Construct its a table-based LL(1) predictive parser.

ESE

Q.4	**Solve any Two**				
a)	Consider the CFG G = {NT = {E,T,F}, T = {a,b,+,*}, P, E } with the set of productions as follows: $E \rightarrow E + T$ $E \rightarrow T$ $T \rightarrow T F$ $T \rightarrow F$ $F \rightarrow F *$ $F \rightarrow a$ $F \rightarrow b$ For the above grammar answer the following questions: (A) Compute the FIRST and FOLLOW for all non-terminals in G. (B) Consider the augmented grammar for computing the set of LR(0) items for G'.	09	L_3	CO3
b)	Explain inherited and synthesized attributes of syntax directed translation	09	L_3	CO3
c)	Illustrate the concept of back-patching with suitable example	09	L_3	CO3
Q.5	**Solve any Two**				
a)	What is peephole optimization? Describe different characteristics of peephole optimization.	09	L_2	CO4
b)	Explain in detail code improving transformation, copy propagation, code motion	09	L_2	CO4
c)	Discuss different issues in design of code generator	09	L_2	CO4
Q.6	**Solve any Three**				
a)	Write short note on flow graph representation of basic blocks	06	L_2	CO4
b)	Illustrate the basic block by using DAG with suitable example	06	L_3	CO4
c)	Explain in detail three address statements using quadruple and triple	06	L_3	CO4
d)	Write an algorithm for common sub expression elimination.	06	L_2	CO4

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