Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India

(Autonomous College Affiliated to University of Mumbai)

Mid Semester Examination
March 2020

Max. Marks: 20

Class: TE

Course Code: CE61

Name of the Course: System Programming and Compiler Construction

Duration: 1 Hr.

Semester: VI

Branch: Computer

Instructions:
- (1) All questions are compulsory
- (2) Assume suitable data if necessary
- (3) Draw neat diagram wherever required.

Q. No.		Max. Marks	CO-BL-PI
Q.1	Compute *firstpos*, *followpos* and *lastpos* for the syntax tree generated from the augmented regular expression $(a|b)*abba\#$.	5	3-3-2.4.1
Q.2	(A) Consider the following context free grammar: $S \rightarrow a|aAb|abSb$ $A \rightarrow aAAb|bS$ Is the grammar ambiguous or unambiguous? Justify by giving parse tree using leftmost or rightmost derivation.	2	3-3-1.3.1
	(B) Why the algorithm of one pass macro processor cannot handle the invocation of one macro within the another. Justify with the help of an example.	3	2-2-2.3.2
	OR		
	(B) State the reason for the given statement:- "The body of a macro processor should not contain any labels" How this feature can be dealt by the macro processor?		
Q.3	Illustrate the design of an absolute loader with the help of any example.	5	1-2-2.2.2

Q.4	Apply the algorithm of two pass assembler to assemble the following SIC source program. Design suitable data structures if required.	5	2-3-2.2.3

```
SUM      START     4000
FIRST    LDX       ZERO
         LDA       ZERO
LOOP     ADD       TABLE,X
         TIX       COUNT
         JLT       LOOP
         STA       TOTAL
         RSUB
TABLE    RESW      2000
COUNT    RESW      1
ZERO     WORD      0
TOTAL    RESW      1
         END       FIRST
```

Refer the following OPTAB.

Mnemonic	Opcode
ADD	18
JLT	38
LDA	00
LDX	04
RSUB	4C
STA	0C
TIX	2C

OR

Apply the algorithm of two pass assembler to assemble the following SIC source program. Design suitable data structures if required.

```
SUM      START     4000
         LDX       ZERO
CLOOP    TD        INDEV
         JEQ       CLOOP
         RD        INDEV
         STCH      RECORD, X
         TIX       B200
         JLT       CLOOP
INDEV    BYTE      X 'F5'
RECORD   RESB      200
ZERO     WORD      0
B200     WORD      200
```

Refer the following OPTAB.

Mnemonic	Opcode
JEQ	30
JLT	38
LDX	04
RD	D8
STCH	54
TD	E0
TIX	2C