POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: System Programming

Semester : Spring

Year : 2023
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) Explain the architectures of the SIC and SIC/XE machines with important features. 10
   b) Write a SIC program for arithmetic operations. 5
2. a) How is the forward reference handled in the one pass assembler? 7
   b) Explain machine dependent assembler features. 8
3. a) Consider the following assembly language program. 10

Line	Symbol	Opcode	Exp
10	Test	START	0
20		EXTDEF	Odev
30		EXTREF	Ch, Phash
40	Begin	LDA	=C'A'
50		+STA	Ch
60		+JSUB	Phash
70		LTORG	
80	Odev	BYTE	X'06'
90	Phash	CSECT	
100		EXTDEF	Ch
110		EXTREF	Odev
120	Loop	+TD	Odev
130		JEQ	Loop
140		LDCH	Ch
150		+WD	Odev
160		RSUB	
170	Ch	RESB	10
180		END	Begin

Mnemonic	Opcode
JEQ	30
JSUB	48
LDA	00
LDCH	50
STA	0C
TD	E0
WD	DC
RSUB	4C

i. Fill column for location counter
ii. Create object code column with object codes
iii. Show all data structures
iv. Create Object code file.

b) What is absolute loader? Explain with proper algorithm. 5

4. Consider the following assembly language program. 15

Line	Symbol	Opcode	Exp
10	TEST	START	2050
20	FIRST	LDA	P
30		MUL	RATE
40		MUL	TIME
50		DIV	HUNDRED
60		STA	SI
70	P	RESW	1
80	RATE	RESW	1
90	TIME	RESW	1
100	HUNDRED	WORD	100
110	SI	RESW	1
120		END	FIRST

Mnemonic	Opcode
LDA	00
MUL	20
DIV	24
STA	0C

i. Fill column for location counter
ii. Create object code column with object codes
iii. Create Object code file.
iv. Load the program in memory

5. a) What is macro time variable? How macro processor manages value of macro time variable? 5
b) Explain Concatenation of macro parameters. 5
c) Explain conditional macro expansion. 5

6. a) Explain the Object diagram for assembler with diagram. 7
   b) What is the object oriented programming? Write about the principles of the object oriented programming. 8

7. Write short notes on: (**Any two**) 2×5
   a) RISC architecture.
   b) Multipass assembler.
   c) Generation of unique labels

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: System Programming

Semester: Spring

Year : 2021
Full Marks: 100
Pass Marks: 45
Time : 3 hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is system software and application software 5
   b) Describe the architectures of SIC and SIC/XE machines. 10
2. a) What are the basic functions of an assembler? What is the simple format of the object program generated by the assembler? 7
   b) Explain load-and go assembler with example. 8
3. a) Consider the following assembly language program 12

Mnemonic	Opcode
CLEAR	B4
LDT	74
TD	E0
JEQ	30
TIXR	B8
JLT	38
RSUB	4C
WD	DC
LDCH	50

Line	Symbol	Opcode	Exp
10	WRREC	START	105D
20		CLEAR	X
30		LDT	LENGTH
40	WLOOP	TD	OUTPUT
50		JEQ	WLOOP
60		+LDCH	BUFFER,X
70		WD	OUTPUT
80		TIXR	T
90		JLT	WLOOP

100		RSUB	
110	OUTPUT	BYTE	X'05'
120	BUFFER	RESB	100
130	LENGTH	RESB	2
140		END	WRREC

i) Fill the column for the location counter.
ii) Create an object code column with object code.
iii) Create an object file.
iv) Load the program into memory. 8

b) Write short notes on the machine independent assemblers features such as literals and program linking.

4. a) What is loader? Differentiate linking loader from linkage editors. 7
b) Give working mechanism of the absolute loader with the algorithm. 7

5. a) What is macro time variable? How macro processor manages value of macro time variable? 5
b) Write about concatenation of macro parameters with example. 5
c) Consider the macro definition given below and show macro expansion for the macro call statement "Print 54 F2". Show all data structures used by macro processor clearly. 5

Print	MACRO	&Ch, &Od
$Repeat	TD	&Od
	JEQ	$Repeat
	LDCH	#&Ch
	WD	&Od
	MEND	

6. a) Define Booch's Micro and Macro process activities. 5
b) Explain object diagram for the assembler. 6

7. Write short notes on: (Any two) 2×5
a) Dynamic Linking
b) Principle of OOP.
c) Macro Expansion.

A402

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: System Programming

Semester: Fall

Year : 2021
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What are the types of software? Explain briefly with their importance. 4
   b) Write about the instruction formats, addressing modes and registers of SIC/XE architecture. 7
   c) Identify the addressing mode and target address if the instruction is 012030.[PC=2000, B=5030, X= 3000]. 4
2. a) Discuss the roles of data structures OPTAB, SYMTAB, LOCCTR. 5
   b) Consider the following assembly language program. 10

Line	Symbol	Opcode	Exp
10	Test	START	0
20		EXTDEF	Odev
30		EXTREF	Ch, Phash
40	Begin	LDA	=C'F'
50		+STA	Ch
60		+JSUB	Phash
70		LTORG	
80	Odev	BYTE	X'06'
90	Phash	CSECT	
100		EXTDEF	Ch
110		EXTREF	Odev
120	Loop	+TD	Odev
130		JEQ	Loop
140		LDCH	Ch
150		+WD	Odev
160		RSUB	
170	Ch	RESB	1
180		END	Begin

Mnemonic	Opcode
JEQ	30
JSUB	48
LDA	00
LDCH	50
STA	0C
TD	E0
WD	DC
RSUB	4C

i. Fill column for location counter
ii. Create object code column with object codes
iii. Show all data structures
iv. Create Object code file.

3. a) What is the format of the Object Program generated by the assembler? What are the assembler directives and assembler data structures? Explain very briefly. 8

b) What is the use of the load and go assembler? Illustrate with example. 7

4. Consider the following assembly language program. 15

Line	Symbol	Opcode	Exp
10	TEST	START	3000
20	FIRST	LDA	C
30		MUL	NINE
40		DIV	FIVE
50		ADD	THIRTYTWO
60		STA	F
70	C	RESW	1
80	F	RESW	1
90	NINE	WORD	9
100	FIVE	WORD	5
110	THIRTYTWO	WORD	32
120		END	FIRST

Mnemonic	Opcode
LDA	00
MUL	20
DIV	24
STA	0C
ADD	18

a) Fill column for location counter
b) Create object code column with object codes
c) Create Object code file.
d) Load the program in memory

a)	What is macro definition and macro data structures? Explain the concept of concatenation of macro parameters briefly.	7
b)	Explain conditional macro expansion.	8
a)	Explain the object diagram for assembler with diagram.	5
b)	What is object oriented programming? Write about principles of object oriented programming.	5
c)	Define Booch's Micro and Macro process activities.	5

Write short notes on: **(Any two)** 2×5

a) Risc vs Cisc
b) Conditional macro expansion
c) Dynamic Linking

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: System Programming

Semester: Fall

Year : 2020
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.
Attempt all the questions.

a) Write about instruction formats and addressing modes of SIC/XE. Identify the addressing mode and target address if the instruction is 012030 {PC=2000, B=5030, X=3000} 7

b) Explain VAX and UltraSPARC Architecture. Write a SIC/XE Program for arithmetic operations. 8

a) Discuss the roles of data structures OPTAB, SYMTAB, LOCCTR. 5

b) Consider the following assembly language program. 10

Line	Symbol	Opcode	Exp
10	Test	START	0
20		EXTDEF	Odev
30		EXTREF	Ch, Phash
40	Begin	LDA	=C'#'
50		+STA	Ch
60		+JSUB	Phash
70		LTORG	
80	Odev	BYTE	X'06'
90	Phash	CSECT	
100		EXTDEF	Ch
110		EXTREF	Odev
120	Loop	+TD	Odev
130		JEQ	Loop
140		LDCH	Ch
150		+WD	Odev
160		RSUB	
170	Ch	RESB	1
180		END	Begin

Mnemonic	Opcode
JEQ	30
JSUB	48
LDA	00
LDCH	50
STA	0C
TD	E0
WD	DC
RSUB	4C

a) Fill column for location counter
b) Create object code column with object codes
c) Show all data structures
d) Create Object code file

3. a) Consider the following assembly language program.

Mnemonic	Opcode
LDCH	50
LDX	04
STCH	54
JLT	38
TIX	2C

Line	Symbol	Opcode	Exp
10	STRCPY	START	1000
20	FIRST	LDX	ZERO
30	MOVECH	LDCH	STR1,X
40		STCH	STR2,X
50		TIX	ELEVEN
60		JLT	MOVECH
70	STR1	BYTE	C'ABCD'
80	STR2	RESB	11
90	ZERO	WORD	0
100	ELEVEN	WORD	11
110		END	FIRST

i) Fill column for location counter
ii) Create object code column with object codes
iii) Create Object code file.
iv) Load the program in memory

b) Write about program blocks and control section. 5

4. a) What is macro definition and conditional macro expansion? Explain with Example. 10

b) Consider the macro definition given below and show macro expansion for the macro call statement "Print 54 F2". Show all data structures used by macro processor clearly. 5

Print	MACRO	&Ch, &Od
$Repeat	TD	&Od
	JEQ	$Repeat
	LDCH	#&Ch
	WD	&Od
	MEND	

a) Explain the interaction diagram for assembler with diagram. 8

b) What is object oriented programming? Write about principles of object oriented programming. 7

a) Define Booch's Micro and Macro process activities. 8

b) Differentiate linking loader from linkage editors. 7

Write short notes on: **(Any two)** 2×5

a) Absolute Loader and its algorithm

b) Concatenation of macro parameters

c) Dynamic Linking

POKHARA UNIVERSITY

Level: Bachelor Semester: Spring Year : 2019
Programme: BE Full Marks: 100
Course: System Programming Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.
Attempt all the questions.

1. a) Write about instruction formats and addressing modes of SIC/XE. 7
   Identify the addressing mode and target address if the instruction is 012030 {PC=2000, B=5030, X=3000}
   b) Explain the importance of system software. How it differs from application software? 4
   c) Explain VAX, RISC and CISC architecture. 4
2. a) What is one-pass and Multi-pass Assembler? Which one do you prefer while designing an assembler? Justify your answer. 5
   b) Consider the following assembly language program. 10

Line	Symbol	Opcode	Exp
10	Test	START	0
20		EXTDEF	Odev
30		EXTREF	Ch, Phash
40	Begin	LDA	=C'#'
50		+STA	Ch
60		+JSUB	Phash
70		LTORG	
80	Odev	BYTE	X'06'
90	Phash	CSECT	
100		EXTDEF	Ch
110		EXTREF	Odev
120	Loop	+TD	Odev
130		JEQ	Loop
140		LDCH	Ch
150		+WD	Odev
160		RSUB	
170	Ch	RESB	1
180		END	Begin

Mnemonic	Opcode
JEQ	30
JSUB	48
LDA	00
LDCH	50
STA	0C
TD	E0
WD	DC
RSUB	4C

i. Fill column for location counter
ii. Create object code column with object codes
iii. Show all data structures
iv. Create Object code file. 5

c) Explain literal and its handling in pass 1 and pass 2 15

3. Consider the following assembly language program.

Line	Symbol	Opcode	Exp
10	STRCPY	START	1000
20	FIRST	LDX	ZERO
30	MOVECH	LDCH	STR1,X
40		STCH	STR2,X
50		TIX	ELEVEN
60		JLT	MOVECH
70	STR1	BYTE	C'ABCD'
80	STR2	RESB	11
90	ZERO	WORD	0
100	ELEVEN	WORD	11
110		END	FIRST

Mnemonic	Opcode
LDCH	50
LDX	04
STCH	54
JLT	38
TIX	2C

i. Fill column for location counter
ii. Create object code column with object codes
iii. Create Object code file.
iv. Load the program in memory 5

4. a) What is Macro definition and Expansion? Explain with Example.

b) Consider the macro definition given below and show macro expansion for the macro call statement "Display 69 F8". Show all data structures used by macro processor clearly. 5

Print	MACRO	&Ch, &Od
$Repeat	TD	&Od
	JEQ	$Repeat
	LDCH	#&Ch
	WD	&Od
	MEND	

c) Explain Machine independent Macro processors Features. 5

5. a) Explain the interaction diagram for assembler with diagram. 8
b) What is object oriented programming? Write about principles of object oriented programming. 7

6. a) Define Booch's Micro and Macro process activities. 5
b) Differentiate linking loader from linkage editors. 5

7. Write short notes on: **(Any two)** 2×5
a) Absolute Loader and its algorithm
b) Conditional macro expansion
c) Dynamic Linking

Level: Bachelor
Programme: BE
Course: System Programming

POKHARA UNIVERSITY

Semester: Fall

Year : 2019
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

a) Write about instruction formats and addressing modes of SIC/XE. Identify the addressing mode and target address if the instruction is 012030 {PC=2000, B=5030, X=3000} 7

b) Explain VAX and UltraSPARC Architecture. Write a SIC/XE Program for arithmetic operations. 8

a) Explain the basic assembler concept highlighting the machine dependent and machine independent features. 7

b) Consider the following assembly language program. 8

Line	Symbol	Opcode	Exp
10	Test	START	0
20		EXTDEF	Odev
30		EXTREF	Ch, Phash
40	Begin	LDA	=C'#'
50		+STA	Ch
60		+JSUB	Phash
70		LTORG	
80	Odev	BYTE	X'06'
90	Phash	CSECT	
100		EXTDEF	Ch
110		EXTREF	Odev
120		+TD	Odev
130	Loop	JEQ	Loop
140		LDCH	Ch
150		+WD	Odev
160		RSUB	
170		RESB	1
180	Ch	END	Begin

Mnemonic	Opcode
JEQ	30
JSUB	48
LDA	00
LDCH	50
STA	0C
TD	E0
WD	DC
RSUB	4C

i) Fill column for location counter

ii) Create object code column with object codes

iii) Show all data structures

iv) Create Object code file.

15

3. Consider the following assembly language program.

Line	Symbol	Opcode	Exp
10	STRCPY	START	1000
20	FIRST	LDX	ZERO
30	MOVECH	LDCH	STR1,X
40		STCH	STR2,X
50		TIX	ELEVEN
60		JLT	MOVECH
70	STR1	BYTE	C'ABCD'
80	STR2	RESB	11
90	ZERO	WORD	0
100	ELEVEN	WORD	11
110		END	FIRST

Mnemonic	Opcode
LDCH	50
LDX	04
STCH	54
JLT	38
TIX	2C

i.) Fill column for location counter

ii.) Create object code column with object codes

iii.) Create Object code file.

iv.) Load the program in memory

POKHARA UNIVERSITY

Level: Bachelor | Semester: Spring | Year : 2018
Programme: BE | Full Marks: 100
Course: System Programming | Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.
Attempt all the questions.

a) What is system software? Explain its importance. 5
b) Describe the architectures of SIC and SIC/XE machines. 10
a) What is the advantage of relative addressing mode over absolute addressing mode? 5
b) Consider the following assembly language program. 10

Line	Symbol	Opcode	Exp
10	Test	START	0
20		EXTDEF	Odev
30		EXTREF	Ch, Phash
40	Begin	LDA	=C'#'
50		+STA	Ch
60		+JSUB	Phash
70		LTORG	
80	Odev	BYTE	X'06'
90	Phash	CSECT	
100		EXTDEF	Ch
110		EXTREF	Odev
120	Loop	+TD	Odev
130		JEQ	Loop
140		LDCH	Ch
150		+WD	Odev
160		RSUB	
170	Ch	RESB	1
180		END	Begin

Mnemonic	Opcode
JEQ	30
JSUB	48
LDA	00
LDCH	50
STA	0C
TD	E0
WD	DC
RSUB	4C

i. Fill column for location counter
ii. Create object code column with object codes
iii. Show all data structures
iv. Create Object code file.

3. a) What is loader? Differentiate linking loader from linkage editors. 2+5
   b) What is relocation? How relocation is carried out in a loader? 8
4. a) What is macro time variable? How macro processor manages value of macro time variable? 5
   b) Write about concatenation of macro parameters with example. 5
   c) Consider the macro definition given below and show macro expansion for the macro call statement "Print 54 F2". Show all data structures used by macro processor clearly. 5

Print	MACRO	&Ch, &Od
$Repeat	TD	&Od
	JEQ	$Repeat
	LDCH	#&Ch
	WD	&Od
	MEND	

5. a) Explain the object diagram for assembler with diagram. 8
   b) What is object oriented programming? Write about principles of object oriented programming. 7
6. a) Define Booch's Micro and Macro process activities. 5
   b) Explain load and go assembler 5
   c) What is Literal? Explain its handling during pass 1 and pass 2. 5
7. Write short notes on: **(Any two)** 2×5
   a) Absolute Loader and its algorithm
   b) Conditional Macro Expansion
   c) Dynamic Linking

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: System Programming

Semester: Fall

Year : 2018
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is system software? Explain its importance. 5
   b) Describe the architecture of SIC/XE machine. 5
   c) Differentiate RISC and CISC architectures. 5
2. a) How forward references are handled in one pass assembler? 5
   b) Consider the following assembly language program. 10

Line	Symbol	Opcode	Exp
10	Test	START	0
20	FIRST	LDA	#5
30		STX	THREE
40		LDX	=C'EOF'
50		+LDS	THREE
60		ADDR	A,X
70		+STA	RESULT,X
80	RESULT	RESW	1
90	THREE	RESW	1
100		END	FIRST

Mnemonic	Opcode
LDA	00
STX	10
LDX	04
LDS	6c
ADDR	90
STA	0C

   i. Fill column for location counter
   ii. Create object code column with object codes
   iii. Show all data structures
   iv. Create Object Program.
3. a) Write about program blocks and control sections. 5

b) Consider the following assembly language program.

Line	Symbol	Opcode	Exp
10	SUM	START	5000
20	FIRST	LDX	ZERO
30		LDA	ZERO
40	LOOP	ADD	TABLE,X
50		TIX	COUNT
60		JLT	LOOP
70		STA	TOTAL
80		RSUB	
90	TABLE	RESW	2000
100	COUNT	RESW	1
110	ZERO	WORD	0
120	TOTAL	RESW	1
130		END	FIRST

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

i. Fill column for location counter
ii. Create object code column with object codes
iii. Create Object code file.
iv. Load the program in memory

4. a) What is macro time variable? How macro processor manages value of macro time variable? 5

b) Explain conditional macro expansion. 5

c) Consider the macro definition given below and show macro expansion for the macro call statement "Print 54 F2". Show all data structures used by macro processor clearly. 5

Print	MACRO	&Ch, &Od
$Repeat	TD	&Od
	JEQ	$Repeat
	LDCH	#&Ch
	WD	&Od
	MEND	

5. a) Explain the Object diagram for assembler with diagram. 7

b) What is object oriented programming? Write about principles of object oriented programming. 8

6. a) Define two different development processes that Booch suggested. 8

b) What is Absolute Loader? Write its algorithm. 7

7. Write short notes on: **(Any two)** 2×5

a) Dynamic Linking

b) Recursive microprocessor

c) Simple Bootstrap Loader

POKHARA UNIVERSITY

Level: Bachelor
Programme: BE
Course: System Programming

Semester: Spring

Year : 2017
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Attempt all the questions.

1. a) What is system software? Explain its importance. 5
   b) Describe the architectures of SIC and SIC/XE machines. 10
2. a) What is the advantage of relative addressing mode over absolute addressing mode? 5
   b) Consider the following assembly language program. 10

Line	Symbol	Opcode	Exp
10	Test	START	0
20		EXTDEF	Odev
30		EXTREF	Ch, Phash
40	Begin	LDA	=C'#'
50		+STA	Ch
60		+JSUB	Phash
70		LTORG	
80	Odev	BYTE	X'06'
90	Phash	CSECT	
100		EXTDEF	Ch
110		EXTREF	Odev
120	Loop	+TD	Odev
130		JEQ	Loop
140		LDCH	Ch
150		+WD	Odev
160		RSUB	
170	Ch	RESB	1
180		END	Begin

Mnemonic	Opcode
JEQ	30
JSUB	48
LDA	00
LDCH	50
STA	0C
TD	E0
WD	DC
RSUB	4C

i. Fill column for location counter
ii. Create object code column with object codes
iii. Show all data structures
iv. Create Object code file

c) What is Literal? Explain its handling during pass 1 and pass 2. 5

3. a) What is loader? Differentiate linking loader from linkage editors. 2+5
   b) What is relocation? How relocation is carried out in a loader? 8

4. a) What is macro time variable? How macro processor manages value of macro time variable? 5
   b) Write about concatenation of macro parameters with example. 5
   c) Consider the macro definition given below and show macro expansion for the macro call statement "Print 54 F2". Show all data structures used by macro processor clearly. 5

Print	MACRO	&Ch, &Od
$Repeat	TD	&Od
	JEQ	$Repeat
	LDCH	#&Ch
	WD	&Od
	MEND	

5. a) Explain the object diagram for assembler with diagram. 8
   b) What is object oriented programming? Write about principles of object oriented programming. 7

6. a) Define Booch's Micro and Macro process activities. 5
   b) Explain load and go assembler. 5

7. Write short notes on: (**Any two**) 2×5
   a) Absolute Loader and its algorithm
   b) Conditional Macro Expansion
   c) Dynamic Linking

POKHARA UNIVERSITY

Semester: Fall

Year : 2016
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

Level: Bachelor
Programme: BE
Course: System Programming

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.
Attempt all the questions.

a) Define system software. Briefly explain machine dependent and independent parts of system software. 5
b) Explain about the SIC/XE architecture. 5
c) Write about Data format and addressing modes of Power PC Architecture. 5

a) How forward references are handled in one pass assembler? 5
b) Consider the following assembly language program. 10

Line	Symbol	Opcode	Exp
10	STRCPY	START	1000
20	FIRST	LDX	ZERO
30	MOVECH	LDCH	STR1,X
40		STCH	STR2,X
50		TIX	ELEVEN
60		JLT	MOVECH
70	STR1	BYTE	C'ABCD'
80	STR2	RESB	11
90	ZERO	WORD	0
100	ELEVEN	WORD	11
110		END	FIRST

Mnemonic	Opcode
LDCH	50
LDX	04
STCH	54
JLT	38
TIX	2C

i. Fill column for location counter
ii. Create object code column with object codes
iii. Show all data structures
iv. Create Object code file

c) Write about program blocks and control sections. 5

3. a) What is relocation? How relocation is carried out in a loader? 7
b) What are the main features of machine dependent loader when logically related parts of programming are linked then what is 8

generated and why it is important?

4. a) What is macro time variable? How macro processor manages value of macro time variable? 5

   b) Write about concatenation of macro parameters with example. 5

   c) Consider the macro definition given below and show macro expansion for the macro call statement "Print 54 F2". Show all data structures used by macro processor clearly. 5

Print	MACRO	&Ch, &Od
$Repeat	TD	&Od
	JEQ	$Repeat
	LDCH	#&Ch
	WD	&Od
	MEND	

5. a) Define object oriented programming and write about its principles. 6

   b) Show the relationship between classes with example in Object Oriented Programming. Also show the Object diagram for assembler. 9

6. a) Define Booch's Micro and Macro process activities. 5

   b) Briefly explain load and go assembler. 5

7. Write short notes on: (Any two) 2×5

   a) Simple Bootstrap Loader

   b) MASM macro processor

   c) MS-DOS linker

POKHARA UNIVERSITY

Level: Bachelor | Semester: Fall | Year : 2015
Programme: BE | Full Marks: 100
Course: System Programming | Pass Marks: 45
Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.
Attempt all the questions.

a) Explain the architecture of SIC/XE machine. 10
b) Write a SIC Program to find the sum of two numbers and save the result in Sum variable. 5

a) How does machine-dependent assembler distinguish by machine-independent assembler? Write and explain about one pass assembler 6
b) Generate the object code and necessary data structure for each statement in the following code. 9

```
STTO     START  2000
INPOUT   LDA    ZERO
INLOOP   TD     INDEV
         JEQ    INLOOP
         RD     INDEV
         STCH   DATA
OUTLP    TD     OUTDEV
         JEQ    OUTLP
         LDCH   DATA
         WD     OUTDEV

ZERO     BYTE   X'0'
INDEV    BYTE   X'F1'
OUTDEV   BYTE   X'05'
DATA     RESB   1
         END    INPOUT
```

Mnemonic	Opcode
LDA	00
TD	E0
JEQ	30
RD	D8
STCH	54
LDCH	50
WD	DC

3. a) Why loader is essential for system software? Differentiate loader with linker? Define the basic function of loader. 8
b) What are the loader design options? Briefly explain any two of them. 7
4. a) What is necessity of macro processors in programming languages? Explain how unique labels are generated within macro expansion? 8
b) How is conditional macro expansion implemented? Explain with suitable examples. 7
5. a) Briefly explain about program blocks. 5
b) Briefly explain the loader options. 5
c) Briefly explain the general purpose macro processors? 5

6. a) Define object diagram. Identify possible objects and draw the object diagram for two pass assembler. 7

b) What do you mean by object oriented designing? Briefly explain the two different development processes suggested by Booch. 8

7. Write short notes on: (**Any two**) 2×5

a) MASM Assembler

b) SUNOS linker

c) ANSI C macro Language