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SECTION:- CE

ROLL NO. :- 20

SUBJECT:- SYSTEM SOFTWARE (TCS-501)

Assignment:- 1

Question 1)

Consider the memory contents shown in the following figures. What would be loaded to register A with instruction 022030 (hexadecimal)?

Ans:-

3030	003600
3600	103000
6390	00C303
C303	003030
...	...

$$(B) = 006000$$

$$(PC) = 003000$$

$$(X) = 000090$$

Machine Instruction

Hex	op	n	i	x	b	p	e	displacement		Target Address	Value in A
								0	1		
032600	000000	1	1	0	0	1	0	0110 0000 0000	3600	103000	
03C300	000000	1	1	1	1	0	0	0011 0000 0000	6390	00C303	
022030	000000	1	0	0	0	1	0	0000 0011 0000	3030	103000	
010030	000000	0	1	0	0	0	0	0000 0011 0000	30	000030	
003600	000000	0	0	0	0	1	1	0110 0000 0000	3600	103000	
0310C303	000000	1	1	0	0	0	1	0000 1100 0011 0000 0011	C303	003030	

Therefore, target Address is 3030 and value of register A must be 103000.

Question 2) Briefly answer the following questions :-

(1.) Why does Beck's "System Software" textbook design a hypothetical computer SIC to present the concepts of the book?

Ans) It illustrates the most commonly encountered hardware features & concepts while avoiding most of the idiosyncrasies.

(2.) What are maximum memory size of

Ans) SIC - 2^{15} bytes (32KB)
SIC-XE - 2^{20} bytes (1MB)

(3.) How many addressing modes do

Ans) SIC - 2.
SIC-XE - 18.

(4.) How many instructions are there in SIC/XE instruction set?

Ans) 59

(5.) How does SIC determine whether the result of a TD instruction is successful?

Ans) CC (condition code) = LT means the device is ready.

(6.) Which are the 2 general purpose registers in SIC/XE?

Ans) S,T.

(7.) What is the size of F register?

Ans) 48 bits.

(8.) Why does the Assembler need to handle source file in 2 passes?

Ans) Pass 1 : Assign addresses to all symbols.

Pass 2 : Generate object code in order to solve the problem of FORWARD REFERENCES.

So, it takes 2 passes to execute it.

Question 3) Translate the following assembly program to 61C object code. (The output format should contain H record, T record & E record)?

Ans)

Loc		Source	Statement	Object code
1000	STRCPY	START	1000	
1000	FIRST	LDX	ZERO	041025
1003	MOVECH	LDCH	STRI,X	50900F
1006		STCH	STR2,X	54901A
1009		TIX	ELEVEN	2C1028
100C		JLT	MOVECH	381003
100F	STRI	BYTE	C'TEST STRING'	544553.
101A	STR2	RESB	11	
1025	ZERO	INORD	0	000000
1028	ELEVEN	WORD	11	00000B
102B		END	FIRST	

H, STRCPY, 001000, 00002B

T, 001000, 0F, 041025, 50900F, 54901A, 2C1028, 381003

T, 00100F, 0B, 544553, 5420535453494E47

T, 001025, 06, 000000, 00000B

E, 001000.

L Desired Object Program.

Question 4) Translate the following assembly program to SIC/XE object code

Ans

Loc	source statement	Object code
1000	STRCP2 START 1000	
10000	FIRST LDT #11	75000B
10003		050000
10006	MOVECH LDCH STR1,X	53A008
10009	STCH STR2,X	57A010
1000C	TIXR T	B850
1000E	JLT MOVECH	382FF5
10011	BYTE C'TESTSTRING'	544553...
1010	RESB 11	
1027	END FIRST	

H, STRCP2, 001000, 000027

T, 001000, 11, 75000B, 050000, 53A008, 57A010, B850,
382FF5,

T, 001011, 0B, 544553542053 54 52 494E 47

E, 001000.

Required Object code.