

Model paper of Computer Architecture

1.

a) Convert the following numbers to their Binary equivalents (8 Marks).

- I. 54_{10}
- II. 47_8
- III. $A5D_{16}$
- IV. 682_{10}

b) Convert the following numbers to their Decimal equivalents (8 Marks).

- I. 110001_2
- II. 245_8
- III. $5D4_{16}$
- IV. 1001.101011_2

c) Encode the following in ASCII code (4 Marks).

b_6				0	0	0	0	1	1	1	1	
b_5				0	0	1	1	0	0	1	1	
b_4				0	1	0	1	0	1	0	1	
1	0	0	0	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	A	LF	SUB	*	:	J	Z	j	z
1	0	1	1	B	VT	ESC	+	;	K	[	k	{
1	1	0	0	C	FF	FS	,	<	L	\	l	|
1	1	0	1	D	CR	GS	-	=	M	]	m	}
1	1	1	0	E	SO	RS	.	>	N	^	n	~
1	1	1	1	F	SI	US	/	?	O	-	o	DEL

The code is read from this table as:

b_6	b_5	b_4	b_3	b_2	b_1	b_0
H = 1	0	0	1	0	0	0 = (48) ₁₆
n = 1	1	0	1	1	1	0 = (6E) ₁₆

Table 1: The ASCII Code

- a. England team with 11 players.
- b. Salary is < 50.2;

2.

a) Prepare a truth tables for the following Boolean expressions (6 Marks).

I. $\bar{A}(B\bar{C}+BC)+(CD)'$

II. $(A+B)+((\bar{A}+\bar{C})(A+B))'$

III. $(A+\bar{C})(AB+\bar{A}\bar{C})(AC+B)$

IV. $ABC + \overline{BC}(A + CD)(B + C)$

b) The voltage waveforms shown in Fig. 1.1 are applied at the inputs of a 2 input OR gate. Determine the output waveform. (4 Marks).

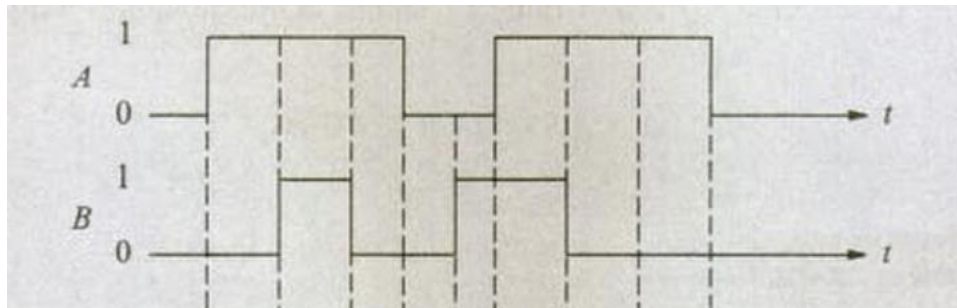


Fig. 1.1

c) Convert the following circuits into equations (10 Marks)

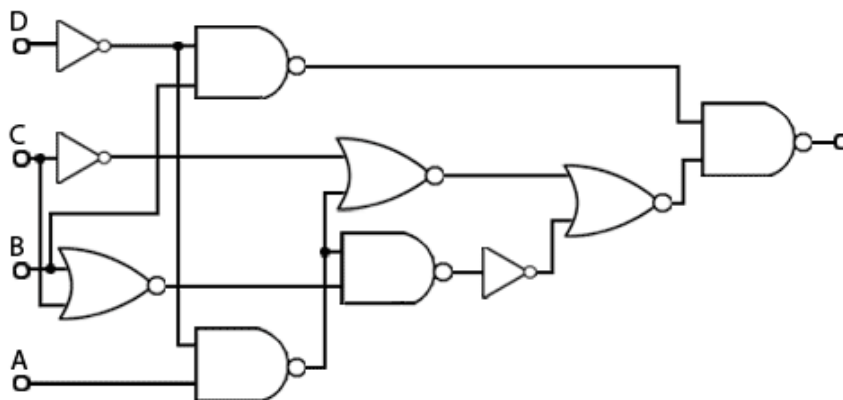


Fig. 1.2

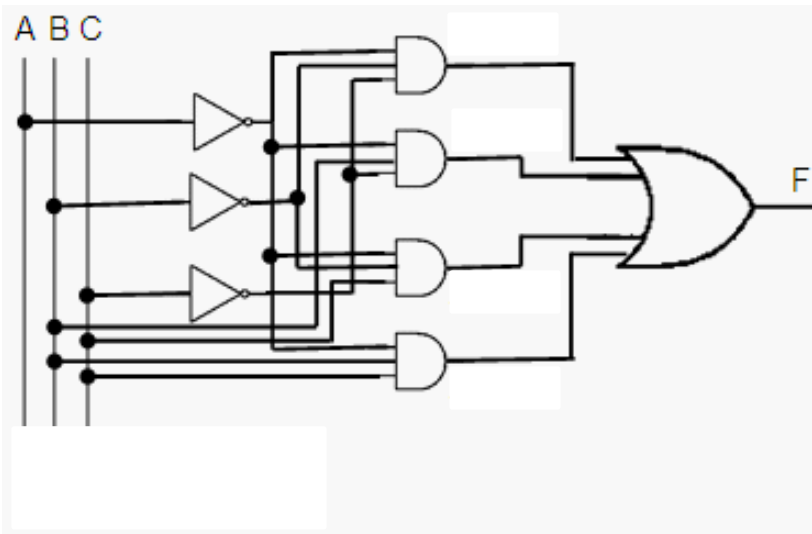


Fig. 1.3

3.

- a. Explain what is Multiplexer and De-multiplexer. (8 Marks).
- b. How is memory stored in electricity, Analyze and discuss how it applies to store memory in RAM? (8 Marks).
- c. C program code

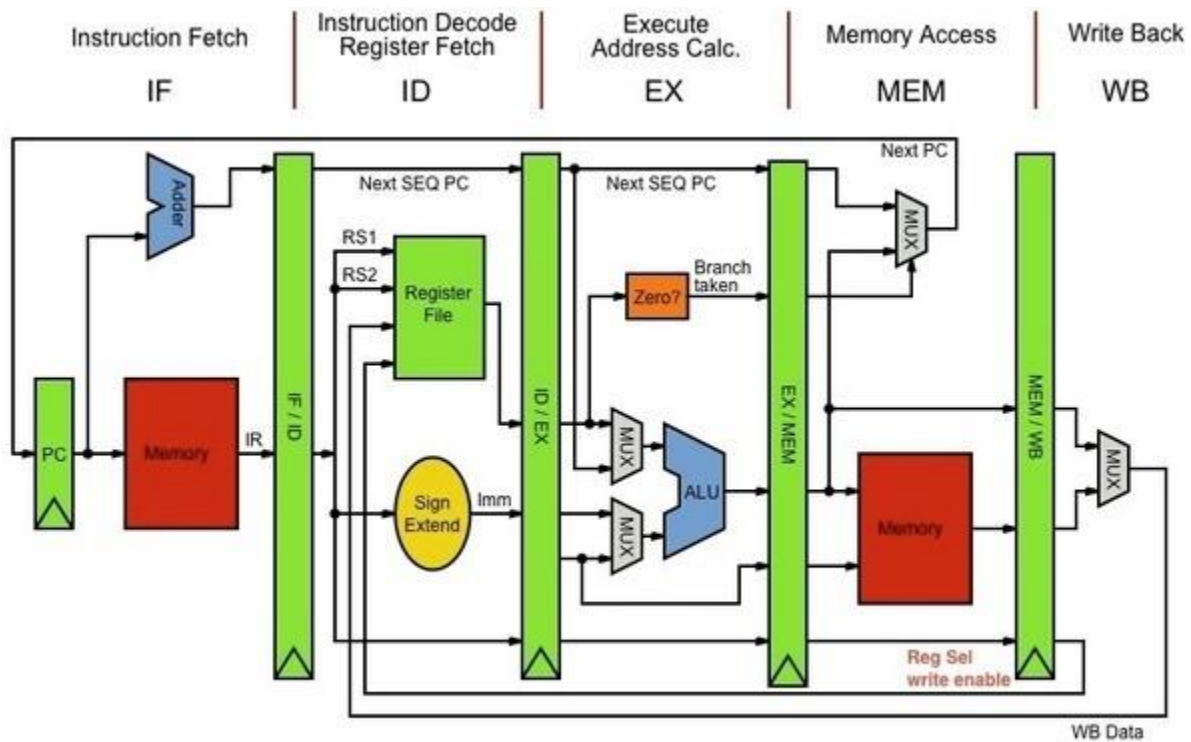

```
While(k!=4){
k=k+1;
}
```

Please write assembly code and instructions for $k=k+1$ in above code, take r1 as source register (4 Marks).

4.

a) Describe following components of CPU briefly(20 Marks)

- i. PC
- ii. Register File
- iii. ALU
- iv. Memory
- v. MEM



5.

- a) Explain what is sequential processing and pipelining (4 Marks).
- b) How can be improve performance of CPU by using pipelining (6 Marks)
- c) Name three hazards in Pipelining and explain one of them (5 Marks)

d) What is cache memory? Explain memory hierarchy with suitable examples.
(5 Marks)