

S.No	INSTRUCTION	OPERATION	OPCODE	Control Bits (Execute)
Zero register Instructions				
A) Flags and Machine Control Instructions				
1.	CLR	$[\text{<rn>}] (n = 0, 1, \dots, 7) \leftarrow 0$ (all registers cleared)	00000000	W_{ARN}
2.	CLF	$\text{fl} \leftarrow 0$	00000011	CL_{FR}
B) Data Transfer Instructions				
3.	LDI <od>	$[A] \leftarrow \text{<od>}$	00000100	$R_{\text{OR}}, W_{\text{A}}$
4.	STI	$[\text{<od>}] \leftarrow [A]$	00000101	$R_{\text{A}}, W_{\text{OR}}$
C) Logical Instructions				
5.	RTL <od>	Rotate [A] left by <od> bits	00000110	W_{A}
6.	RTR <od>	Rotate [A] Right by <od> bits	00000111	W_{A}
7.	CPI <od>	Compare [A] with <od>	00001000	W_{A}
8.	ANI <od>	$[A] \leftarrow [A] \& \text{<od>}$	00001001	W_{A}
9.	ORI <od>	$[A] \leftarrow [A] \mid \text{<od>}$	00001010	W_{A}
10.	XRI <od>	$[A] \leftarrow [A] \wedge \text{<od>}$	00001011	W_{A}
11.	CMA	$[A] \leftarrow \sim[A]$	00001100	W_{A}
D) Arithmetic Instructions				
12.	ADI <od>	$[A] \leftarrow [A] + \text{<od>}$ with carry	00001101	W_{A}
13.	SBI <od>	$[A] \leftarrow [A] - \text{<od>}$ with borrow	00001110	W_{A}
E) Branch Control Instructions				
14.	JMP <ad>	$\text{PC} \leftarrow \text{<ad>}$	00010000	$I_{2\text{PC}}, I_{\text{SP}}, R_{\text{PC}}, W_{\text{RS}},$ $\text{RD}_{\text{AB}}, W_{\text{PC}}$
15.	JNC <ad>	If Carry fl = 0, $\text{PC} \leftarrow \text{<ad>}$	00010001	$I_{2\text{PC}}, I_{\text{SP}}, R_{\text{PC}}, W_{\text{RS}},$ $\text{RD}_{\text{AB}}, W_{\text{PC}}$
16.	JNZ <ad>	If zero fl = 0, $\text{PC} \leftarrow \text{<ad>}$	00010010	$I_{2\text{PC}}, I_{\text{SP}}, R_{\text{PC}}, W_{\text{RS}},$ $\text{RD}_{\text{AB}}, W_{\text{PC}}$
17.	JNS <ad>	If sign fl = 0, $\text{PC} \leftarrow \text{<ad>}$	00010011	$I_{2\text{PC}}, I_{\text{SP}}, R_{\text{PC}}, W_{\text{RS}},$ $\text{RD}_{\text{AB}}, W_{\text{PC}}$
18.	JC <ad>	If Carry fl = 1, $\text{PC} \leftarrow \text{<ad>}$	00010100	$I_{2\text{PC}}, I_{\text{SP}}, R_{\text{PC}}, W_{\text{RS}},$ $\text{RD}_{\text{AB}}, W_{\text{PC}}$

19.	JZ <ad>	If zero fl = 1, PC \leftarrow <ad>	00010101	I _{2PC} , I _{SP} , R _{PC} , W _{RS} , RD _{AB} , W _{PC}
20.	JS <ad>	If sign fl = 1, PC \leftarrow <ad>	00010110	I _{2PC} , I _{SP} , R _{PC} , W _{RS} , RD _{AB} , W _{PC}
21.	RET	PC \leftarrow <stack>	00011000	RD _S , W _{PC} , D _{SP}
One Register Instructions				
A) Logical Instructions				
22.	CPR <rn>	if [A] < [<rn>]: carry flag is set. if [A] = [<rn>]: Sign flag is set if [A] > [<rn>]: carry and Sign flags are reset	01000<rn>	R _{RN}
23.	AND <rn>	[<rn>] \leftarrow [<rn>] & [A]	01001<rn>	R _{RN} , W _{RN}
24.	OR <rn>	[<rn>] \leftarrow [<rn>] [A]	01010<rn>	R _{RN} , W _{RN}
25.	XOR <rn>	[<rn>] \leftarrow [<rn>] ^ [A]	01011<rn>	R _{RN} , W _{RN}
26.	CMR <rn>	[<rn>] \leftarrow ~[<rn>]	01100<rn>	R _{RN} , W _{RN}
B) Arithmetic Instructions				
27.	ADIR <rn> <od>	[<rn>] \leftarrow [<rn>] + <od>	01101<rn>	R _{RN} , W _{RN}
28.	SBIR <rn> <od>	[<rn>] \leftarrow [<rn>] - <od>	01110<rn>	R _{RN} , W _{RN}
29.	ADD <rn>	[<rn>] \leftarrow [<rn>] + [A]	01111<rn>	R _{RN} , W _{RN}
C) Data Transfer Instructions				
30.	MVI <rn> <od>	[<rn>] \leftarrow <od>	10000<rn>	R _{OR} , W _{RN}
31.	MOVD <rn>	[<rn>] \leftarrow [A]	10001<rn>	R _A , W _{RN}
32.	MOVS <rn>	[A] \leftarrow [<rn>]	10010<rn>	R _{RN} , W _A
Two Register Instructions				
33.	STAR <rn timer>	[[<rn timer>]] \leftarrow [A]	110<rn timer>	R _{RP} , A _{AR} , R _A , W _R
34.	LDAR <rn timer>	[A] \leftarrow [[<rn timer>]]	111<rn timer>	R _{RP} , A _{AR} , RD, W _A

Table : Instruction Set