5. Find the equivalent partition of the following machine.

| | Next State, z | |
Present State	$X = 0$	$X = 1$
A	C, 1	D, 0
B	D, 1	E, 0
C	B, 1	E, 1
D	B, 1	A, 0
E	D, 1	B, 1

Solution: The partitions are

$P_0 = (\text{ABCDEF})$

$P_1 = (\text{AD})(\text{BCE})$ (Depending on o/p for i/p 1)

$P_2 = (\text{AD})(\text{BE})(\text{C})$ (For i/p 0, the next state of C goes to another set)

$P_3 = (A)(D)(BE)(C)$ (For i/p0, the next state of A and D goes to a different set)

$P_4 = (A)(D)(BE)(C)$

As P_3 and P_4 are the same, P_3 is the equivalent partition.

Minimization: We know that the cquivalent partition is unique. So,

$P_4 = (A)(D)(BE)(C)$ is the unique combination. Here, every single set represents one state of the minimized machine.

Let us rename these partitions for simplifi cation.

Rename (A) as $S_1, (BE)$ as $S_2, (C)$ as S_3, and (D) as S_4

The minimized machine becomes

	Next State,z	
Present State	$X = 0$	$X = 1$
$S_1(\ A)$	$S_3, 1$	$S_4, 1$
$S_2(BE)$	$S_4, 1$	$S_2, 0$
$S_3(C)$	$S_2, 1$	$S_2, 1$
$S_4(D)$	$S_2, 1$	$S_1, 0$

6, Simplify the following incompletely specified machine.

	Next State,z		
Present State	I_1	I_2	I_3
A	D, 1	E,1	—
B	B, 0	E,-	C,-
C	C, —	C,0	B, -
D	B, 0	D,-	E,-
E	—	B,0	A, -

Solution: Put a temporary state T in the next state place, where the next states are not specified. If the output is not mentioned, there is no need to put any output.

As a temporary state T is considered, T is put in the present state colunm with the next state T for all inputs with no output.
The simplifi ed machine becomes

Present State	Next State,z		
	I_1	I_2	I_3
A	D, 1	E, 1	T, −
B	B, 0	E, −	C, −
C	C, −	C, 0	B, −
D	B, 0	D, −	E, −
E	T, −	B, 0	A, −
T	T, 0	T, 0	T, 0