① HHHHHH ① HHTTHH HTTTHH
THHHHH HHTHTH HTTHTH
HTHHHH HHTHHT HTTHHT
HHTHHH (6) HHHTTH HTHTTH
HHHTHH HHHTHT HTHTHT
HHHHTH HHHHTT HTHHTT
HHHHHT TTTHHH HHTTTH

TTHHHH TTHTHH HHTTHT
THTHHH TTHHTH HHHTTT
THHTHH TTHHHT HHTHTT
THHHTH THTTHH
THHHHT THTHTH
HTTHHH THTHHT
HTHTHH (15) THHTTH
HTHHTH THHTHT
HTHHHT TTHHTT } 20

+ mirror image of 2T4H → 2H4T = 15
+ "   "   " 1T5H → 1H5T = 6
+ "   "   0T6H → 0H6T = 1
─────────
⑥④
= 2^6

$$0H, 6T = 0T, 6H = \frac{6!}{6!\,0!} = 1$$

$$1H, 5T = 1T, 5H = \frac{6!}{5!\,1!} = 6$$

$$2H, 4T = 2T, 4H = \frac{6!}{4!\,2!} = 15$$

$$3H, 3T = \frac{6!}{3!\,3!} = 20$$

②

	A	B	C	D	E	# minus states
1	6	0	0	0	0	5
2	5	1	0	0	0	=5·4 = 20
3	4	2	0	0	0	=5·4 = 20
4	4	1	1	0	0	= 5·4·3/2 = 30
5	3	2	1	0	0	= 5·4·3 = 60
6	3	3	0	0	0	= 5·4/2 = 10
7	2	2	2	0	0	= 5·4·3/3·2·1 = 10

$$8 \quad 3\ 1\ 1\ 1\ 0 \qquad = \quad 5\cdot4\cdot3\cdot2 / 3\cdot2\cdot1 \; = \; 20$$

$$9 \quad 2\ 2\ 1\ 1\ 0 \qquad = \quad (5\cdot4/2)(3\cdot2/2) \; = \quad 30$$

$$10 \quad 2\ 1\ 1\ 1\ 1 \qquad = \quad 5\cdot4\cdot3\cdot2\cdot1 / 4\cdot3\cdot2\cdot1 \; = \; 5$$

$$\overline{210 \ \text{microstates}}$$

③ Macrostates 5,6,8 have an atom with 3 units of energy

$$= \quad 60 + 10 + 20 = 90$$

$$\text{Prob}(3) = \quad \frac{60}{210} \times \frac{1}{5} \; + \; \frac{10}{210} \times \frac{2}{5} \; + \; \frac{20}{210} \times \frac{1}{5} \; = \; \frac{100}{5 \times 210} \; = \; 9.5\%$$