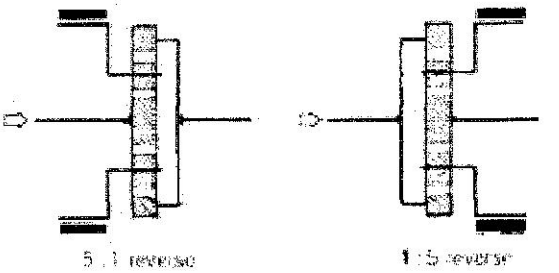
Gear ratio of simple epicyclic gearing:

1- Complete the following tables:

1-a) Fixing the planet carrier:

Condition	S	A	C
Arm fixed	-1	s/a	0
$N_A = -(s/a)\, N_S$			

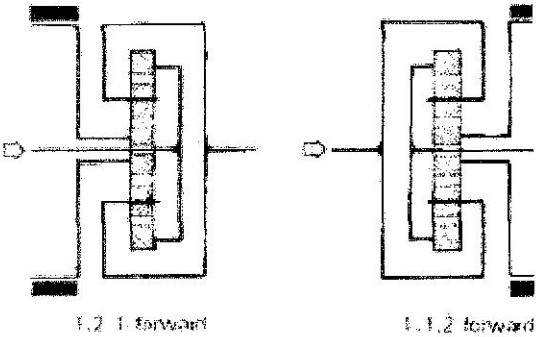


1-b) Fixing the planet carrier:

Condition	S	A	C
Arm fixed	a/s	-1	0
$N_S = -(a/s)\, N_A$			

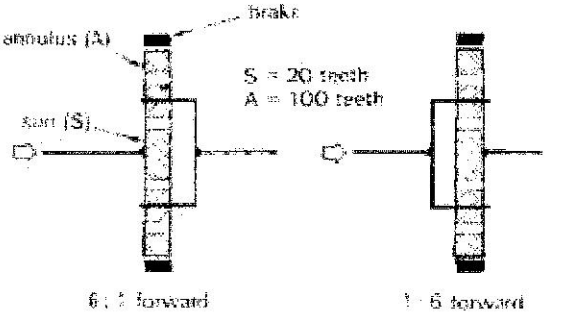
2- Fixing the sun gear:

Condition	S	A	C
Arm fixed	-1	s/a	0
Train locked	+1	+1	+1
Sun fixed	0	1+s/a	1
$N_A = (1+s/a)\, N_C = [(a+s)/a]\, N_C$			



3- Fixing the annulus wheel:

Condition	S	A	C
Arm fixed	a/s	-1	0
Train locked	+1	+1	+1
Annulus fixed	1+a/s	0	1
$N_S = (1+a/s)\, N_C = [(a+s)/s]\, N_C$			



* The general formula is:

$$N_C = (a\, N_A + s\, N_S) / (a+s) \quad \text{or}$$

$$(a+s)\, N_C = a\, N_A + s\, N_S$$

2- Find the gearbox ratio in case:

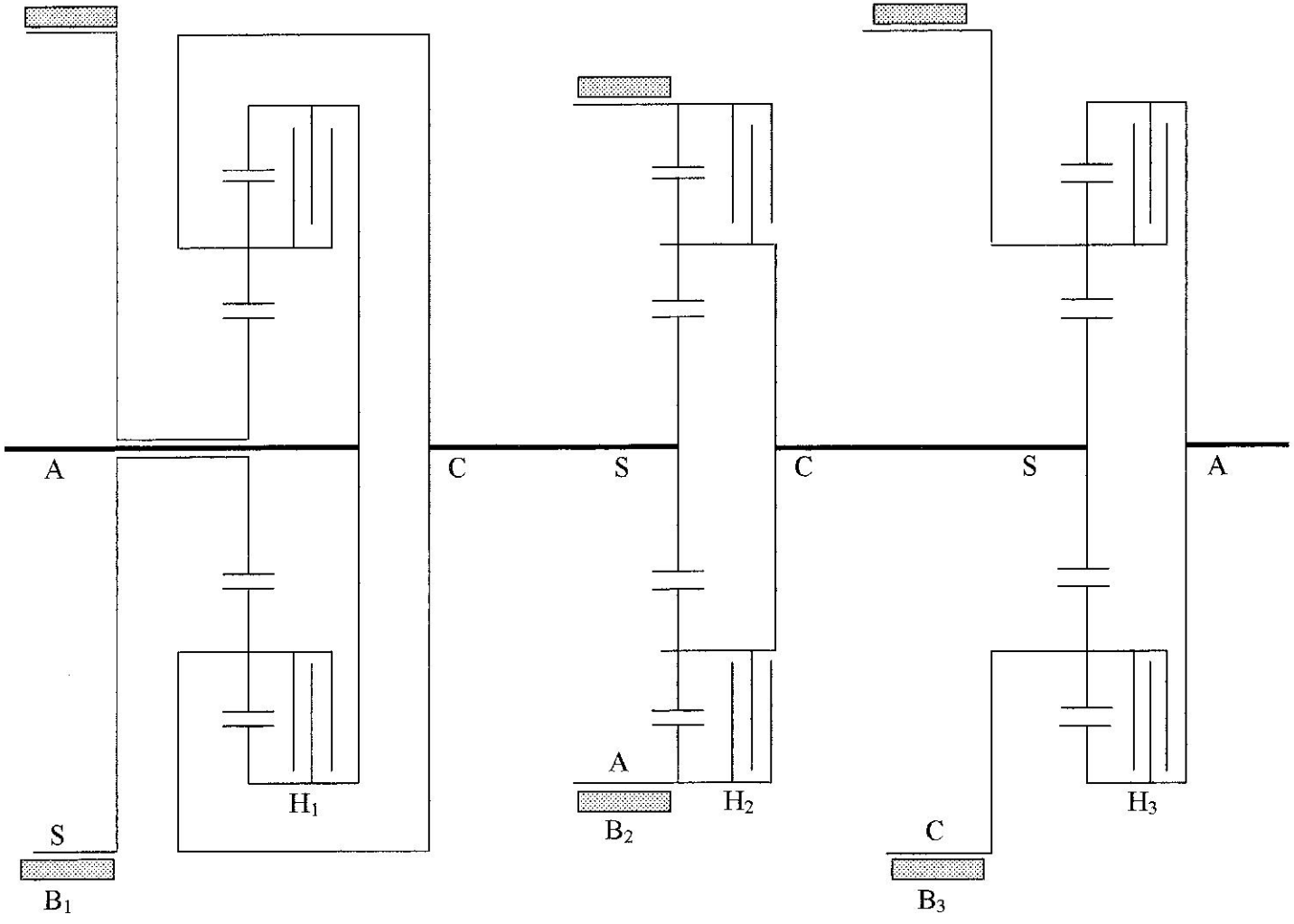
s = number of teeth on sun wheel (S) = 20,

a = number of teeth on annulus (A) = 100

i- the carrier is fixed, Input S, $i_g = -(a/s) = -100/20 = -5.0$, $(N_A = N_S / -5.0)$

ii- the sun in fixed, Input A, $i_g = (a+s)/a = [120/100] = 1.2$, $(N_C = N_A / 1.2)$

iii- the annulus is fixed. Input S, $i_g = (a+s)/s = [120/20] = 6.0$, $(N_C = N_S / 6.0)$


A
C
S
C
S
A
H1
H2
H3
S
B1
A
B2
C
B3