(ii)

Running EXPAND on the initial cover:

```
# espresso -Dexpand -t -v  hw2q8.pla
# UC Berkeley, Espresso Version #2.3, Release date 01/31/88
.olb f
.dc
# READ        Time was 0.00 sec, cost is c=9(9) in=36 out=9 tot=45
# COMPL       Time was 0.00 sec, cost is c=3(3) in=8 out=3 tot=11
# PLA is hw2q8.pla with 4 inputs and 1 outputs
# ON-set cost is  c=9(9) in=36 out=9 tot=45
# OFF-set cost is c=3(3) in=8 out=3 tot=11
# DC-set cost is  c=0(0) in=0 out=0 tot=0
EXPAND: 1111 1 (covered 1)
EXPAND: 1000 1 (covered 3)
EXPAND: 1001 1 (covered 1)
EXPAND: 0101 1 (covered 0)
# EXPAND       Time was 0.00 sec, cost is c=4(0) in=9 out=4 tot=13
# READ         1 call(s) for 0.00 sec ( 0.0%)
# COMPL        1 call(s) for 0.00 sec ( 0.0%)
# EXPAND       1 call(s) for 0.00 sec ( 0.0%)
# expand       Time was 0.00 sec, cost is c=4(0) in=9 out=4 tot=13
.i 4
.o 1
.ilb a b c d
.p 4
-111 1
--00 1
-00- 1
0-0- 1
.e
# WRITE        Time was 0.00 sec, cost is c=4(0) in=9 out=4 tot=13
```

Running IRREDUNDANT on the expanded cover:

```
# espresso -Dirred -t -v  exp
# UC Berkeley, Espresso Version #2.3, Release date 01/31/88
.olb f
.dc
# READ        Time was 0.00 sec, cost is c=4(4) in=9 out=4 tot=13
# COMPL       Time was 0.00 sec, cost is c=0(0) in=0 out=0 tot=0
# PLA is exp with 4 inputs and 1 outputs
# ON-set cost is  c=4(4) in=9 out=4 tot=13
# OFF-set cost is c=0(0) in=0 out=0 tot=0
```

DC-set cost is c=0(0) in=0 out=0 tot=0
IRRED: F=4 E=4 R=0 Rt=0 Rp=0 Rc=0 Final=4 Bound=0
IRRED   Time was 0.00 sec, cost is c=4(4) in=9 out=4 tot=13
READ   1 call(s) for 0.00 sec (0.0%)
COMPL   1 call(s) for 0.00 sec (0.0%)
IRRED   1 call(s) for 0.00 sec (0.0%)
irred Time was 0.00 sec, cost is c=4(4) in=9 out=4 tot=13
.i 4
.o 1
.ilb a b c d
.p 4
-111 1
--00 1
-00- 1
0-0- 1
.e
WRITE   Time was 0.00 sec, cost is c=4(4) in=9 out=4 tot=13

Running REDUCE on the irredundant cover:

espresso -Dreduce -t -v irred
UC Berkeley, Espresso Version #2.3, Release date 01/31/88
.olb f
.dc
READ   Time was 0.00 sec, cost is c=4(4) in=9 out=4 tot=13
COMPL   Time was 0.00 sec, cost is c=0(0) in=0 out=0 tot=0
PLA is irred with 4 inputs and 1 outputs
ON-set cost is c=4(4) in=9 out=4 tot=13
OFF-set cost is c=0(0) in=0 out=0 tot=0
DC-set cost is c=0(0) in=0 out=0 tot=0
REDUCE: 0-0- 1 to 0101 1 0.00 sec
REDUCE: -00- 1 to -001 1 0.00 sec
REDUCE   Time was 0.00 sec, cost is c=4(2) in=12 out=4 tot=16
READ   1 call(s) for 0.00 sec (0.0%)
COMPL   1 call(s) for 0.00 sec (0.0%)
REDUCE   1 call(s) for 0.00 sec (0.0%)
reduce   Time was 0.00 sec, cost is c=4(2) in=12 out=4 tot=16
.i 4
.o 1
.ilb a b c d
.p 4
0101 1
-001 1
--00 1
-111 1

.e
WRITE   Time was 0.00 sec, cost is c=4(2) in=12 out=4 tot=16

<u>Running EXPAND on the reduced cover:</u>

espresso -Dexpand -t -v red
UC Berkeley, Espresso Version #2.3, Release date 01/31/88
.olb f
.dc
READ   Time was 0.00 sec, cost is c=4(4) in=12 out=4 tot=16
COMPL   Time was 0.00 sec, cost is c=3(2) in=8 out=3 tot=11
PLA is red with 4 inputs and 1 outputs
ON-set cost is c=4(4) in=12 out=4 tot=16
OFF-set cost is c=3(2) in=8 out=3 tot=11
DC-set cost is c=0(0) in=0 out=0 tot=0
EXPAND: 0101 1 (covered 0)
EXPAND: -111 1 (covered 0)
EXPAND: -001 1 (covered 0)
EXPAND: --00 1 (covered 0)
EXPAND   Time was 0.00 sec, cost is c=4(0) in=9 out=4 tot=13
READ   1 call(s) for 0.00 sec (0.0%)
COMPL   1 call(s) for 0.00 sec (0.0%)
EXPAND   1 call(s) for 0.00 sec (0.0%)
expand   Time was 0.00 sec, cost is c=4(0) in=9 out=4 tot=13
.i 4
.o 1
.ilb a b c d
.p 4
0-0- 1
-111 1
-00- 1
--00 1
.e
WRITE   Time was 0.00 sec, cost is c=4(0) in=9 out=4 tot=13