# Restriction Mapping Problems

For each of the problems below, develop a map of the plasmid or show how the gel for a particular plasmid would appear with the restriction digests given.
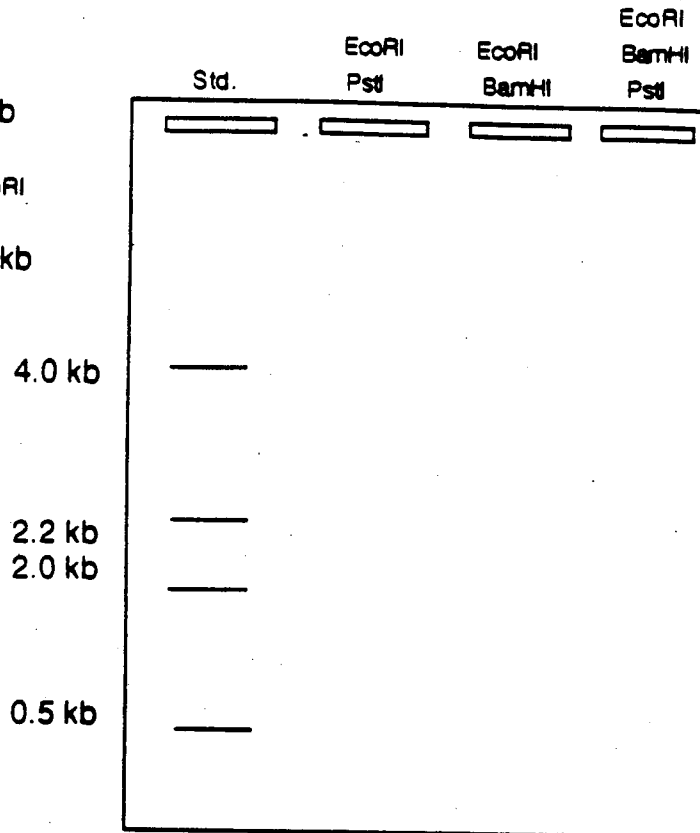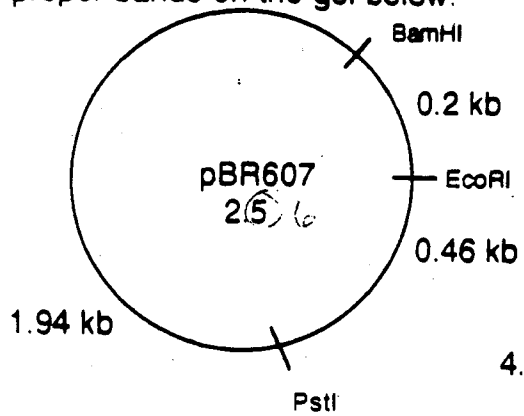
1. pGEN101 is a 20 kb plasmid. When digested with EcoRI, one linear fragment results. Digestion with BamHI restuls in 3 fragments of the following sizes: 12 kb, 2kb, and 6 kb. A combination digest with EcoRI and BamHI results in 4 fragments: 8 kb, 4 kb, 2 kb, and 6 kb.

pGen101
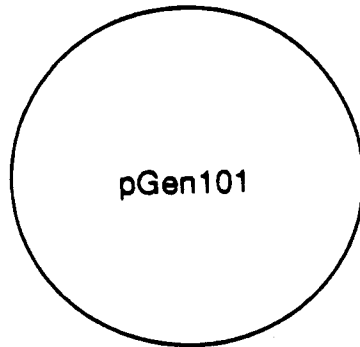
2. pBLA230 is digested with HpaI and results in one band of 26 kb. When digested with HindIII, there are four bands: 13 kb, 6 kb, 4 kb, and 3 kb. A combination digest with HpaI and HindIII results in four bands: 7 kb, 6 kb, 4 kb, and 3 kb.

pBLA230

40
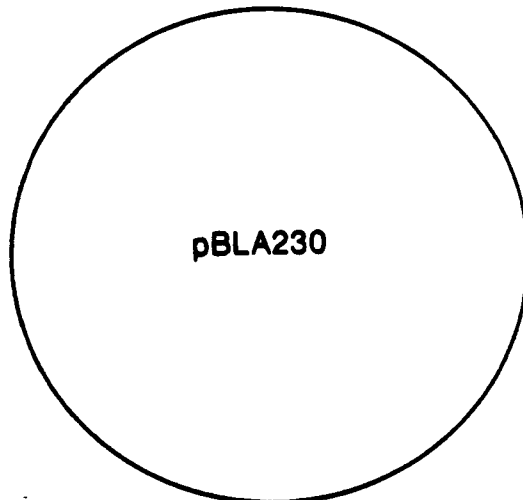
3. The restriction map for pBR607 is shown below. Draw and label the locations of the proper bands on the gel below.

pBR607
2.5 kb

BamHI

0.2 kb

EcoRI

0.46 kb

1.94 kb

PstI

Std.	EcoRI PstI	EcoRI BamHI	EcoRI BamHI PstI

4.0 kb

2.2 kb
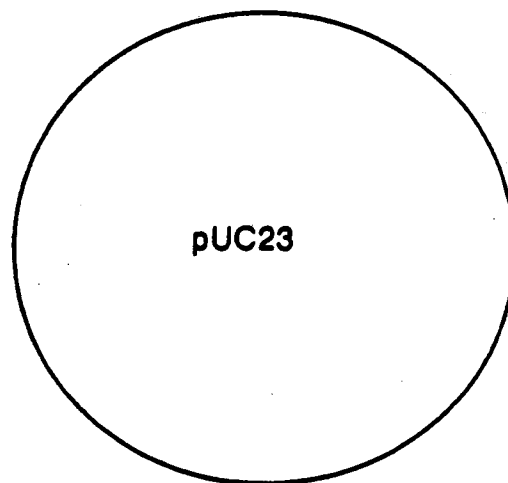2.0 kb

0.5 kb

4. pUC is digested with EcoRI and BamHI, resulting in the fragments shown below.
   EcoRI: 20 kb
   BamHI: 11 kb, 6 kb, 3 kb
   EcoRI + BamHI: 8 kb, 6 kb, 3 kb

pUC23

5. Map the plasmid from the fragments shown below.
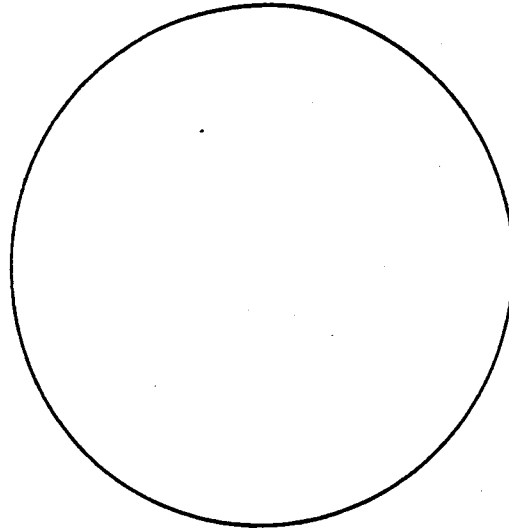   PstI: 4.36 kb
   EcoRI: 4.36 kb
   SalI: 4.36 kb
   EcoRI + SalI: 3.98 kb, 0.38 kb
   EcoRI + PstI: 3.61 kb, 0.75 kb
   PstI + SalI: 3.23 kb, 1.13 kb

6. Map pDA401 from the digests below (all given in kb units):
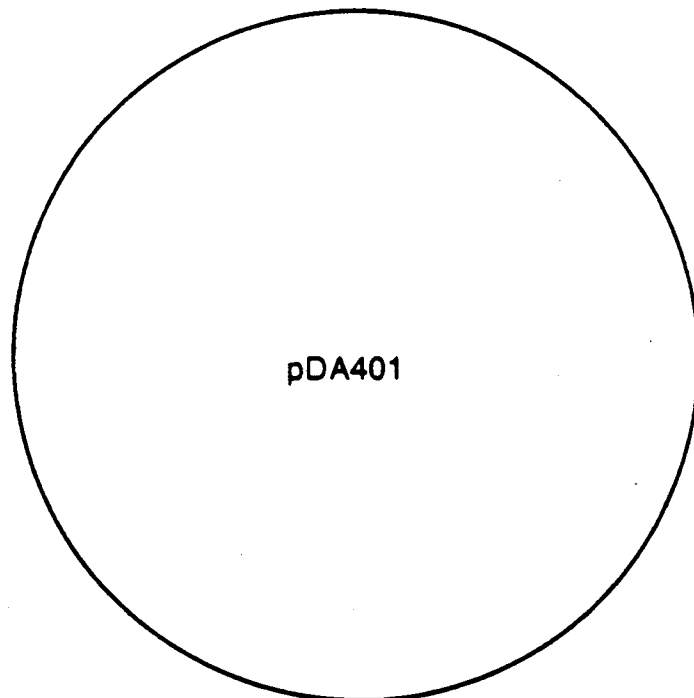   HindIII: 3.82, 0.18
   BamHI: 2.35, 1.65
   EcoRI: 3.00, 1.00
   HindIII + BamHI: 2.35, 1.20, 0.27, 0.18
   HindIII + EcoRI: 1.87, 1.00, 0.95, 0.18
   BamHI + EcoRI: 1.60, 1.40, 0.75, 0.25
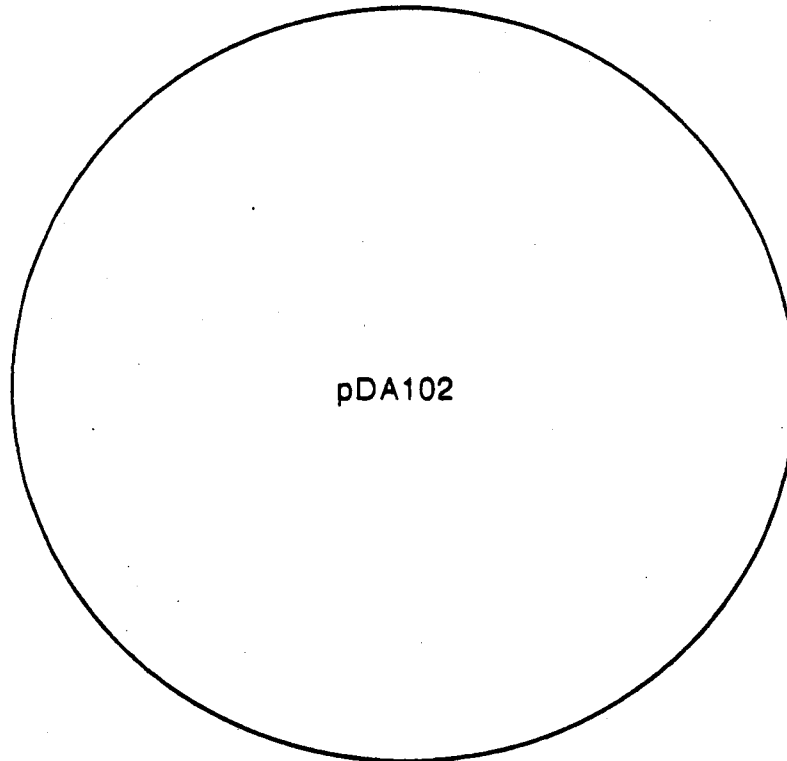
pDA401

7. Show the restriction map for pDA102, which is a total of 4.35 kb.
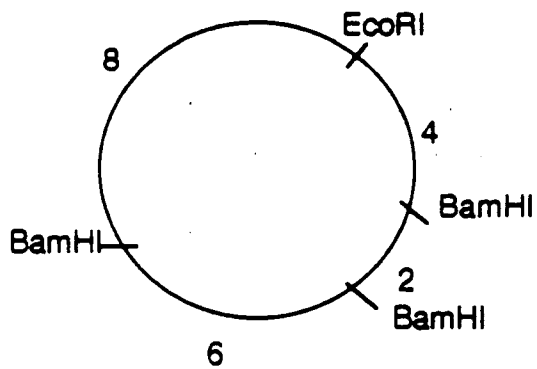   Sall: 2.30, 0.25, 1.80
   Hhalll: 2.10, 1.55, 0.70
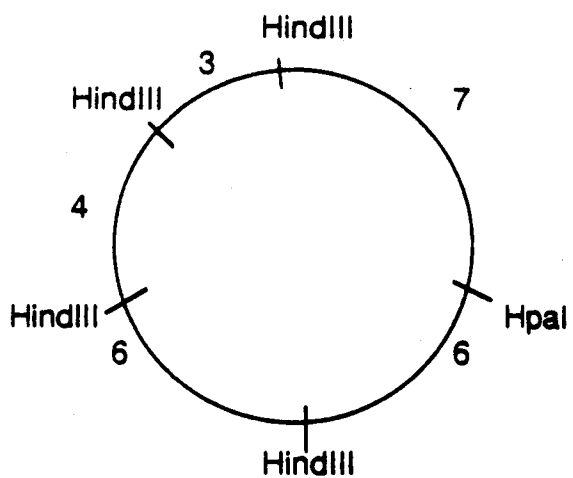   Sall + Hhalll: 1.20, 1.10, 0.75, 0.70, 0.35, 0.25

pDA102
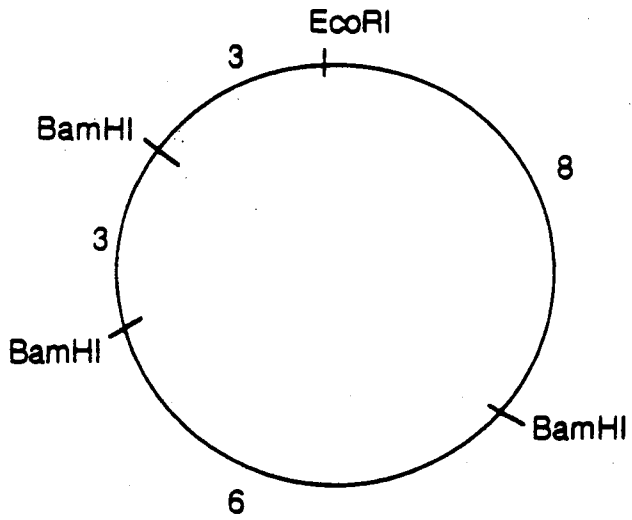
Key to Restriction Mapping Problems

1.

2.

3.

4.

```
            EcoRI
        3    |
BamHI    ╱       ╲   8
    ╳              
3                  
                   
BamHI   ╳          
    ╲              ╱ BamHI
         ╲   6   ╱
```

Circular restriction map 4:
- EcoRI (top)
- 3 — BamHI (upper left)
- 3 — BamHI (lower left)
- 6 (bottom)
- BamHI (lower right)
- 8 (right)

5.

```
            EcoRI
    0.75     |    0.38
PstI ╳          ╳ SalI
                   
                   
         3.23
```

Circular restriction map 5:
- EcoRI (top)
- 0.75 — PstI (upper left)
- 0.38 — SalI (upper right)
- 3.23 (bottom)

7.

```
              SalI
    0.35       |       1.20
HhaII ╳                  
                         
0.70                     
                         
HhaII ╳                  ╳ HhaII
0.75                     1.10
SalI  ╳
0.25  ╳
      SalI
```

Circular restriction map 7:
- SalI (top)
- 0.35 — HhaII (upper left)
- 1.20 (upper right)
- 0.70 (left)
- 0.75 — HhaII (lower left)
- SalI — 0.25 (bottom left)
- SalI (bottom)
- 1.10 — HhaII (lower right)

6.

```
            EcoRI
             |    0.75
    ╱                ╳ BamHI
                     0.25
1.6                  ╳ EcoRI
                     0.95
    ╳                
BamHI  ╳        ╳ HindIII
   0.27
```

Circular restriction map 6:
- EcoRI (top)
- 0.75 — BamHI (upper right)
- 0.25 — EcoRI (right)
- 0.95 (right)
- 1.6 (left)
- BamHI — 0.27 (lower left)
- HindIII (bottom right)