《离散数学二》第一次作业

1. 参考答案:

$$(177 \bmod 31 \cdot 270 \bmod 31) \bmod 31 = (22 \cdot 22) \bmod 31 = 484 \bmod 31 = 19$$

$$(21^2 \bmod 15)^3 \bmod 22 = (441 \bmod 15)^3 \bmod 22 = 6^3 \bmod 22 = 216 \bmod 22 = 18$$

12^100 mod 5= 2^100 mod 5=16^25 mod 5=1^25 mod 5=1

123^{1001} **mod** 101=22

2. 参考答案:

（1）（下列两表中数字外的中括号可删去）

$\mathbb{Z}_5 = \{[0],[1],[2],[3],[4]\}$, **其中** $[i] = \{5k+i | k \in \mathbb{Z}\}, i = 0,1,2,3,4.$

$\oplus$	[0]	[1]	[2]	[3]	[4]
[0]	[0]	[1]	[2]	[3]	[4]
[1]	[1]	[2]	[3]	[4]	[0]
[2]	[2]	[3]	[4]	[0]	[1]
[3]	[3]	[4]	[0]	[1]	[2]
[4]	[4]	[0]	[1]	[2]	[3]

$\otimes$	[0]	[1]	[2]	[3]	[4]
[0]	[0]	[0]	[0]	[0]	[0]
[1]	[0]	[1]	[2]	[3]	[4]
[2]	[0]	[2]	[4]	[1]	[3]
[3]	[0]	[3]	[1]	[4]	[2]
[4]	[0]	[4]	[3]	[2]	[1]

（2）均满足，加法单位元0。其中0,1,2,3,4的加法逆元分别是0,4,3,2,1;

（3）均满足，乘法单位元1。其中1,2,3,4的乘法逆元分别是1,3,2,4;

3. 参考答案:

(a)13　　(b)19

4. 参考答案:

（a）-3　　（b）-12

5. 参考答案:

（a）321=$(101000001)_2$

（a）1023=$(1111111111)_2$