In a group of eight homosexual men, Gary, Hal, Ian, Jon, Kevin, Luis, Mark and Neil, every individual has one or more of five sexually transmitted diseases. Two of the diseases, AIDS and hepatitis C, are considered life-threatening; the other three, chlamydia, gonorrhea and syphilis, are not.

The following rules apply:

Mark has a life-threatening disease.
If Luis has AIDS, then Mark must be infected with the same disease.
Neil has three diseases, none of which is life-threatening.
Gary does not have AIDS or chlamydia, but he has hepatitis C.
If Mark has AIDS, then Kevin and Luis also have AIDS.
Hal has AIDS.
All individuals with AIDS have also been diagnosed with chlamydia.
No queer has contracted more than three diseases in total, or more than one life-threatening disease.

1. Which of the following must be true?

A) Jon does not have hepatitis C.
B) Both Hal and Neil have chlamydia.
C) Gary has syphilis.
D) Ian has AIDS and hepatitis C.
E) Mark has AIDS and hepatitis C.

2. Which of the following must be false?

A) Luis has AIDS and Kevin has chlamydia.
B) Mark has syphilis and gonorrhea.
C) Kevin has AIDS, but Mark does not.
D) Jon has both AIDS and gonorrhea.
E) Mark has hepatitis C and Luis has AIDS.

3. What is the maximum number of queers that could have hepatitis C?

A) 4
B) 5
C) 6
D) 7
E) 8

4. If Luis has AIDS, then which of the following could be false?

A) All of the queers, except Gary and Neil, have AIDS.
B) There are at least five cases of chlamydia.
C) Kevin has both AIDS and chlamydia.
D) No more than three queers have hepatitis C.
E) The minimum number of AIDS cases is four.

5. Which of the following cannot be true?

A) Hal has both gonorrhea and syphilis.
B) Jon has both gonorrhea and AIDS.
C) Neither Ian nor Jon has a life-threatening disease.
D) Kevin does not have chlamydia, but Luis does.
E) Luis has been diagnosed with AIDS and syphilis.

6. If Mark does not have AIDS, then what is the maximum number of AIDS cases.

A) 3
B) 4
C) 5
D) 6
E) 7

Answers and explanations:

This game is governed by seven rules:

M = a xor h
L = a ←→ M = a → K = a
N = c, g, s
G = h ≠ a ≠ c
H = a
diseases ≤ 3; life threats ≤ 1
a → c

The whole game hinges around the first rule, which states that Mark has exactly one life-threatening disease, AIDS or hepatitis C. If he has AIDS, then we are informed that Luis and Kevin have AIDS as well, that all three men have chlamydia, and that none of the three has hepatitis C. Alternatively, if Mark has hepatitis C, then we know that neither he nor Luis has AIDS. Based on that, we can come up with two templates, one in which Kevin, Luis and Mark have AIDS, and one in which Mark and Luis do not.

							c
	c			c	c	c	g
h	a			a	a	a	s
G	H	I	J	K	L	M	N
~a	~h			~h	~h	~h	~a
~c							~h

							c
	c						g
h	a					h	s
G	H	I	J	K	L	M	N
~a	~h				~a	~a	~a
~c							~h

From the two templates, we can surmise the answers to every question.

1. B

Ian and Jon are "wild cards," and we know nothing about what particular diseases they may have. Therefore, **A** and **D** may or may not be true and are incorrect. Similarly, we know that Gary has hepatitis C, but we do not know his condition as to syphilis. Therefore, **C** is also incorrect. **E** cannot be correct according to the eighth rule. We are left with the correct answer, which is **B**.

2. E

According to the second and seventh rules, if Luis has AIDS, then Kevin must have both AIDS and chlamydia. Therefore, **A** must be true and is incorrect. As to **B**, we know that Mark has either AIDS or hepatitis C, but it could be true that he has syphilis and gonorrhea as well; this answer choice is not correct. If Mark has AIDS, then Kevin must too, but to assume the converse is also true is to commit a logical fallacy; in fact, **C** may or may not be true and is incorrect. We have no information regarding what disease Jon has, so **D** may or may not be true and is

incorrect. Finally, we know that Mark has either hepatitis C or AIDS but not both, and if Luis has AIDS, then Mark must have AIDS as well and cannot have hepatitis C. Therefore, **E** must be false and is the right answer.

3. C

This question can be easily answered by looking at the two templates; the highest possible number of hepatitis C cases in either scenario will be the correct answer. In the first one we see that five of the queers cannot have hepatitis C, leaving three who either have or could have the disease. In the second model only two cannot have it, leaving six who potentially have it. Therefore, **C** is the correct answer.

4. A

If Luis has AIDS, then we can see in the first template that he, Mark and Kevin, as well as Hal and Neil have chlamydia, thus making at least five cases. **B**, therefore is wrong. Again, we know from the second and seventh rules that if Luis has AIDS, then Kevin must have it also, and since whoever has AIDS has chlamydia as well, **C** is wrong. We also see in the template that if Luis has AIDS, a maximum of three queers could have hepatitis C. Thus, **D** is wrong. Again, **E** is shown to be definitely true by the template, and is wrong. **A** is the only answer choice that could be false and thus is correct.

5. A

A cannot be true because in that case Hal would have a total of four diseases. All the other answer choices could be true and are, therefore, incorrect.

6. A

Easy. Just look at the second template.