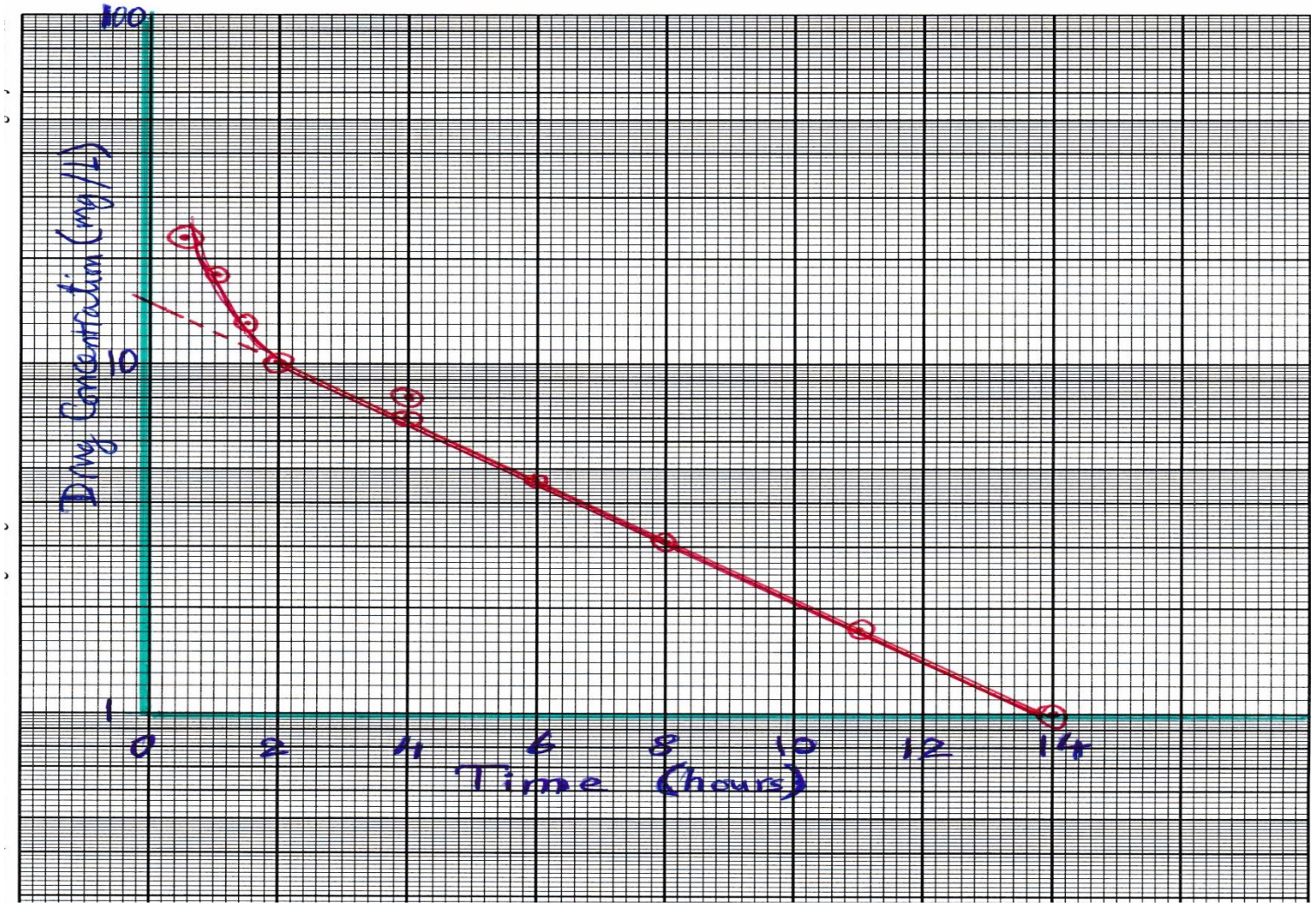
Case Scenario

A volunteer was given a single 400 mg of a drug by IV injection. Serial blood samples were taken to analyze for drug level and to construct a plasma concentration-versus-time curve.

Results

Time (hours)	Drug concentration (mg/L)
0.5	23
1	18
1.5	13
2	10
4	7
6	4.7
8	3.1
11	1.75
14	1

The following semi-log plot of plasma concentration-versus-time was obtained



Q1

Which of the following is the approximate apparent volume of distribution of the drug?

A. 5 L
B. 10 L
C. 25 L
D. 50 L
E. 100 L

Q2

What is the half-life of elimination of the drug?

A. 1.5 hours
B. 3.5 hours
C. 5.5 hours
D. 7.5 hours
E. 9.5 hours

Q3

Which of the following is the first-order elimination rate constant of the drug?

A. **0.0385 / hour**
B. **0.0770 / hour**
C. **0.1155 / hour**
D. **0.1540 / hour**
E. **0.1925 / hour**

Q4

Which of the following is the clearance of this drug?

A. 1 L/hour
B. 2 L/hour
C. 3 L/hour
D. 5 L/hour
E. 10 L/hour

Q5

What is the maintenance dose every 24 hours if the steady-state therapeutic concentration of the drug is 10 mg/L?

A. **100 mg**
B. **500 mg**
C. **750 mg**
D. **1000 mg**
E. **1200 mg**

Q6

Does this drug require a loading dose?

A. Yes
B. No
C. I do not know

If the answer is yes, calculate the loading dose.