TEST 2 – 2008

1. Which of the following rate equations is/are third order overall?

(*i*) $v_0 = k[A]^3$	(*ii*) $v_0 = k[B]^3[C][D]^{-1}$
(*iii*) $v_0 = k[A]^3[B]$	(*iv*) $v_0 = k[A][B]^2$

(A) i, ii, iii

(B) i, ii, iv

(C) i

(D) ii

(E) i, iv

Exam 2010

____ 16. Given the following experimental data for the reduction of nitric oxide with hydrogen gas, which includes initial concentrations and rates, determine the rate law.

Experiment	[NO]	$[H_2]$	Rate
1	6.4×10^{-3} M	2.2×10^{-3} M	2.6×10^{-5} M/s
2	12.8 mM	2.2×10^{-3} M	0.104 mM/s
3	6.4 mM	4.5×10^{-3} M	5.1×10^{-5} M/s

a. $v = k[NO]^2$

b. $v = k[NO]^2[H_2]$

c. $v = k[NO][H_2]$

d. $v = k[NO_2]^2[H_2]$

e. $v = k[HNO_2]^2[H_2]$

EXAM 2009

1. Which of the following statements about the Haber-Bosch reaction ($N_2 + 3H_2 \rightarrow 2NH_3$) must be **TRUE**?

(A) $3\,\Delta[H_2]/\Delta t = 2\,\Delta[NH_3]/\Delta t$

(B) $2\,\Delta[H_2]/\Delta t = 3\,\Delta[NH_3]/\Delta t$

(C) $v_0 = k[N_2][H_2]^3$

(D) $v_0 = -d[N_2]/dt$

(E) $v_0 = d[NH_3]^2/dt$

2. For a reaction involving reactants A and B, the rate data in the table below were obtained. What is the **reaction rate** when [A] = 0.300 M and [B] = 0.400 M?

Expt. #	[A] (M)	[B] (M)	d[A]/dt (M/s)
1	0.20	0.30	0.24
2	0.40	0.60	1.92
3	0.20	0.60	0.48
4	0.40	0.30	0.96

(A) 0.56 M/s

(B) 0.72 M/s

(C) 0.28 M/s

(D) 1.4 M/s

(E) 0.68 M/s

Exam 2008

1. What is the **correct rate law** for a reaction that yields the following initial rates?

Expt. #	[A] (M)	[B] (M)	[C] (M)	v_0 (M/s)
1	1	1	1	0.054
2	2	1	1	0.108
3	1	1	2	0.216
4	2	2	2	0.432

(A) $v_0 = k[A][B][C]$

(B) $v_0 = k[A][B][C]^2$

(C) $v_0 = k[A][B]^{-1}[C]^2$

(D) $v_0 = k[A][C]^2$

(E) $v_0 = k[A][C]$