

## CHEMISTRY

51. The temperature dependence of rate constant (k) of a chemical reaction is written in terms

of Arrhenius equation,  $K = A.e^{\frac{E^*}{RT}}$ . Activation energy ( $E^*$ ) of the reaction can be calculated by plotting

- (1)  $\log k$  vs  $\frac{1}{\log T}$                       (2)  $k$  vs  $T$   
 (3)  $k$  vs  $\frac{1}{\log T}$                       (4)  $\log k$  vs  $\frac{1}{T}$

52. For the reaction,  $N_2 + 3H_2 \rightarrow 2NH_3$ , rate is expressed as

- (1)  $-3 \frac{d[N_2]}{dt} = -\frac{d[H_2]}{dt} = \frac{2}{3} \frac{d[NH_3]}{dt}$   
 (2)  $-\frac{d[N_2]}{dt} = -\frac{1}{3} \frac{d[H_2]}{dt} = \frac{1}{2} \frac{d[NH_3]}{dt}$   
 (3)  $-\frac{d[N_2]}{dt} = -\frac{3d[H_2]}{dt} = \frac{2d[NH_3]}{dt}$   
 (4)  $-\frac{d[N_2]}{dt} = -\frac{d[H_2]}{dt} = \frac{d[NH_3]}{dt}$

53. In the reaction  $3A \rightarrow 2B$ , rate of formation +  $\frac{d[B]}{dt}$  is equal to

- (1)  $-\frac{1}{3} \frac{d[A]}{dt}$                       (2)  $-\frac{2}{3} \frac{d[A]}{dt}$   
 (3)  $+2 \frac{d[A]}{dt}$                       (4)  $-\frac{3}{2} \frac{d[A]}{dt}$

54. If the rate of reaction between A and B is given by rate =  $k[A][B]^2$ , then the reaction is

- (1) first order in A  
 (2) second order in B  
 (3) third order overall  
 (4) all are correct

55. The rate of the first order reaction,  $A \rightarrow$  Products, is  $7.5 \times 10^{-4} \text{ mol L}^{-1} \text{ s}^{-1}$ , when the concentration of A is  $0.2 \text{ mol L}^{-1}$ . The rate constant of the reaction is

- (1)  $2.5 \times 10^{-5} \text{ s}^{-1}$   
 (2)  $8.0 \times 10^{-4} \text{ s}^{-1}$   
 (3)  $6.0 \times 10^{-4} \text{ s}^{-1}$

(4)  $3.75 \times 10^{-3} \text{ s}^{-1}$

56. 75% of a first order reaction was completed in 32 minutes; when was 50% of the reaction completed?

- (1) 4 min                                      (2) 8 min  
 (3) 24 min                                    (4) 16 min

57. The chemical reaction,  $2O_3 \rightarrow 3O_2$  proceeds as follows



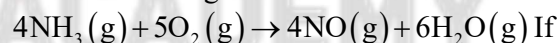
The rate law expression should be

- (1)  $r = k[O_3]^2$   
 (2)  $r = k[O_3]^2[O_2]^{-1}$   
 (3)  $r = k [O_3][O_2]$   
 (4)  $r = [O_3][O_2]^2$

58. The rate of a reaction can be increased in general by all the following factors except

- (1) by increasing the temperature  
 (2) using a suitable catalyst  
 (3) by increasing the concentration of reactants  
 (4) by an increase in activation energy

59. For the following reaction



the rate of formation of NO is

$3.6 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$ , then what is the rate of formation of  $H_2O$ ?

- (1)  $3.6 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$   
 (2)  $5.4 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$   
 (3)  $7.2 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$   
 (4)  $2.4 \times 10^{-3} \text{ mol L}^{-1} \text{ s}^{-1}$

60. Consider the following data for the reaction,  $A + B \rightarrow$  Products

Expt	Initial conc.	Initial conc.	Initial rate (mol s <sup>-1</sup> )
	[A]	[B]	
1	0.10 M	1.0 M	$2.1 \times 10^{-3}$
2	0.20 M	1.0 M	$8.4 \times 10^{-3}$
3	0.20 M	2.0 M	$8.4 \times 10^{-3}$

The rate equation of the reaction is

- (1)  $r = k[A]^2$   
 (2)  $r = k[B]^2$   
 (3)  $r = k[A]^2 [B]^1$   
 (4)  $r = k[A]^1 [B]^1$