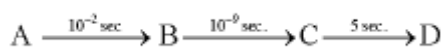


KINETICS OF CHEMICAL REACTIONS

1. Molecularity of reaction can not be

- (a) 0
- (b) 1
- (c) 2
- (d) 3

2. Consider a multistep reaction



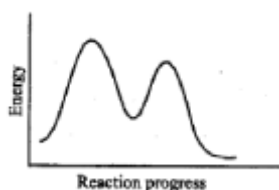
Which step is Rate determining step

- (A) $A \rightarrow B$ (B) $B \rightarrow C$ (C) $C \rightarrow D$ (D) Insufficient data

3. You are driving on your bike on a four – lane highway and you are likely to come across the following in your path. Identify which of the following would be your rate – determining step?

- (a) A two – lane fly over
- (b) A single – Lane bridge
- (c) The four – lane highway itself
- (d) Cannot be predicted

4. Identify the incorrect statement for the given potential energy profile

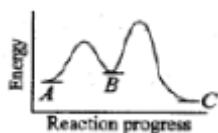


- (a) There are two transition states
- (b) two intermediates are formed
- (c) Overall reaction is exothermic
- (d) Step-1 is the rate-determining step

5. For a reaction : $A \rightleftharpoons B \rightleftharpoons C$

Given are :

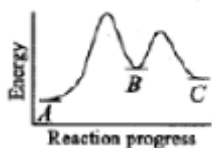
C is the most stable. B is the least stable. The transition state going from A to B is more stable than the transition state going from B to C. Choose the right diagram for the above facts.



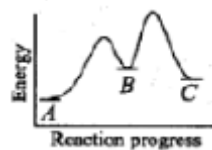
(a)



(b)



(c)



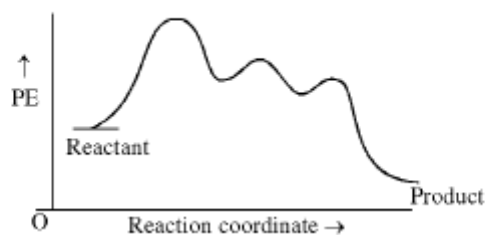
(d)

6. A hypothetical reaction gives rise two products X and Y. X follows a path with lower activation energy but its free energy content is very high. Y follows a path with activation energy but its free energy content is very low. Under what condition X will be formed as the major product?

- (a) Low temperature
- (b) Slightly high temperature
- (c) High temperature
- (d) All of these.

COMPREHENSION TYPE**Paragraph For Question no. 7 to 11**

Consider following potential energy (PE) profile for a multistep chemical reaction



Now answer the following questions based on above PE profile

7. Total number of steps in above chemical reaction are
- (a) 2
 - (b) 3
 - (c) 4
 - (d) 5
8. Reaction is
- (a) Exothermic
 - (b) Endothermic
 - (c) Thermoneutral
 - (d) None of these
9. Total number of transition states formed
- (a) 3
 - (b) 4
 - (c) 5
 - (d) 6
10. Total number of intermediates formed in above multistep chemical reaction
- (a) 1

- (b) 2
- (c) 3
- (d) 4

11. Which step seems to be rate determining step

- (a) First
- (b) Second
- (c) Third
- (d) Both second and third

Paragraph for question no. 12 to 14

Consider given expression

$$\text{rate} = k[A]^{3/2} [B]^{-1/2} [C]^{1/2}$$

there A, B and C are reactants in a chemical reaction.

Now answer the following questions

12. What is order w.r.t. to reactant A

- (a) 1
- (b) 1.5
- (c) 2
- (d) 2.5

13. What is order w.r.t. to reactant B

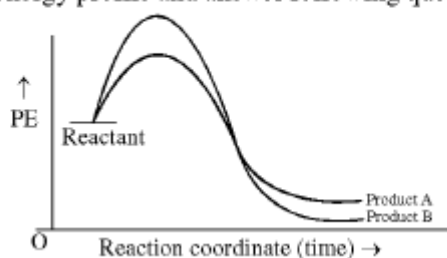
- (a) $-1/2$
- (b) 0
- (c) $+1/2$
- (d) Negative order is not possible

14. What is the overall order of reaction

- (a) 1
- (b) 1.5
- (c) 2.0
- (d) 2.5

Paragraph For Question no. 15 and 16

Consider given potential energy profile and answer following questions

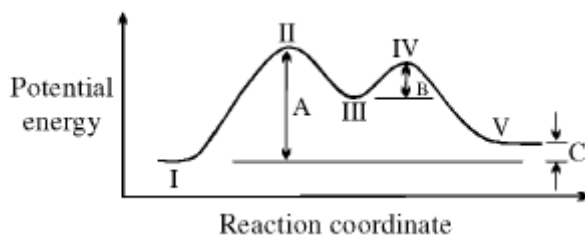


15. Which product is thermodynamically more stable

- (a) A
- (b) B
- (c) Both A & B are equally stable
- (d) Can not Decide

16. Which product will form at faster rate

- (a) A
- (b) B
- (c) both A & B
- (d) Can not decide



17. Is this an endothermic or exothermic reaction?
- (a) Exothermic
 - (b) There is not enough information to determine
 - (c) Endothermic
 - (d) This reaction can be either exothermic or endothermic
18. What potential energy difference represents the heat of reaction?
- (a) A
 - (b) B
 - (c) C
 - (d) both A and B
19. Which of the following indicates the location of intermediate?
- (a) I
 - (b) II
 - (c) III
 - (d) IV
20. Highly unstable transition state is represented by
- (a) I
 - (b) II
 - (c) III
 - (d) IV
21. Which step is rate determining step
- (a) 1st
 - (b) 2nd
 - (c) Both 1st and 2nd
 - (d) Can not decide
22. Which of the following statement is correct?
- (a) State I is less stable than transition state II
 - (b) Product is more stable than reactant
 - (c) First step is endothermic while second step is exothermic
 - (d) Overall reaction is exothermic

ANSWER KEY

Ques.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Ans.	A	C	B	B	A	A	B	A	A	B
Ques.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.
Ans.	A	B	A	B	B	A	C	C	C	B
Ques.	21.	22.								
Ans.	A	C								

