

A. For a reaction, the value of the rate constant at 300 K is  $6.0 \times 10^5 \text{ s}^{-1}$ . The value of Arrhenius factor A at infinitely high temperature is :

1.  $6 \times 10^5 \times e^{-E_a/300R}$
2.  $e^{-E_a/300R}$
3.  $6 \times 10^{-5/300}$
4.  **$6 \times 10^5$**

B.  $A \rightarrow B$  The above reaction is of zero order The life of this reaction is 50 min The time taken for the concentration of A to reduce to one-fourth of its initial value is \_\_\_\_\_ min (Nearest integer)

Correct Answer: 75

C. For the first-order reaction  $A \rightarrow B$  the half-life is 30 mins, The time taken for 75% completion of the reaction is min (Nearest integer) Given:  $\log 2 = 0.3010$ ,  $\log 3 = 0.4771$ ,  $\log 5 = 0.6989$ .

The correct answer is 60.

$$t_{1/2} = T_{50} = 30 \text{ min}$$

$$T_{75} = 2t_{1/2} = 30 \times 2 = 60 \text{ min}$$

C. How many statements are correct:

- If there is no relation between the rate constant and temperature, then activation energy is negative.
- If the activation energy is zero, the rate constant is temperature-independent.
- If the rate constant increases with the increase of temperature, activation energy is positive.
- If the rate constant decreases with an increase in temperature, activation energy is negative.

1. 1 and 2
2. 2 and 3
3. **2, 3, and 4**
4. 4

D. A and B are two substances undergoing radioactive decay in a container The half-life of A is 15min and that of B is 5min If the initial concentration of B is 4 times that of A and they both start decaying at the same time, how much time will it take for the concentration of both of them to be same? \_\_\_\_\_ min

Correct Answer: 15

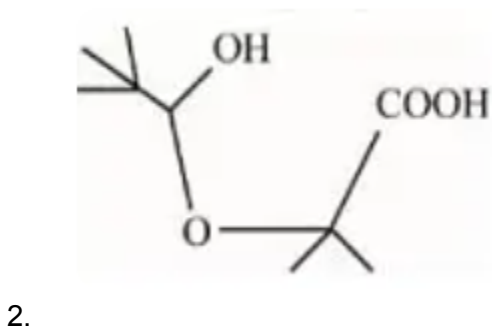
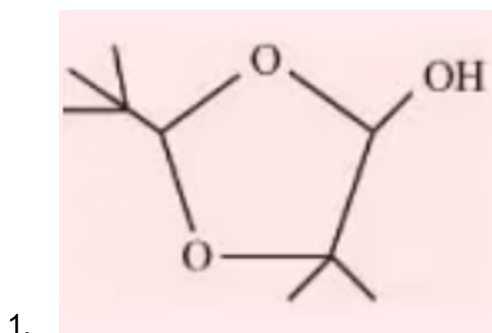
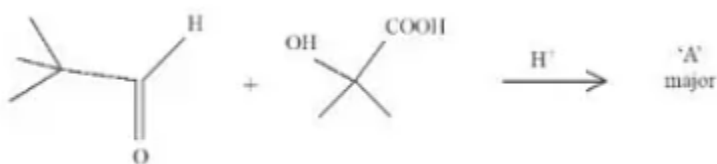
E. If compound A reacts with B following first-order kinetics with rate constant  $2.011 \times 10^{-3} - 12.011 \times 10^{-3} \text{ s}^{-1}$ . The time taken by A (in seconds) to reduce from 7g to 2g will be \_\_\_\_\_ (Nearest Integer) [ $\log 5 = 0.698, \log 7 = 0.845, \log 2 = 0.301$ ]

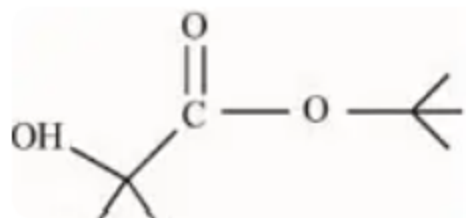
**Correct Answer: 623**

F. Statement I: Sulphanilic acid gives an esterification test for the carboxyl group  
 Statement II: Sulphanilic acid gives a red color in Lassigne's test for extra element detection  
 In light of the above statements, choose the most appropriate answer from the options given below:

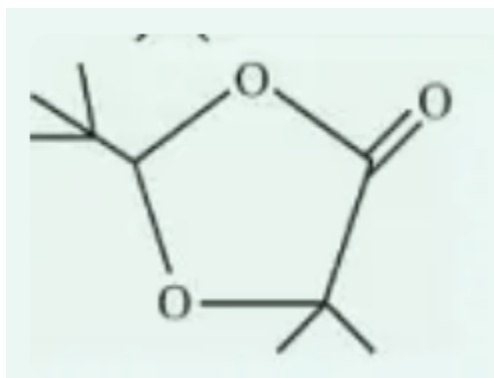
1. Both Statement I and Statement II are correct
2. Both Statement I and Statement II are incorrect
3. **Statement I is incorrect but Statement II is correct**
4. Statement I is correct but Statement II is incorrect

G. 'A' in the given reaction is





3.



4.