

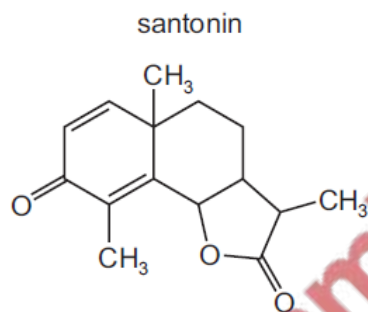
**1. Nov/2022/Paper\_11/No.28**

Which pair of reagents react together in a redox reaction?

- A  $\text{CH}_3\text{CHCH}_2 + \text{Br}_2$
- B  $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH} + \text{concentrated H}_3\text{PO}_4$
- C  $\text{CH}_3\text{COCH}_3 + \text{HCN}$
- D  $\text{HCO}_2\text{C}_2\text{H}_5 + \text{dilute H}_2\text{SO}_4$

**2. Nov/2022/Paper\_11/No.29**

The structure of santonin is shown.



Santonin is first treated with warm dilute  $\text{H}_2\text{SO}_4$ . The product of this reaction is treated with cold dilute acidified  $\text{KMnO}_4$ . A final product, Q, is obtained.

How many atoms of hydrogen in each molecule of product Q will react with sodium metal?

- A 2
- B 4
- C 5
- D 6

**3. Nov/2022/Paper\_11/No.30**

Compound R can be formed from 1-bromopropane using a nucleophilic substitution reaction followed by an oxidation reaction.

What is the identity of R?

- A propanoic acid
- B propanone
- C propylamine
- D propyl ethanoate

4. Nov/2022/Paper\_11/No.33


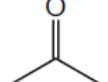
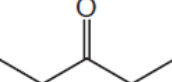
W reacts with alkaline  $I_2(aq)$  to form a yellow precipitate and  $CH_3CH_2CO_2^-$  ions.

Which row identifies W and the yellow precipitate?

	identity of W	identity of yellow precipitate
A	butanone	$CHI_3$
B	butanone	$CH_3I$
C	propanone	$CHI_3$
D	propanone	$CH_3I$

5. Nov/2022/Paper\_12/No.35

The table shows a student's predictions for the reactions of three compounds.

	compound	alkaline $I_2(aq)$	Fehling's reagent	Tollens' reagent
1		✓	✓	✓
2		✓	x	x
3		x	x	x

key  
 ✓ = reaction occurs  
 x = no reaction

Which rows show the correct predictions?

- A 1, 2 and 3    B 1 and 2 only    C 1 and 3 only    D 2 and 3 only

6. Nov/2022/Paper\_12/No.36

Which mechanism describes the reaction of aldehydes and ketones with  $HCN + NaCN$ ?

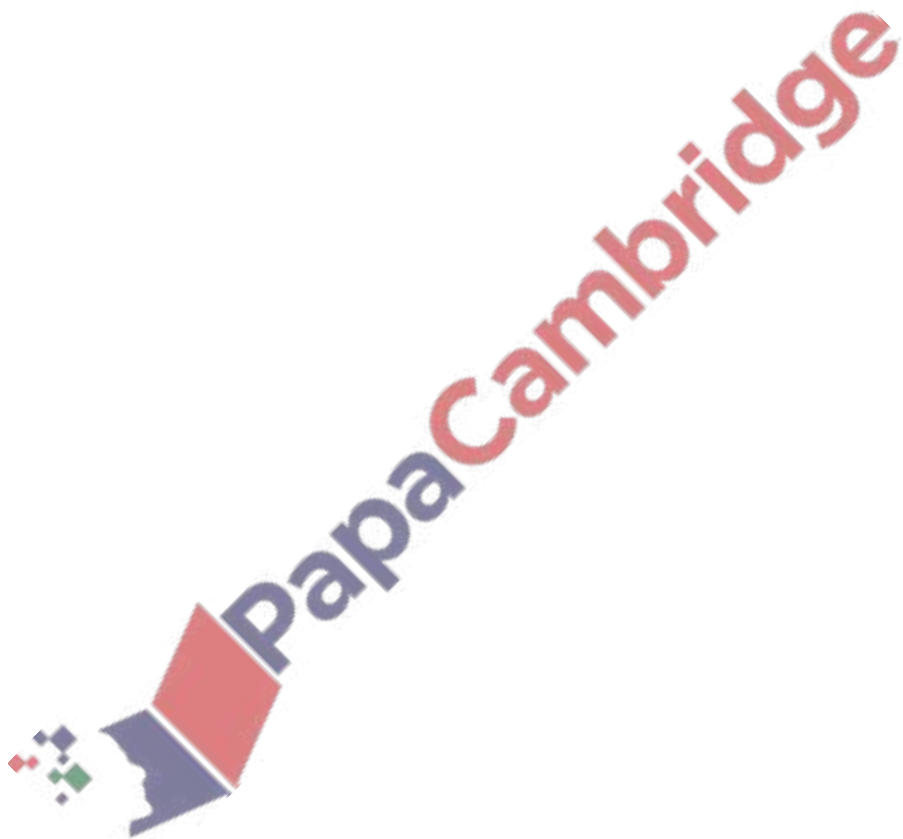
- A electrophilic addition  
 B electrophilic substitution  
 C nucleophilic addition  
 D nucleophilic substitution

7. Nov/2022/Paper\_12/No.38

The ester  $\text{CH}_3\text{CH}_2\text{CO}_2\text{CH}_3$  is hydrolysed by boiling with aqueous sodium hydroxide.

Which compound is one of the products?

- A ethanol
- B propan-1-ol
- C sodium methanoate
- D sodium propanoate



8. Nov/2022/Paper\_21/No.5(a)

Lactones are cyclic esters. Under suitable conditions, lactones form from molecules that have both an alcohol and a carboxylic acid functional group.

Equation 1 shows an example of the formation of a lactone.

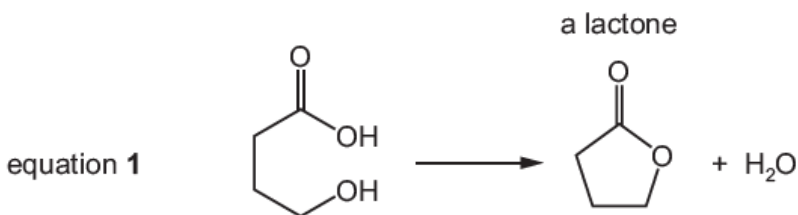


Fig. 5.1 shows the synthesis of lactone **P** from compound **M**.



Fig. 5.1

- (a) (i) **M** reacts with hot concentrated acidified  $\text{KMnO}_4(\text{aq})$  to form **N**,  $\text{C}_6\text{H}_{10}\text{O}_3$ , in reaction 1.

Draw the structure of **N**.

[1]

- (ii) **N** is reduced by  $\text{NaBH}_4$  to form 5-hydroxyhexanoic acid in reaction 2.

Construct an equation for reaction 2 using molecular formulae.

In the equation, use  $[\text{H}]$  to represent one atom of hydrogen from the reducing agent.

..... [1]

- (iii) Reaction 2 is a nucleophilic addition.

Suggest why reaction 2 creates a mixture of two organic compounds.

.....

..... [2]

(iv) Draw lactone **P**, the product of reaction 3.

[1]

