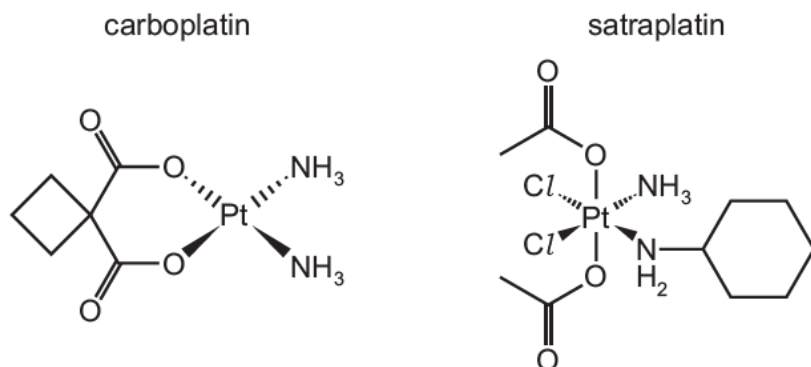


1. March/2021/Paper\_42/No.5

(a) Carboplatin and satraplatin are used as anticancer drugs instead of cisplatin.



(i) Describe the action of cisplatin as an anticancer drug.

.....  
.....  
..... [2]

(ii) Suggest the geometry of the platinum centre in the carboplatin complex.

..... [1]

(iii) Suggest why carboplatin does not show cis-trans isomerism.

.....  
.....  
..... [1]

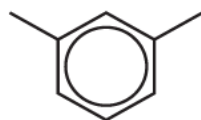
(iv) Satraplatin is a neutral complex, containing the ligands  $\text{CH}_3\text{CO}_2^-$ ,  $\text{C}_6\text{H}_{11}\text{NH}_2$ ,  $\text{Cl}^-$  and  $\text{NH}_3$ .

Deduce the oxidation state of platinum in satraplatin.

..... [1]

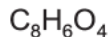
(b) Compound **M** is made from 1,3-dimethylbenzene in a two-step synthesis.

1,3-dimethylbenzene

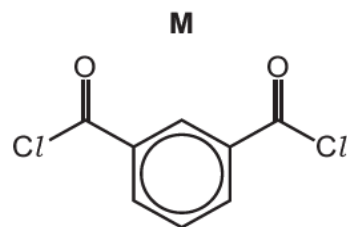


step 1

**L**



step 2



(i) Draw the structure of **L**.

[1]

(ii) Suggest reactants and conditions for each step of this synthesis.

step 1 .....

step 2 .....

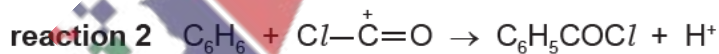
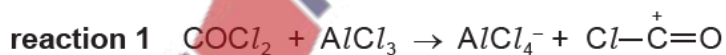
[2]

(iii) Write an equation for step 2.

..... [1]

(iv) A student investigates a possible synthesis of **M** directly from benzene using  $COCl_2$  in the presence of an  $AlCl_3$  catalyst.

Benzene initially reacts with  $COCl_2$  as shown.



Reaction 2 is the electrophilic substitution of  $Cl-\overset{+}{C}=O$  for  $H^+$  in benzene.

Suggest a mechanism for reaction 2.

[3]

[Total: 12]