

1. Nov/2023/Paper_9701/41/No.7(a_c)

Sunset Yellow is an additive used for colouring foods.

A synthetic route for making Sunset Yellow is shown.

Molecules **E** and **G** each contain one $-\text{SO}_3^-$ group. These groups are unchanged in the formation of Sunset Yellow.

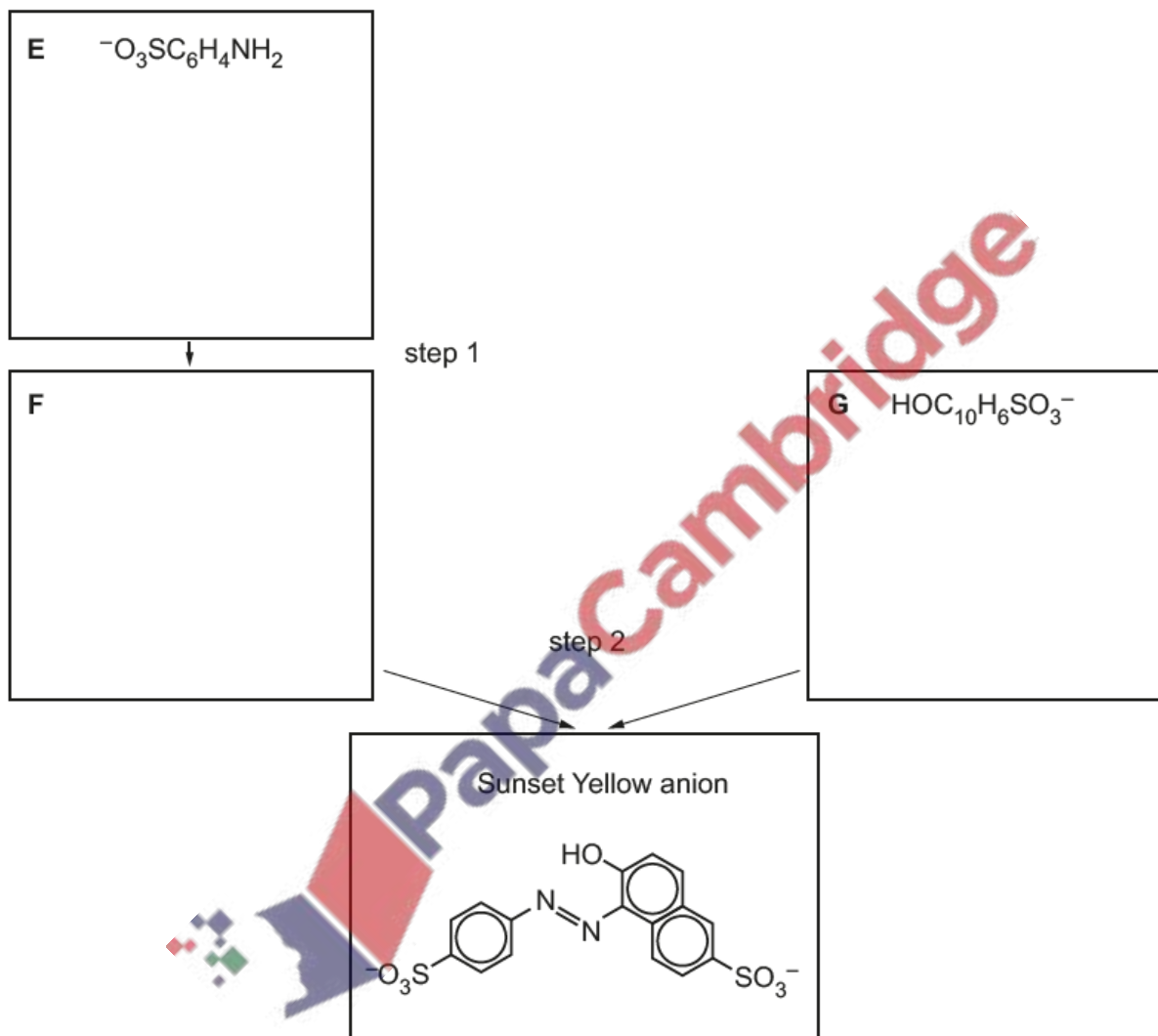


Fig. 7.1

(a) State the molecular formula of the Sunset Yellow anion.

..... [1]

(b) Deduce the structures of **E**, **F** and **G** and draw them in the boxes in Fig. 7.1.

[3]

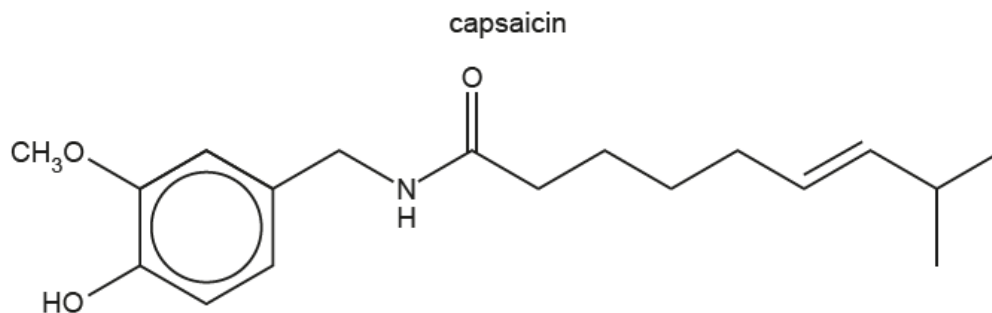
(c) Suggest suitable reagents and conditions for step 1 and 2.

step 1

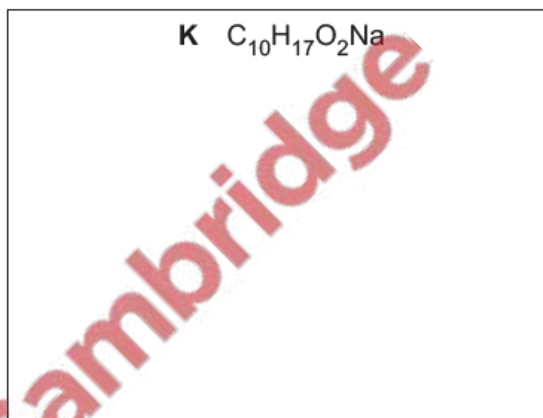
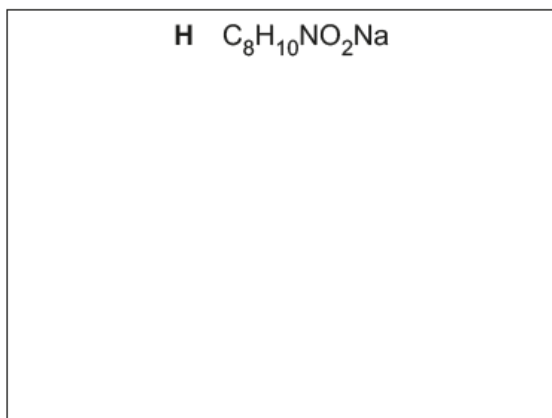
step 2

[3]

(e) (i) Capsaicin is heated with an excess of hot aqueous NaOH.



Draw the structures of the two organic products H and K.

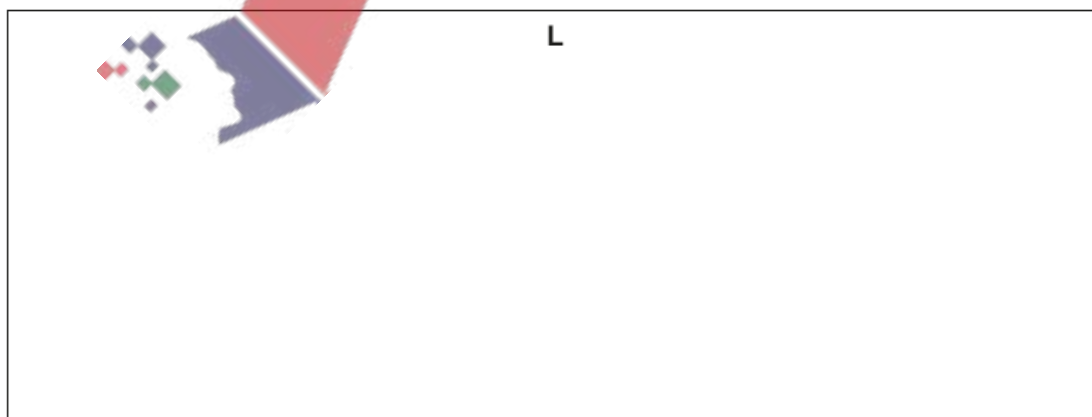


[2]

(ii) Name the **two** types of reaction occurring in (e)(i).

..... [1]

(f) Draw the structure of the organic product L formed when capsaicin is treated with $LiAlH_4$ in dry ether.



[1]