CHEMISTRY ONLINE
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CHEMISTRY
ORGANIC CHEMISTRY

Level & Board	CIE (A-LEVEL)
TOPIC:	INTRODUCTORY TOPICS
PAPER TYPE:	SOLUTION - 1
TOTAL QUESTIONS	04
TOTAL MARKS	29

Introductory topics - 1

1)

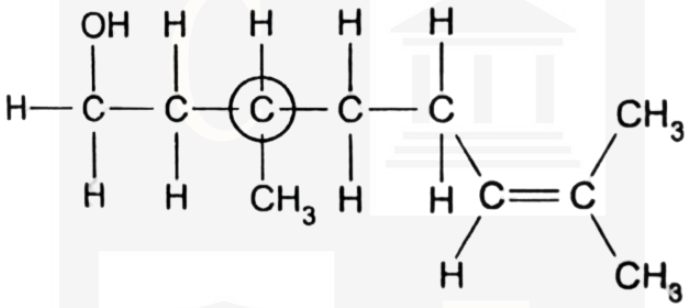
(a) (i) Molecular formula: $C_{10}H_{20}O$

(ii) $M_r = (12\times10) + (1\times20) + 16 = 156$

(b) (i) Primary alcohol.

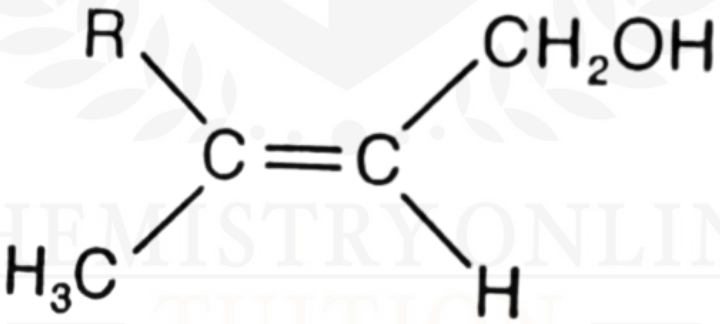
(ii) Alkene.

(c) Carbon atom number 6 circled.



citronellol

(d) (i)



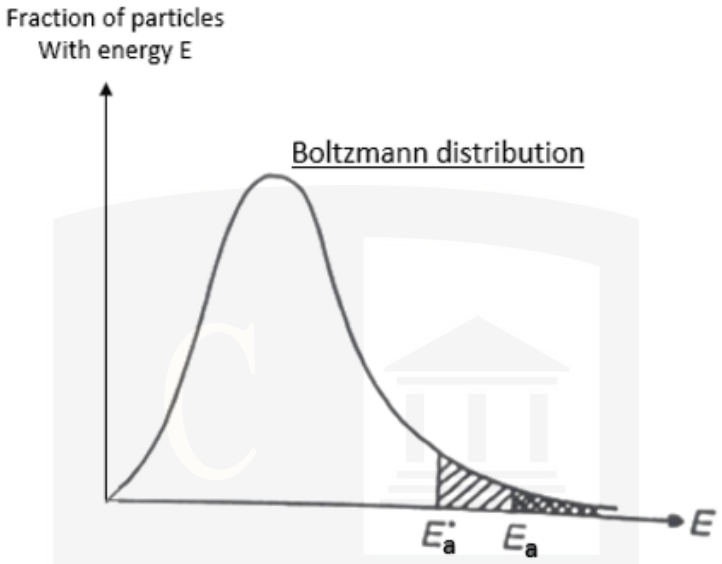
(ii) Geraniol does not have any chiral carbon atom.

(e) Aqueous bromine is decolorized.

2)

(a) A catalyst provides an alternative pathway with a lower activation energy for a

reaction to take place. With a lower E_a', there will be more particles with energy greater than this new but lower E_a'. Hence, there will be more effective collision between particles and the reaction rate increases.



(b) (I) Involves breaking of C – H bond ΔH = BE = 410KJ mol^{-1}

(II) Involves forming a C – Cl bond ΔH = -BE – 340KJ mol^{-1}

(III) Involves forming a Cl – Cl bond ΔH = -BE = -244KJ mol^{-1}

Hence, (II) is the most feasible and it has the lowest activation energy. (I)has the highest activation energy since this step is endothermic.

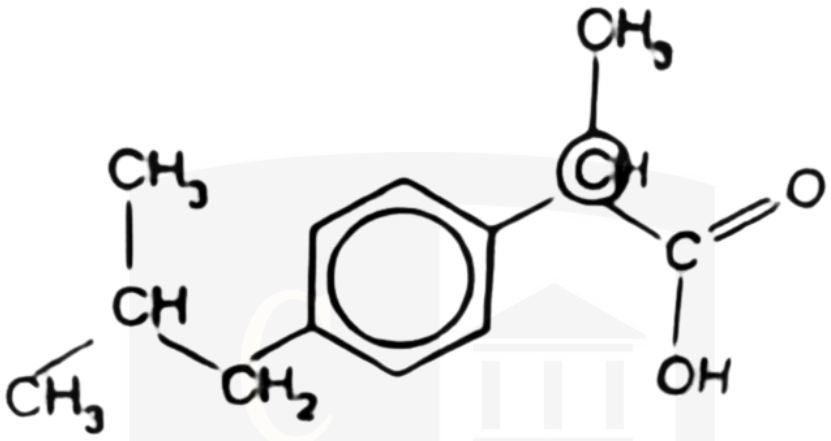
(c) $2Fe^{2+} + H_2O_2 + 2H^+ \longrightarrow 2Fe^{3+} + 2H_2O$ $\quad E^{\ominus}_{cell}$ = 1.77 – 0. 77 = 1.00V > 0

$2Fe^{3+} + H_2O_2 \longrightarrow 2Fe^{2+} + O_2 + 2H^+$ $\quad E^{\ominus}_{cell}$ = 0.77 = 0.68 = +0.09V > 0

The 2 steps in the pathway have positive $E^{\ominus}_{cell}$ and hence are energetically feasible.

3)

(a) (i)



(ii) $C_{13}H_{18}O_2$

(iii) M_r value of ibuprofen = (12×13) + (1×18) + (16×2) = 206

No. of moles = conc. × vol

$= 0.15 \times \frac{100}{1000} = 0.015$

$= 1.5 \times 10^{-2}$ moles

Mass of Ibuprofen = no. of moles × M_r

= 1.5 × 10-2 × 206

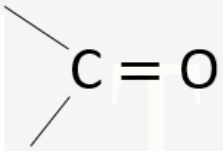
= 3.09 ≈ 3.1g3)

4)

(a) $C_4H_8O_2$

(b)

$HCO_2CH(CH_3)_2$ W	$HCO_2CH_2CH_2CH_3$ X
$CH_3CO_2CH_2CH_3$ Y	$CH_3CH_2CO_2CH_3$ Z

(c) (i) Presence of Carbonyl group 

(ii) – CHO group (Aldehyde) is absent OR ketone is present.

(iii) Alcohol C is $(CH_3)_2CHOH$

(iv) W

(d) None. No chiral centres are present in any of the four esters.

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