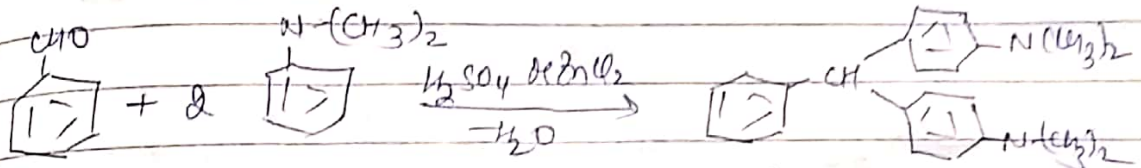
2) Triphenyl Methane Dyes

⇒ have $-NH_2$ and $-NR_2$ derivatives of triphenyl methane
⇒ basic dye.
⇒ used for wool, silk & mordanted cotton

a) Malachite Green

⇒ Condensation of benzaldehyde with N,N-dimethylaniline in presence of conc H_2SO_4 or anhyd $ZnCl_2$



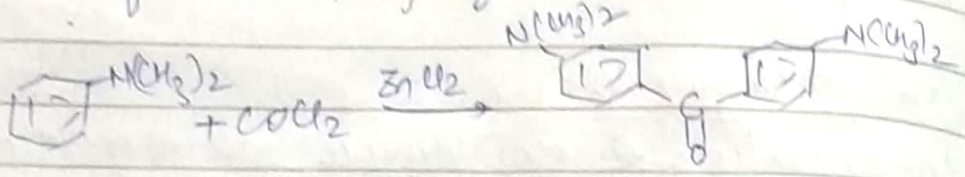
⇒ Malachite green is bright green dye
⇒ used for dyeing wool, silk & cotton (after mordanting with tannic)
⇒ used as antiseptic for bacterial & mycotic infections
⇒ as a reagent for spot test for detecting sulphurous acid.
⇒ for staining the host tissue in plants infested by fungi

If replace with $-N(C_2H_5)_2$ then it is called Brilliant green used as powerful antiseptic.

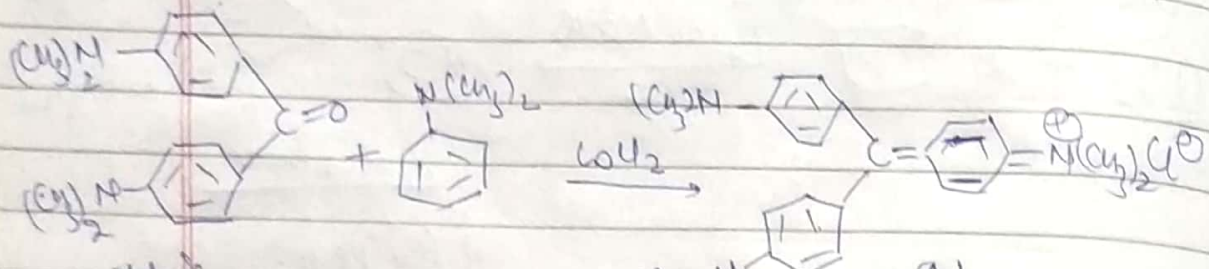
b) Crystal Violet:

→ Prepared by Michler's ketone (obt. by reaction of $COCl_2$ on N,N dimethylaniline in presence of $ZnCl_2$)

→ Then react with again N,N-dimethyl aniline in presence of $COCl_2$ or phosphoryl chloride.



Michler's ketone



Michler's Ketone

(A)

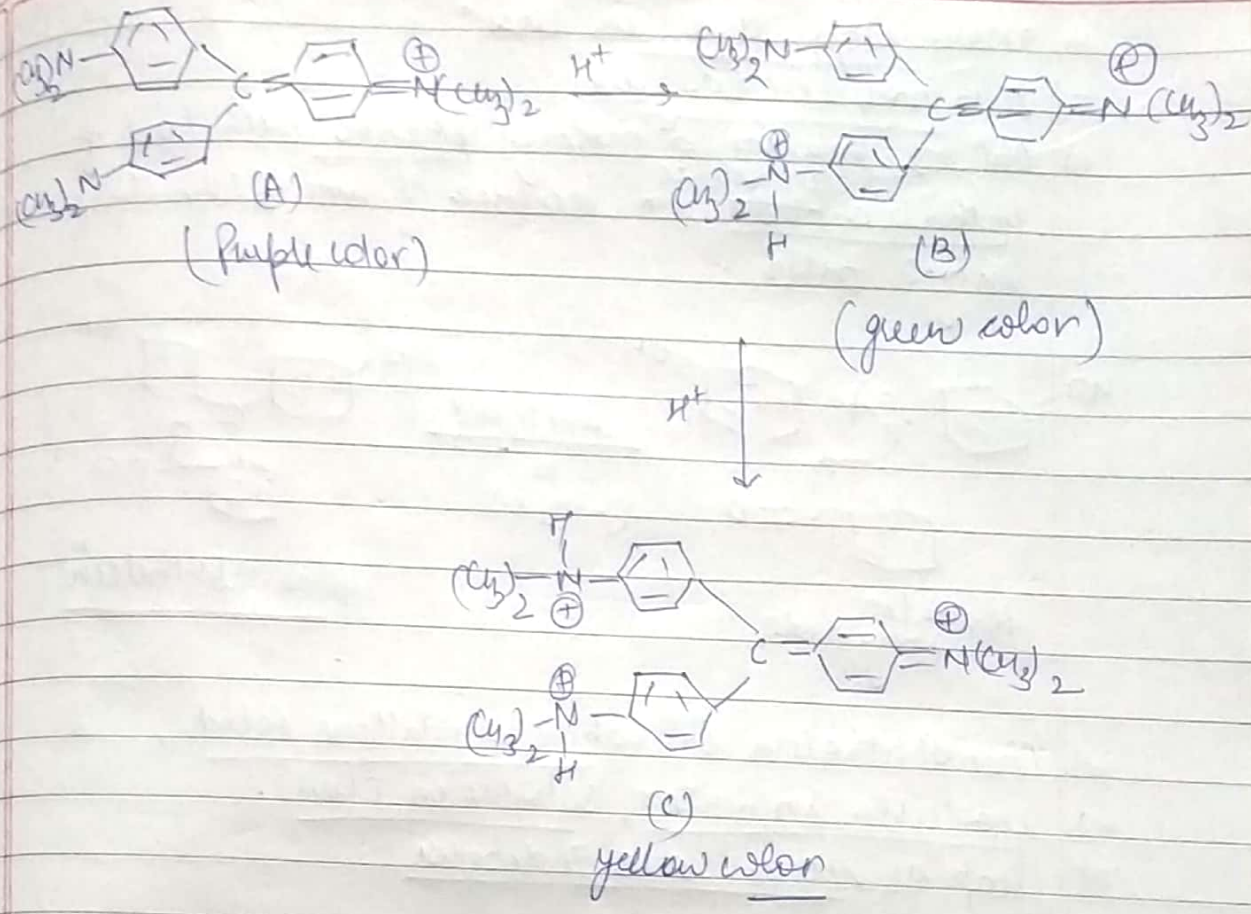
Crystal violet (Purple)

→ It exist as singly charged ion (A) in weakly acidic medium, In this ring are not planar, only 2/3 of charge can oscillate.

⇒

→ In strong acidic medium dye exist as doubly charged ion (B) in which entire charge oscillate. So colour deepens to green

→ In much stronger, third N gets protonated so dye exist with 3 charges. There is no oscillation so very little resonance; therefore dye becomes yellow (C).



⇒ Crystal violet used for bacteriological work & histological work.

⇒ also for antifungal, antibacterial agent. under the name Gentian violet.

⇒ sol^n of 0.5% of this dye & brilliant green is generally used for sterilizing the skin & in gynaecological purpose.

3) Phthalein Dyes

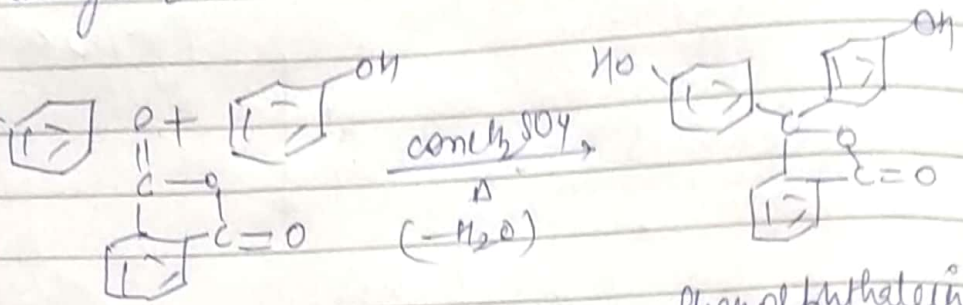
⇒ these contains triphenyl methyl nucleus

⇒ obt. by condensation of phenols with phthalic anhydride in presence of dehydrating agent e.g conc H_2SO_4 & anhy $ZnCl_2$

Date

a) Phenolphthalein

⇒ most imp dye in this.
⇒ It is not used as dye.
⇒ Obt by heating 2 moles of phenol with 1 mol of phthalic anhydride in presence of conc H_2SO_4 or anhyd. $ZnCl_2$.



phthalic anhydride

Phenolphthalein

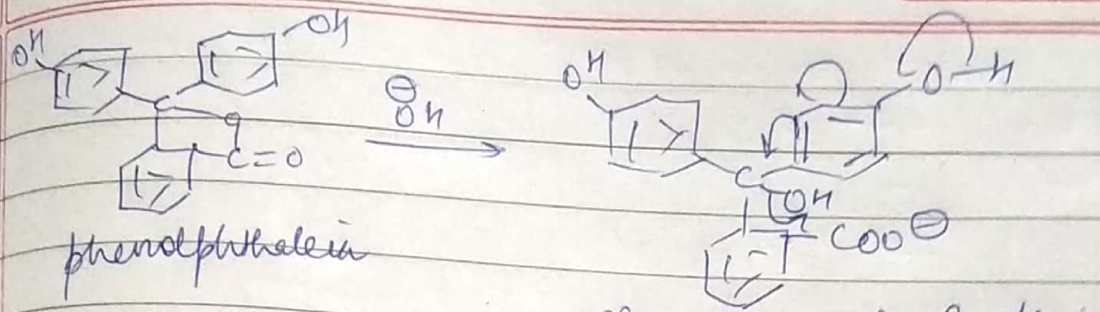
⇒ Phenolphthalein is white crystalline solid,
⇒ insoluble in water, soluble in EtOH.
⇒ Imp as acid-base Indicator.

⇒ In acidic medium it is colorless.
⇒ In presence of dil. alkali, lactone ring got open up to give triphenyl carbonyl (A).

⇒ A loses the $-H_2O$ and to give resonating ion B.

⇒ But phenolphthalein when treated with conc alcoholic alkali, the red color first produce, disappear due to formation of C (quinonoid structure is destroyed.

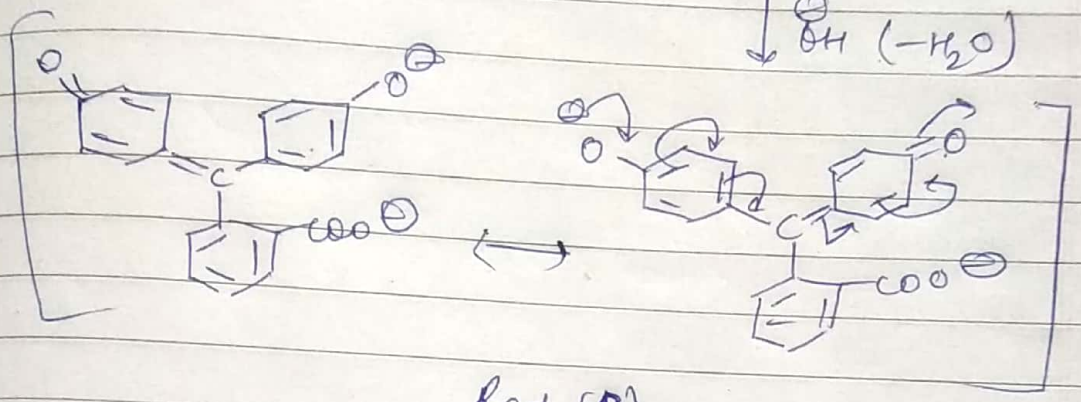
⇒ Phenolphthalein is used in medicine as a laxative.



phenolphthalein

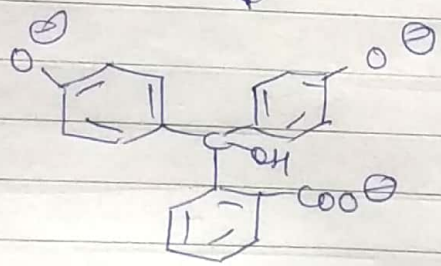
triphenyl carbinol derivative

↓ $\overset{\ominus}{O}H$ $(-H_2O)$



Red (B)

↓ excess $\overset{\ominus}{O}H$



(colorless) C)

4) Xanthene dyes :