Non Carbonate hardness — Called permanent hardness because it is not removed when the water is heated. It is much more expensive to remove non-carbonate hardness than carbonate hardness.

» Ca^{2+}, mg^{2+} associated with other ions, Cl^-, NO_3^-, SO_4^{2-}

» NCH = TH − CH

» If Alkalinity » Total hardness then NCH = 0

Physical characteristic — physical properties of waste water.

① Temperature — Temperature affects biological activity of bacteria present in sewage. The average tem of sewage in India is 20°C.

② Colour — Colour can be detected by naked eye and it indicates the freshness of sewage.

③ Odour — fresh sewage is odourless but in 3-4 hours it becomes state with all Oxygen present.

④ Solids — Through sewage contains only about 0.1 precent soilds. The sewage solids may be classified into dissolved solids.

⑤ Turbidity — ~~Dirty~~ Dirty water or wastewater from baths having floating matter like feacel ment.

Chemical characteristics — characteristics of waste water.

① PH Value — PH value of sewage indicates the negative log of Hydrogen ion concentration present in sewage

$$[PH] = -\log_{(10)}[H]$$

$$[PH] = (10)^{-PH}$$

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② Nitrogen Content — presence of nitrogen in Waste indicates the presence of free ammonia.

(i) Organic Nitrogen
(ii) Nitrate
(iii) Nitrate.

Chloride content — presence of nitrogen in waste water indicates the presence of free ammonia.

(i) Organic nitrogen
(ii) Nitrate
② Nitrate.

Chloride are derived from kitchen waste human faces and cernary discharge etc.

④ fats, oils and carelas — These are derived in sewage from discharge of animal and vegatable waters.

⑤ Dissolved oxygen — It is necessary to ensure at least 4 PPM of DO in treated sewage before discharging into River stream.

Chemical oxygen Demand — It is measure of the capacity of waters to consume oxygen during the decomposition of organic matter.

Ans-2(2) Activated sludge — The actived sludge is the sludge which is obtained by settling sewage in presence of abundant oxygen so as to be super charge with favourable aerobic microaganism.

Process —