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## Unit - II

- ☒ Aims of house drainage or houses & buildings sanitary collection: → It is provided
- (i) to maintain healthy conditions in the building
  - (ii) to dispose off waste water as early and quickly as possible
  - (iii) to avoid the entry of foul gases from the sewer or the septic tank.
  - (iv) to facilitate quick removal of foul matter
  - (v) to collect and remove waste matters systematically.

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## ☒ Principles of house drainage or Sanitary Plumbing System: →

☐ Following principles are adopted for the efficient drainage system:-

- 1) The labor lavatory blocks should be so located that the length of drainage line is minimum. In case of multistoreyed building they should be located one above the other.
- 2) The drainage pipes should be laid by the side of the building rather than below the building.
- 3) All the drains should be aligned straight b/w successive inspection chambers. All sharp bends & junctions should be avoided except through chambers.



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| <p>4) The slope of the drains should be sufficient to develop self cleansing velocity.</p> <p>5) The size of drain should be sufficient, so that flooding of the drain does not take place while handling the max. discharge.</p> <p>6) The drainage system should contain enough no. of traps at suitable locations.</p> <p>7) The house drain should be disconnected to the public sewer by the provision of an intercepting trap.</p> <p>8) Rain water pipes should drain out rain water directly into the street gutters from where it is carried to the storm water drain.</p> <p>9) All the connections should be water tight.</p> <p>10) The entire drainage system should be properly ventilated from the starting pt. to the final pt. of disposal. It should permit free circulation of air.</p> <p>11) All the materials &amp; fittings of the drainage system should be strong, hard &amp; resistant to corrosive action. Should be non-absorbent type.</p> <p>12) The entire system should be so designed that the possibilities of formation of air locks, siphonage, under deposits etc. are minimised.</p> | <p><b>IX</b> <u>Traps</u></p> <ul style="list-style-type: none"> <li>• A trap when remains water</li> <li>• It prevents the passage of waste water through the trap</li> <li>• The trap is placed between the drain and the street sewer</li> <li>• Great importance is the</li> </ul> <p><b>Characteristics</b></p> <ol style="list-style-type: none"> <li>1) It should be made of strong material.</li> <li>2) It should be made of non-corrosive material.</li> <li>3) It should be made of non-absorbent material.</li> <li>4) It should be made of non-porous material.</li> <li>5) It should be made of non-flammable material.</li> <li>6) It should be made of non-toxic material.</li> </ol> |
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Trap:-

• A trap is a depressed or bent fitting which, when provided in a drainage system, always remains full of water, thus maintaining a water seal.

• It prevents the passage of foul air or gas through it, through it allows the sewage or waste water to flow through it.

• The depth of water seal is the vertical distance b/w the crown & dip of a trap.

• The depth of water seal represents its strength or effectiveness.

• Greater the depth of water seal more effective is the trap. Depth varies from 25mm to 75mm.

Characteristics :-

1) It should possess adequate water seal at all times, to fulfill the purpose of its installation.

2) It should be of non-absorbent material.

3) It should be free from any inside projections, angles or contractions, so that flow is not obstructed or retarded.

4) It should be simple in const., cheap and readily available.

5) It should be self cleansing.

6) It should be provided with suitable access for cleaning.



## Classifications:

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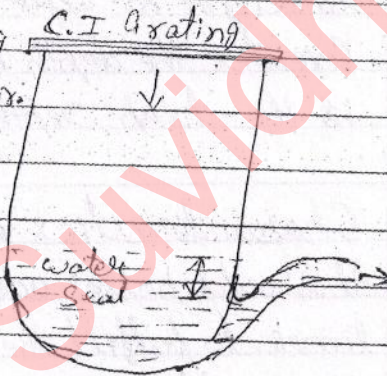
- (i) P-trap (ii) S-trap or half S-trap  
(iii) S-trap (iv)

Use:

- (i) Floor trap or nahni trap  
(ii) Gully trap (iii) Intercepting trap

### 1) Floor Trap or Nahni Trap →

- It is used to collect wash water from floors, kit & bath rooms.
- It forms the standing bit of waste water floor.
- It is made of cast iron, with a gravity at top, to check entry of solid matter of big size.
- These traps have small water seal.

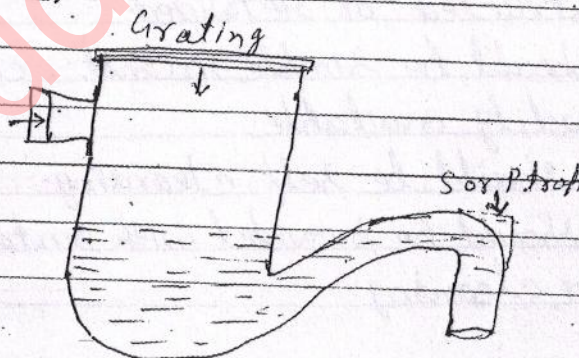


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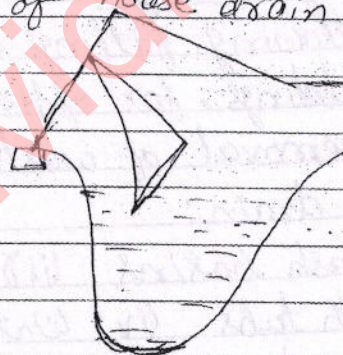
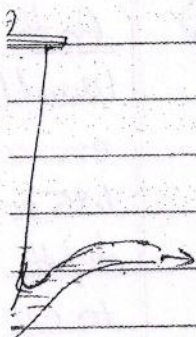
- A C.I. gully is circulate in section.
- It can be fitted in a masonry chamber.
- A water seal of 60 to 70 mm is usually provided at the external face of a wall.
- It receives wastewater from baths, kit, etc. and pass it on to the house drain carrying excremental discharge from water closets.
- A well designed gully trap may serve two or three connections from various traps.

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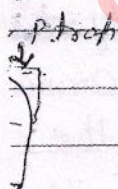
3) Intercepting Traps:→

- This is a special type of trap provided at the junction of house drain with the public sewer or septic tank.



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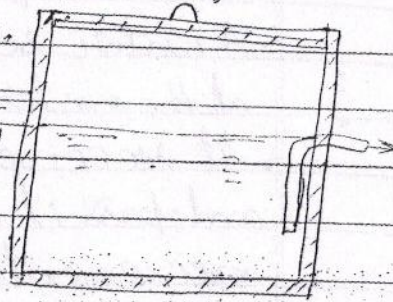
- It is provided in the last manhole of the house drainage system.
- It has a deep water seal of 100 mm, so
- The trap has an opening at the top, called the cleaning eye or rodding arm, having a tight plug, for frequent cleaning of the trap.





### 1) Grease Traps :-

- Such traps are used only in large hotels, restaurants or industries where large quantities of oily wastes are expected to enter the water flow.
- It is either a masonry or C.I. chamber with a bent pipe or Tee-pipe at the outlet end. The greasy matter, floating on the top, can be removed later.



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### Sanitary Fittings :-

The following fittings are commonly used in buildings, for efficient collection and removal of wastewater to the house drain:

- Wash basins
- Sinks
- Bath tubs
- Water closets
- Urinals
- Flushing cisterns

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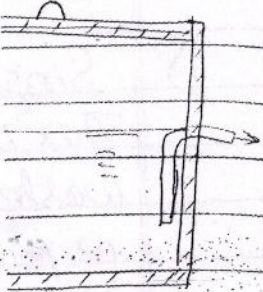
#### 1) Wash Basin :-

Wash basins are usually made of pottery or porcelain ware. An ordinary wash basin is mounted on brackets fixed on wall, while a pedestal type basin is mounted on pedestal rising from wall. They are available

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in different shapes and sizes. The waste pipe with a metallic strainer is provided at the bottom of the bowl.

## 2) Sink:->

These may be made of glazed fire clay, stainless steel, metal porcelain or enamelled pressed steel. They have various shapes and sizes. The outlet pipe, provided with a grating of brass or nickel, may discharge over a floor trap or nahni trap.

## 3) Bath tub:-

Usually made of iron or steel coated with enamel. It has length varying from 1.7 to 1.85 m, width between 0.7 to 0.75 m and depth near waste pipe varying from 0.43 to 0.45 m. It is provided with outlet and overflow pipes.

## 4) Water Closets:->

Designed to receive and discharge human excreta directly from the person using it. The appliance is connected to the soil pipe by means of a suitable trap. It is usually connected to a flushing cistern to flush the closet and discharge human excreta to the soil pipe.



### Requirements:-

- 1) It should be convenient in use by persons of all age - both old as well as children.
- 2) The size of pan should be such that the urine as well as the faecal material does not fall outside the pan.
- 3) The trap should be such that water does not splash when the excreta falls in water.
- 4) Urine should not splash outside the pan.
- 5) Faecal matter should flow easily in the trap, without sticking to the pan.
- 6) Flushing should be achieved efficiently with the use of small quantity of water.
- 7) Faecal material should not be too plainly visible before flushing.
- 8) The water in the trap should provide an effective and air tight seal.
- 9) The pan should be of durable material, so that it does not crack with the passage of time.

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### Plumbing System:-

There are four principal systems of plumbing for drainage of buildings:

- (i) Single stack system
- (ii) One pipe system

- 3) Partial  
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(iii) Partially ventilated single stack system  
(iv) Two pipe system.

### 1) Single Stack System:-

This is the simplest system, in which the waste matter from baths, sinks etc. as well as foul matter from the W.C. are discharged in one single pipe, called the soil and waste pipe. This pipe terminates as the vent pipe at its top, and no separate vent pipe is provided. This system is effective only if the traps are filled with water seal of depth not less than 75 mm.

### 2) One pipe System:->

In this system, a separate vent pipe is provided and the traps of all water closets, basins etc. are completely ventilated. The system is costlier than single stack system.

### 3) Partially Ventillated single stack system:->

This is modified form of the single stack system and one pipe system. In this, the waste from W.C, basins etc. is discharged into one common soil and waste pipe. A relief vent pipe is also



provided which provides ventilation to the traps of water closets. The traps of basins etc. are not directly connected to the vent pipe.

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#### 4) Two Pipe System:->

In this system, separate soil pipe and waste pipe are provided. The discharge from W.C. is connected to the soil pipe while the discharge from bath, sinks etc. are connected to the waste pipe. All the traps are connected completely ventilated by providing separate ventilating pipes. Thus, four pipes are required.

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