

# **Sessional Assignment 2**

## **Wastewater Engineering**



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**SECTION A**

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# 1) a) Soil Pipes:-

- ⇒ It is a type of pipe that conveys sewage or wastewater reliably, either from the toilet or sink to a soil drain or sewer.
- ⇒ Soil pipes don't carry water and liquids, they carry soiled waste from the toilet & urinal.
- ⇒ Soil pipes need to be properly vented (generally at the top of the building) to allow the safe disposal of gasses and to reduce odours, often the gasses from soil pipes can be harmful to health, which is why it's best to ventilate the pipes as high as possible.

## b) Anti-Syphon Pipes:-

⇒ When the wastewater is discharge from a sanitary fixture of upper floor, it moves down rapidly through the soil pipe, during the movement it may suck some air from the lateral pipe connecting the soil pipe with the fixture at lower level.

⇒ The sucked air causes siphonic action resulting in the flow of water from the trap of the fixture to the soil pipes and thus breaking its water seal.

⇒ To overcome this difficulty a separate pipe of smaller diameter is attached to the trap which connects the trap with the vent pipe, this is known as Anti-Siphon Pipes.

## 2) a) Sanitary Fixtures:

⇒ These are receptacle for industrial and fecal sewage that are installed in homes, public and industrial places.

Sanitary fixtures are attached to the interior systems of water pipes and sewerage systems and constitute the main elements of a building's sanitary engineering equipment.

⇒ Sanitary fixtures are equipped with hydrants or faucets that deliver both hot and cold water.

⇒ They are also equipped with siphon that have water seals to prevent polluted air from entering a room from sewerage pipes.

⇒ They are installed in different areas i.e. bathtubs, washstands, laboratories, barber shops, beauty salons and transportation facilities.

## b) Sanitary Trap:-

⇒ The traps are defined as bittings at the end of soil pipes or waste pipes to stop foul gases coming out of these soil pipe or waste pipe.

⇒ Every water using appliance or fitting have a drain line to flow out the waste water, so there must be a trap in the pipe that seals the drain.

⇒ Traps are designed in such a way that it retains a small quantity of waste water from discharge, of fitting to which it is attached, as a barrier to prevent foul gases or air entering the building.

### 3) a) Cross-connection:-

⇒ Cross connection is a point in a plumbing system where it is possible for a nonpotable substance to come in contact with the potable drinking water.

⇒ Cross connection risks contamination of building water piping or municipal water supply with bacteria. A cross connection is a dangerous situation where wastewater may enter and contaminate the supply water.

⇒ Examples of cross-connection include a garden hose submerged in a pesticide mixture, a pipe connection providing potable feed water to an industrial process, connections to fire fighting equipment.

## b) Back Siphonage Control:-

⇒ A reversal of the normal flow of water or other liquid due to negative pressure gradient (i.e. vacuum).

⇒ Back siphonage occurs when there is a stoppage of water supply due to nearby fire fighting, a break in main water supply pipe etc.. Back siphonage in a water system may result in contamination.

⇒ Back siphonage can be controlled by using air gaps (it must be twice the dia of pipe), atmospheric vacuum breaker, double check valve assembly, pressure vacuum breaker, barometric loop.