

IAT-II - RURAL WATER SUPPLY & SANITATION. SOLUTION.

- Q1. Define i) Epidemics ii) Incubation period iii) Carriers
iv) Vehicles of Infection v) Endemic.

Solution EPIDEMICS :

An epidemic is the incidence of a communicable disease among a number of people to an extent that is recognized statistically as being well beyond the normal expectancy for the disease in a community in a definite period of time.

Ex: Small Pox.

ENDEMIC :

A disease is endemic in an area if it is constantly present in some degree. An endemic disease may flare up at times and become epidemic.

INCUBATION PERIOD :

It is the time elapsing b/w the entrance of the infectious agent into the body & the appearance of signs & symptoms of the disease.

CARRIERS :

Carriers are persons who harbour specific infectious agent without desirable clinical diseases but who can be reservoir of infection. Some of the diseases that produce carriers are typhoid, diphtheria, Cholera, Hookworm, Scarlet fever etc.

VEHICLES OF INFECTION :

These are the means through which infectious agents are transferred in causing disease.

Ex: Water, Food, Insects.

Q2. Explain the different types of collection offered by the collecting refuse.

Solution: The following are the systems adopted to collect the waste produced from individual house hold.

✓ CURB SERVICE :

In this method the house owners is responsible for placing the refuse containers at the curb on the scheduled day. When the workman from the refuse vehicle collects and empty the containers and place them back at the curb. The house owner has to take back the empty containers.

* ALLEY SERVICE :-

In this method the containers are placed at the alley line from where they are picked by work man from ~~surface~~ refuse vehicle who deposit & replace the empty containers.

* SET-OUT & LET-IN SERVICE :

In this method, let out men go to the individual houses collect the containers & empty them in the surface vehicle. Another group of persons return the empty containers to individual houses.

* SET-OUT SERVICE :

In this method, the workers with refuse vehicles collect the containers from the containers from individual houses & empty them in refuse vehicle & the house owner by the take back the empty containers.

* BACKYARD SERVICE :

In this method, the workers with vehicle

carrying a bin (or) wheeled borrow (or) sack to the yard and empty the refuse container with. The wheel borrow is then carried back to the vehicle. In a new method of backyard collect the collection vehicle stops at selected locations on specific days. The house owner empties the waste in the vehicle which then moves ahead.

Q4. List and Explain the disease transmitted by animals due to poor sanitation.

Solution:

DISEASE TRANSMITTED BY ANIMALS :

- * Brucellosis (or) Undulant fever
- * Bovine Tuberculosis.
- * Q-fever
- * Anthrax
- * Leptospirosis.
- * Salmonellosis.
- * Tularemia.
- * Rabies.
- * Parrot fever
- * Foot & Mouth Disease

→ BRUCELLOSIS (OR) UNDULANT FEVER :

Brucellosis is transmitted from cattle, goats & swine by the consumption of raw milk.

→ BOVINE TUBERCULOSIS is transmitted by cows.

→ Q-FEVER is transmitted by domestic animals like cattle, sheep & goat.

- ANTHRAX: is transmitted by cattle & horses & man, may be infected by skin abrasion.
- LEPTOSPIROSIS: occurs among rats, rodents, dogs, swine, cattle & other animals. It is transmitted to man by direct contact.
- Salmonellosis: is caused by salmonella group of bacteria which is commonly being found in poultry and meat products.
- Tularemia: is usually contracted by man from rabbits, rodents, Quail & other game animals.
- Rabies: is an acute fatal encephalitis caused by specific virus. Reservoirs of this virus include domestic animals like dogs, cats & many of the large group of wild & domestic animals.
- Parrot fever: is a virus diseases of parrot, parakeets, pigeons, fowls & other birds. The disease is transmitted to man through direct contact with infected birds.
- Foot & Mouth disease: is caused by the virus to which all cloven hoofed animals are susceptible, although cattle are more commonly infected. It is transmitted to man by raw consumption of milk.
- Ring Worm: is a fungal infection caused by cats & dogs, cattle & horses.
- Teniasis: is a tape worm infection which involves various animal hosts. The common varieties occur in man results in eating of infection pork (or) fish (or) beef.

Q5. Define Sanitary Land Filling. Explain the different methods of sanitary land filling. Also mention Advantages & Disadvantages.

SOLUTION:-
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SANITARY LAND FILLING:

It is defined as a method of disposing of ~~surface~~ refuse on land without creating nuisance or hazardous to public health (or) safety by utilizing the principle of Engineering. It is also defined as to confined the refuse to smallest practical area to reduce it to smallest practical volume & cover it with a layer of earth at the conclusion of each days operation. Sanitary land filling can be done by following ways.

→ TRENCH METHOD:

This method is suitable for flat land where excavations can be carried out easily & where water table is sufficiently low. A trench of two-meter deep & 2.5m wide is cut & the length depends on the site conditions, no. of trucks arriving etc. The excavated soil is placed on the side of the trench & after the refuse has been put in layers & compacted, the trench is filled with excavations soils.

→ Area Method:

This method is used for the areas where natural depressions exist in the form of stone quarries, ravines & valleys. The waste is put in a natural depression & compacted. The process is repeated till the depression are filled up & the covering earth has to be brought from borrow pits.

→ Ramp Method:

In this method, Ramp of about 15m, wide & 30m long & suitable height is created.

A shallow cut is taken at the bottom (or) foot of the ramp, truck loaded with wastes comes to the top of the ramp & discharge, their content inside the trench at the end of the opera, the refuse is compacted & earth is pushed on it & compacted again.

ADVANTAGES:

- * The Initial investment is low.
- * It is the final disposal method.
- * It is the flexible for quality variation.
- * It can receive all kinds of waste.

DISADVANTAGES:

- * In highly populated area, suitable land is not available
- * The Sanitary land filling standards cannot be maintain
- * If provided in residential area, it causes public nuisance
- * A completed sanitary land fill will settle in a uneven manner & requires periodic maintenance.

Q6. Write Short notes on 1) Rain Water Harvesting
2) Biogas Plant

1) RAIN WATER HARVESTING:-

Collection of rain-water from paved or G.I. corrugated roofs and paved court yards for houses either in storage tanks or in the ground water reservoir is known as Rain Water Harvesting.

→ This collected water serves as a good source of water in rural and water scarce areas.

This practise has been adopted since olden times, particularly in rural areas in places having high rainfall, intensity well distributed in the year.

The technique is highly promising even for urban areas and places where the rainfall occurs only for a few months in a year, and where other sources of water are scarce and ground water levels have gone down, such as in Gujarat, Delhi etc.

BIOGAS PLANT :

In rural areas these plants are known as Gobar Gas Plant. Since, cow dung is being used as raw material. In some places, the excreta from toilets is also fed along with cow-dung to these plants. The Gobar gas plant eventually consists of a \odot lar well shaped tank divided into 2 compartments, by one partition wall. It is covered from the top by a cylindrical drum, which collects the biogas.

* One inlet is provided for feeding the charge of cow-dung & one outlet is provided through which digested sludge in the form of rich manure comes out.

* The H_2O is added to the cowdung to form a slurry of 10% solids the slurry is fed with certain preaction related to p^H temperature & chook lands. The gas producing is collected in the cylindrical drum from where it taken for burning, lights etc.,

* Since, cowdung contain 15-25% of total solids & almost 80% moisture with predominance of volatile solids of 80% aggregate the anaerobic digestive on the conversion rate is very high. The digested sludge is rich in nutrients & thus being extensively used in agricultural activities

Q3. List and explain the different methods for conveying storm water and Sullage in rural area.

- * Separate System.
- * Combined System.
- * Partially Combined System.

SEPARATE SYSTEM :

The Separate system provides two separate systems of sewers - the one intended for the conveyance of foul sewage only, such as faecal matter, domestic waste-water, the washing and drainage of places such as slaughter houses, laundries, stables, and the waste water derived from the manufacturing process. The other are rainwater, including the surface washing from certain streets, overflow from public baths and foundation.

The Sewage from the first system of sewer can be led to the treatment works, while the flow from the second system of sewers can be discharged directly to natural streams, without any treatment.

COMBINED SYSTEM :

The combined system provides only one sewer to carry both the foul sewage as well as the rain water. The sewage and rain water are carried to the sewage treatment plant, before its final disposal. The combined footing is advocated on the ground that the street surface washing are as impure as the sewage itself and should therefore be suitably treated before being allowed to enter the natural stream.

PARTIALLY COMBINED SYSTEM :

In this system, only one set of ~~under~~ underground sewer is laid. These sewers admit the foul sewage as well as the early washing by rains. As soon as the quantity of storm water exceeds a certain limit, the storm water overflows and is collected and conveyed in open drains to the natural streams. The foul sewage, however, continues to flow in the sewers.