Q1. What is Wastewater Engineering? Briefly describe its applications in safeguarding the environment?

Wastewater Engineering:

Sanitary engineering, also known as public health engineering or wastewater engineering, which deals with the removal and disposal of the sewage (liquid waste) without causing nuisance to the society by preventing communicable diseases.

Applications in safeguarding the environment:

1. To protect water supply from pollution.
2. To collect and dispose-off the waste of the city.
3. To remove rain water from city/town.
4. To prevent the pollution of water resources.
5. To maintain healthy environment.
6. To prevent the occurrence of disease. Ex: Malaria, typhoid, etc.

Q2. Briefly describe the relationship of wastewater generation with water supply of a locality?

The percentage of wastewater generation generally varies with the local conditions and the time of the year. But approximately 60 to 85 percent of the per capita consumption of water becomes wastewater of a locality.

Q3. What is the importance of wastewater characterization?

Whenever a major wastewater flow needs to be treated, the nature of the contamination present in the water must be determined in order to evaluate the suitability of one treatment over another as they tend to be highly selective as regards the type of contamination eliminated. Characterization of the wastewater, which provides a wide variety of information regarding the type and concentration of the contaminants present, must be carried out to determine the type of contamination.

Q4. Enlist physical, chemical and biological characteristics of wastewater?

Physical characteristics:

1. Turbidity
2. Color
3. Odor
4. Total solids
5. Total suspended solids (TSS)
6. Total Dissolved solids (TDS)
7. Temperature
8. Density & Specific gravity

Chemical characteristics:

1. PH
2. Organic Matter (OM)
3. Nitrogen content
4. Toxics
5. Dissolved Oxygen
6. Chloride contents
7. Fats, Oils and Greases
8. Sulphides, sulphates and Hydrogen gas

Biological Characteristics:

1. Biochemical Oxygen Demand (BOD).
2. Oxygen required for nitrification.
3. Microbial population. (Bacteria, Fungi, Algae, Protozoa, Viruses)
4. Pathogenic microorganisms groups.

Q5. What are the advantages and disadvantages of combine and separate sewerage system? Which sewerage system will you recommend for a new proposed township Support your answer with justification?

Advantages of Separate System:

1. The load on treatment plant is less as only sewage is carried to the plant.
2. The size of sewer is mall, thus economical.
3. When pumping is required, the system proves to be economical.
4. Natural/storm water is not unnecessarily polluted by sewage.

Disadvantages of Separate System:

1. Cleaning of sewer is difficult due to their small size.
2. The self-cleansing velocity is not easily obtained.
3. The storm sewers come in operation in rainy season only.
4. They may be chocked in dry season by garbage.
5. Maintenance cost is high.
6. Sewage sewers are provided below storm sewer which causes greater depth and pumping at waste water treatment plant (WWTP).

Advantages of Combined Sewerage System:

1. Easy cleaning because of larger diameter.
2. Reasonable maintenance cost.
3. Strength of sewage is reduced due to dilution of sewage by storm water.
4. This system requires only one set of sewer making it economical.

Disadvantages of Combined Sewerage System:

1. In storm season sewer may overflow and the sewer may damage causing serious health risks.
2. The combine sewer gets silted and becomes foul in dry days.
3. Load on treatment plant is more because storm water is also carried there.
4. The storm water gets polluted unnecessarily.
5. The system becomes uneconomical when pumping is needed.

Partially Separate sewerage system is recommended for a new proposed township because it combines the advantages of both the separate as well as the combine systems.