NAME	**Salman Ahmed**
ID	**6864**
Section	**B**
Paper	**Waste Water Engineering**
Semester	**8th**

Answer 1-

Wastewater engineering composed of planning, design, construction, and supervision of wastewater systems or waste water treatment plant. It is the study of flow of water (and the design of unit processes) from the development of a source through the unit processes of coagulation, flocculation, softening, reverse osmosis, filtration, sedimentation, granular filtration, membrane filtration, disinfection, and residuals management.

Design criteria are the boundary conditions that establish the functional performance of the facility. Two general types of criteria are used: performance and prescriptive. Performance criteria define the desired objective, but not the means of achieving it. Prescriptive criteria define the explicit details of how the facility will be built. Some of the factors to be considered will differ for water supply and sewer systems.

Six factors are normally considered in establishing the design criteria for water and wastewater Treatment systems:

- Raw water or wastewater characteristics.
- Environmental and regulatory standards.
- System reliability.
- Facility limits.
- Design life.
- Cost.

WASTE WATER TREATMENT IMPACT ON SAFEGUARDING ENVIRONMENT:

- Effluent
- Conventional pollutants
- Source of effluent to the environment
- Impacts of wastewater effluent on the environment

EFFLUENT

Effluent is a liquid waste discharged from a sewage system, factory, nuclear power station, or other industrial plant. Effluent is a wastewater, treated or untreated that flows out of a treatment plant, sewers, or industrial outfall. One of the most serious environmental problems is the existence of hazardous and toxic pollutants in industrial wastewaters. Since most of these wastewaters end up being discharged to the environment, they pose a whole lot of threat to air, water, soil quality which invariably affects the environment as a whole. The following classes of water contaminants include:

1. Conventional pollutants
2. Toxic pollutants (priority pollutants)
3. Non-conventional pollutants
4. VOCs (Volatile Organic Compounds)

CONVENTIONAL POLLUTANTS

- BOD5 or carbonaceous BOD

- (CBOD)
- Total suspended solids (TSS)
- Fecal coliform
- Oil and grease
- PH

IMPACT OF WASTEWATER EFFLUENT ON THE ENVIRONMENT

A major source of pollution in developing countries is industrial activities and this has gradually increased the problem of waste disposal. Increased industrial activities have led to pollution stress on surface water both from industrial, agricultural and domestic sources. Untreated wastes from processing factories located in cities are discharged into inland water bodies resulting to stench, discoloration and a greasy oily nature of such water bodies. Industrial activities and urbanization in developing countries including Nigeria has gradually led to increased problem of waste disposal. Increase in crude oil exploration, refining and activities of other industrial establishments in the Niger Delta has resulted in the wide-scale contamination of most of its creeks, swamps and rivers with hydrocarbon and dispersant products. The major industrial categories in Nigeria are metals and mining, food, beverages and tobacco; breweries, distilleries, textile, leather products, wood processing and manufacture, furniture, pulp and paper industries and chemical and allied industries. Industrial effluents contain toxic and hazardous materials from the wastes that settle in river water as bottom sediments and constitute health hazards to the urban population that depend on the water as source of supply for domestic uses. Nonetheless, the impact of industrial effluent has on the environment is not limited to water bodies alone, rather cut across all portion of the environment. The various component of the environment interact with each other, hence sooner or later, the harm done to the water bodies would soon be felt by the land and the atmosphere. The impact of industrial effluent would be discussed as it affects each components of the environment namely;

a) Impact on the water bodies
b) Impact on the soil
c) Impact on the air
d) Impact on humans, ecosystem and trophic levels

Answer 2-

Waste water generation has a direct relation with water supply of a locality. The more the population of an area, the more will be the water supply for the locality , the more waste will be generated and more efforts will be required to remove the waste water and treat the water.

Answer 3-

Wastewater characteristics of an industry may be only broadly identified. Concentrations of pollutants can vary widely, hence the need for characterization of effluent discharges of specific facilities.
There may be a lot of different material or matters in the waste water so it is important to identify each of them and to treat them accordingly.

For example there may be following matters:

Organic	Inorganic	Nutrient	Other
BOD	Sodium	Nitrogen	pH
TSS	Potassium	(as nitrate, nitrite,	Temperature
FOG	Calcium	ammonia)	Volume
Pesticides	Magnesium	Phosphorus	Frequency
Herbicides	Arsenic	(as phosphate)	
Benzene	Cadmium		
Toluene	Lead		
Arsenic	Copper		

Different methods and chemicals are required to treat these all. Every waste will be treated in a different process in a different stage. That's the reason that it is absolutely necessary to characterize waste water ingredients.

Answer 4-

CHARACTERISTICS OF WASTEWATER		
PHYSICAL	CHEMICAL	BIOLOGICAL
TURBIDITY	COD	BOD
COLOR	SULPHATES	OXYGEN REQUIRED FOR NITRIFICATION
ODOR	TOC	MICROBIOLOGICAL POPULATION
TOTAL SOLIDS	PH	
TEMPERTURE	NITROGEN PHASPHOROUS	
	ALKALINITY	
	HEAVY METALS	
	TRACE ELEMENTS	
	PRIORITY POLLUTANTS	
	CHLORIDES	

Answer-5-

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 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