

SECTION-4

Q. No. 1)
Ans:-

Composting :-

- (i) Composting of refuse is a biological method of decomposing solid wastes.
- (ii) This decomposition can be affected either under aerobic conditions, or under anaerobic conditions, or both.
- (iii) The final end product is machine called the compost or humus, which is in great demand in European countries as fertilizer for farms.
- (iv) Basically, composting is considered to be an aerobic process, because it involves piling up of refuse and its regular turning, either manually or by mechanical devices, so as to ensure sufficient supply of air and oxygen during its decomposition by bacteria, fungi and other microorganisms.

(A) Thermal Conversion Technologies:-

- (a) Thermal processing of solid waste can be defined as the conversion of wastes into gaseous, liquid and

solid production, with or without energy valorisation.

(2) The main objectives in the thermal treatment process of solid waste are the following:

- (i) Destruction of the organic components of wastes, especially the dangerous ones,
- (ii) Reducing their volume.

(3) The thermal methods are a final solution for most of dangerous and non-dangerous solid wastes, when it is not possible to treat them by biological, physical and chemical techniques.

(B) Thermal Methods:

(i) Pyrolysis:

(1) The biomass feedstock is subjected to high temperature at low oxygen levels, this inhibiting complete combustion, and may be carried out under pressure.

(ii) Biomass is degraded to simple carbon molecules (CH₄ and CO) and H₂ producing a gaseous mixture called 'producer gas'.

(2) Carbonization:-

(i) This is an age old pyrolytic process optimised for the production of charcoal.

(ii) During carbonization, most of the volatile components of the wood are eliminated. This process is also called 'dry wood distillation' carbon. accumulates mainly due to a reduction in the levels of hydrogen and oxygen in the wood.

(3) Classification:-

(i) High temperature and a controlled environment lead to virtually all the raw material being converted to gas. This takes place in two stages.

(ii) In the first stage, the biomass is partially combusted to form producer gas and charcoal.

(4) Catalytic Liquefaction:

(i) Catalytic liquefaction is a low temperature high pressure thermochemical conversion process carried out in the liquid phase. It requires either a catalyst or a high hydrogen partial pressure.