1. Addition Polymers → Addition polymers are formed when monomers units are seperately added to form long chain without elimination of any by-product molecules. These polymers are formed by reactions between monomer molecule possessing multiple bonds.

Ex- Ethylene undergoes polymerization to form polyethene.

The Emperical formula of the monomer & polymer are the same

$$n CH_2 = CH_2 \longrightarrow -(CH_2 - CH_2)- n$$

Ethylene → Polyethene

Condensation Polymers - Condensation Polymers are formed when the monomers containing active functional groups (generally two), which react together with the elimination of a small molecule like water, ammonia, alcohol etc.

Ex- Nylon - 66, Polyster, Baketite etc.

2. For, Number Average Molecular weight (M_n)

$$M_n = \frac{(50 \times 10000) + (35 \times 12000) + (15 \times 14000)}{(50 + 35 + 15)}$$

$$M_n = 11300$$

For weight Average Molecular Weight:

$$M_w = \frac{50(10000)^2 + 35(12000)^2 + 15(14000)^2}{(50\times10000) + (35\times12000) + (15\times14000)}$$

$$M_w = 11,486.7$$

Degree of Polymerization:

$$DP = \frac{M_n}{\text{Molecular weight of Polymer}} = \frac{11300}{354.6}$$

$$= 31.6$$

3. The two mechanisms for Carbon Nanotube formation are-

-> Ball Milling (Tip growth Model)
- Powder graphite is placed in a stainless steel container
- Argon gas is used
- Process occurs at room temperatures.
- Powder is then annealed.

-> Chemical vapour deposition (Base - Growth Model)
- Carbon is in gas phase.
- Energy source transfers energy to carbon molecules
- ~~After life~~ ~~After~~ Common Carbon gases: Methane, CO, Acetylene.
- After energy transfer, the carbon molecule binds to substrate.
- Temperature between 650 - 900°C.
- Yield is usually about 30%.
- It is one of the most common methods of c

nanotube synthesis.

4. If a bulk metal is made thinner & thinner, until electrons are confined at single point instead (1, 2 or 3 namely length, breadth & height) is known as a quantum dot.

Nano Particles have all parameters of length, breadth height while quantum dots are confined at single point.

Potential applications of quantum dots include single electron transistors, solar cells, LED's, quantum computing & medical imaging.

7. Portland cement is obtained by heating limestone & clay or other silicate mixtures at high temper (>1500°C) in a rotating kiln. The resultin clinker, when cooled is mixed with gypsum (calcium sulphate) & grown to a highly uniform fine powder.

Anhydrous portland cement consists mainly of lim (CaO), silica (SiO_2), and alumina (Al_2O_3), in addition to small amounts of magnesia (MgO), ferric oxid (Fe_2O_3), sulphur trioxide (SO_3), and other ox that are added as impurities in the raw ma -ial during its manufacture. When these oxides blended together, they form the four basic components of Portland cement, namely tricalci silicate, dicalcium silicate, tricalcium aluminat

4 tetracalcium aluminoferrite.