OMKAR GUJJA 71

Assignment :- 6

Q Explain approach of nanotechnology.

→ The term "nanotechnology" is used to describe a set of technologies that are based on physical, chemical and biological phenomena occuring at nano-scale.

1 nanometer = 10^{-9} m = 10^{-7} cm

Nanotechnology has opened up new worlds of opportunity. It encompasses precision engineering as well as electronics, electromechanical systems and main stream biological, biomedical such as drug delivery and novel drug discovery techniques. It is also used for nanoelectronic devices, quantum wires, electron field emitters for TV screens, nanoprobes, sensors, gas storage, nano device, parts of nanomachine

Two main approaches are used in nanotechnology :-

- In the "bottom-up" approach, materials and devices are built from molecular components which assemble themselves chemically by principles of molecular recognition.

• In top-down approach, nano-objects are constructed from larger entities without atomic level control.

The impetus for nanotechnology comes from a renewed interest in colloidal science, coupled with a new generation of analytical tools such as the atomic force microscope and the scanning tunnelling microscope.

2) What are nano structured materials? Also state their applications.

→ Nanomaterials are chemical substances or materials that are manufactured and used at a very small scale. Nanomaterials are developed to exhibit new characteristics compared to the same material without nanoscale reactivity or conductivity.

Nanomaterials are materials where the sizes of the individual building blocks are less than 100 nm.

(i) Industrial technologies:-

→ It is important to use nanomaterials in composites as components of various functions.

→ In the production of steels and alloys adding nanoproducts helps to reduce porosity and improve the range of mechanical properties

② Military engineering:-
→ Ultra-fine powders are used in a number of radar absorbing coatings for aircraft created with the use of technology "stealth" and promising types of explosives and incendiary.

→ Carbon nanofibres are used in special ammunition intended for the scrapping of the enemy power systems

③ Nuclear power engineering:
→ The beginning of nuclear power engineering was given by ultra-fine powders. These powders are commonly used in industrial process for the separation of uranium isotopes

④ Material surface protection:-
- It is necessary to ensure the high water and oil repellency properties of material surface.

→ Al present the titanium oxide nanoparticle coatings with sizes of 20-50nm and polymer binder have been developed. This coating greatly reduces the wettability of the surface with water, oil, and alcohol solutions.

(v) Medicine and biotechnology:
→ In some cases, targeted drug delivery in cancer therapy with nanorods several issues such as protecting drugs from degrad

(vi) Electronic equipment.
→ Nanotechnology in electronics was given a boost by using carbon nanotubes.

→ Another application is the creation of a new type of hard disk. Also using this in the manufacturing of solar cells can improve their efficiency and reduce cost.