Miscellaneous

- Heavy Water
- 3D Printing / 4D
- Nasco analysis
- Kevlar
- Agent Orange
- Hydroponics
- Neem Coated Urea
- Air Purification
- Drinking water Purification
- Safety of wheels.
- Wireless electricity or Witricity or wireless Charging
- Cyborgs
- High Speed trains — Bullet, Maglev, Tsaul 18
- CFL v/s LED
- TV Technology.
- BIS ⇒ ISI
- Ecomark & Agmark.

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1) Heavy Water (D_2O) - Deuterium Oxide.

used in Drugs & Medicines (Chemical reactions) through deuteration have positive effects

- More effective
- Less side effects.
- Anti-cancer drugs.
- Thermal Stability of Polio

7 Places in India – Heavy Waters Plants

- Baroda
- Kota
- Hazira (Guj)
- Tuticorin
- Thal (Maha)
- Talcher (Odisha)

Management

2) 3D Printer – object printing
- additive manufacturing
- successive layering

Materials used – ABS Plastic
- PLA, polyamide (Nylon)
- Glass filled polyamide
- Silver, titanium, steel, wax, photopolymer
- polycarbonate.

- Modeling → CAD or animation. computer aided design
- Printing & finishing. → will read the design

– Can food be printed by 3D printing → "Foodini"

- Organ Printing / Bioprinting
  - Integrating biology & 3D printing technology.
  - organs can be created by 3D printing.
  - Organovo — first commercial bioprinter company.
  - Stem cell used in these printers.

— Doctor Antiony Atala → printed a kidney — 7 to 8 hours.

4D Printer — based on material
- hydrogel — Polymeric material

3D object

3) Narco analysis / Polygraph test

controlled administration — Hypnotic

truth drugs

Sodium Pentathol / Sodium Amytol.

FEG

~~Brain~~ P-300 test.

ECG.

4) KEVLAR | Bullet Proof Jacket.

Strong & light - resistance to acid

used in body armour - 100 types of plastic polymaterial.

5) Agent Orange : Vietnam War (61-71) 19

herbs and weeds - Soldiers were hiding

50% 2,4 Dichlorophenoxy acetic Acid

50% 2,4,5 Trichloro " " "

↓

Spray on herbs

- Chemical herbicide

6) Hydroponics

1st Green revolution - high use of chemical, machines

↓

2nd Green revolution - GM plants.

↓

3rd Green revolution - Hydroponics - based.

Soil less culture

- dont need soil

only nutrient based

- decreases land use.

7) Neem Coated Urea

Chemical Urea used for productivity
↓
will lead to biomagnification can enter food chain

- Neem oil coating on urea → it becomes easier for decomposition.
  so negates biomagnification
- Subsidy is also targeted as cannot be used in industries.

⑧ Purification - Drinking Water

Contamination by large particles → Soil, sand.
small particles → Bacteria, pathogens, eggs, cist & faeces.

How can we purify?

1) Ultrafiltration (large particles)
2) Reverse Osmosis : selective permeable membrane.
3) UV radiation - for pathogens
4) Ozonolysis

9) Air Purification / Purifier

what are the impurities?

Dust, pollen, dander, mold spores, dust mite feces, allergens.

VOCs - volatile organic compounds.

↓

Cause dizziness, nausea, eye, ear & nose irritation

↓

Sick building syndromes.

In 1950, HEPA - made from maze of random fibres.

→ High Efficiency particulate air filter.

that air is forced through.

absorbes / arrestance / arresting.

2 ways of Purification

Passive
Do not allow to enter the area

Active
Neutralise existing pathogen & pollutants

- Pre-filters — HEPA - Washable - large
- Activated Carbon - VOCs
- Ultraviolet light - neutralizes microorganisms

} air purification is done through these technology.

10) Safety on wheels;

Active
- avoid accident
- Ex: ABS.
- Autonomous Emergency Braking
- Lane departure warning system.
- Heads up display
- Hill start assist / Hill control.
- Electronic Stability Programme
- Pedestrian airbag
- Cruise control.

Passive
- minimize the problems inside the car — Airbags.

11) Wirless electricity / Witricity / Wireless charging

Nikola Tesla was the innovator

founder of A/c or AC current.

Wardenclyffe tower → 1901 - Tesla
tried to send electricity
from America to Europe.

- Magnetic Resonance coupling
  - used to transmit electricity in the houses wirelessly.

11) Cyborg - Cybernetic organism - man-machine system

eg. Neil Harbisson had colour blindness corrected by machines.
first person to be recognised as cyborg.

12) CFL v/s LED

CFL	LED
• Compact florescence lamp	• Light emitting diode
• Mercury	• Organic material
• Environmental Health	• Not an issue
• More electricity	• Less electricity consumption

CFL	LED
• Hotter – less life • Generates UV light + visible light	• Not hot – more life. • visible light

EESL – DELP – May 2015

UJALA – 2016

13) Bullet Trains / Train 18 / High Speed train.

Gatimaan, Duranto, Tejas, Shatabdi – 140 – 160 km/hr.

* Bullet train → not an official word – unofficial name of first high speed train in Japan → at least 200 km/hr average speed.

Curve track.

Tilt technology

Non-Tilt technology → Straight tracks.

Curve tracks doesn't allow high speed.

→ tilt towards the turn.

→ max 250 km/hr speed. It is expensive

Features of high speed trains

- Streamlined tracks
- Aluminium body
- Standard gauge & Slab track.
- Electric power.
- Renewable sources of energy.

* Maglev train — Magnetic levitation. → Electromagnetic effect.
  - Do not need wheel.
  - very lose noise
  - high energy efficiency.
  - very high cost.
  - few countries.
  - no friction so no maintenance.

In India, High Speed Rail Corporation of India (HSRC) formed under Ministry of Rail.

↓

Bullet train India - Japan coordination.

undersea tunnel → 21 km of our route will be underground.

{ US, China, Russia & Japan.

Hyperloop — proposed by Elon Musk.

- pods work on magnetic levitation
- aluminium coil
- Speed of sound.

→ Maharashtra govt & Virgin group to build hyperloop in Mumbai-pune corridor.

- it means low pressure condition in the tube. — Vacuum.
- Frictionless condition. - Maglev.
- 550 km/hr - 1200 km/hr
- decrease the air pressure by compression.

Pune's Hinjewadi demo project.

* First hyperloop train proposed — Toronto - Montreal.
  - not for commercial purpose.
* First commercial project - Los Angeles & San Francisco.
* In India, 2017 - Amaravati to Vijayawada.

14) T. V. Technology

2 type

- CRT - Cathode Ray Tube
- Flat Panel Display

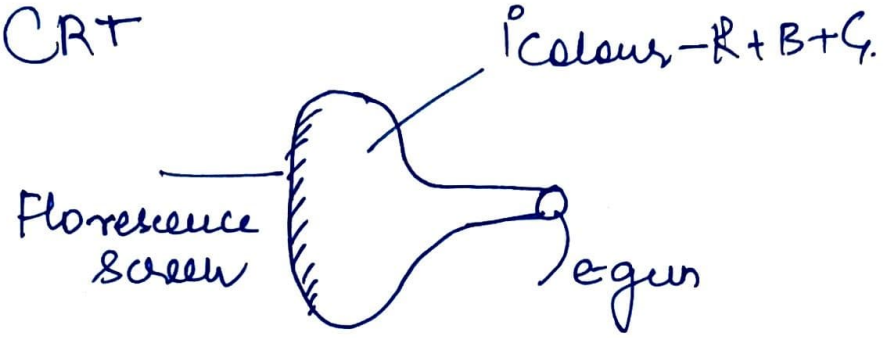
LCD. Plasma LED OLED.

Future

Holography

- Augmented reality.

CRT



Cyan
Magenta
Yellow
kala
} Printing colour

Limitation were overcome by LCD.

LCD

- Big screen
- less electricity
- low luminance

CRT

- large size screen not possible
- consume more electricity
- high luminance

LCD	Plasma	LED.
• Liquid crystal display	Plasma based screen 4th State of matter. (ionized gases form)	Light emitting diode
• B/W LCD & Plasma	— Max electricity in comparision	• Minimum electricity
• Intermediary	• Thickest screen	• Thinnest.
• Any size possible	• Big size only → best image quality	• any size.
- min 60,000 hrs.	— min 36,000 hrs Heat max working time.	— Max 10,000,00 hrs.

— x —

OLED — organic LED. — Flexible material for development of screen

Plastic made material

Thinnest screen. → - Cathode ray light not used.

— power is less.

15) BIS — Bureau of Indian Standard
- national Standard authority
under Ministry of
Consumer Affairs,
Food & public
distribution.

1986 came in Effect.

~~4~~ major activities

1) Standard formulation
2) Certification activities
3) Laboratory testing.
4) Standardization

After ISI it
has taken
its taste
BIS certification

16) Ecomark — environmental friendly product
get this mark
issued by BIS.
16 categories are given
— Ministry of Environment, Forest — under its
ambit.

Agmark — Agricultural marketing by GOI
India based certification.
— confirms control of quality — best hygenic
condition of food.