

Product Development & Design (MP482).  
Assignment II.

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88.

Questions

- ① Identify any one electromechanical device at home and perform a value analysis on it. Use at least 5 criteria and 3 weighting factors.
- ② Detail the ergonomic aspects of the same product. Comment on the possible improvements possible on it.
- ③ With sketches, detail any 2 rapid prototyping processes.

# ①. Harddisk (Electromechanical device).

Criteria :

- safe
- DFM (Design for manufacturing).
- DFE (Design for environment).
- cost.
- Convinced to use.

weighing factors

Major difference : 3

Medium difference : 2

Minor difference : 1.

Paired comparison :

A → safety      B → Convinced to use      C → DFM  
D → DFE      E → cost.

	A	B	C	D	E	Score.
A		A <sub>3</sub>	C <sub>2</sub>	D <sub>2</sub>	A <sub>2</sub>	5
B			B <sub>3</sub>	C <sub>2</sub>	E <sub>2</sub>	2
C				D <sub>3</sub>	C <sub>2</sub>	2
D					D <sub>3</sub>	3
E						2

High speed harddisk (a) } Alternatives.  
Large storage harddisk (b) }

Weighted comparison

	A	B	C	D	E	Score	Rank
weightage	5	3	2	3	2		
Alternative							
a	5x2	3x1	2x1	3x2	2x1	25	1
b	5x1	3x2	2x2	3x1	2x2	22	2

## ② Ease to use

It is portable to anywhere and easy to share data to anyone.

## Ease of maintenance

Since it contains mechanical materials which are easily maintainable. Spares are also available.

## Aesthetic

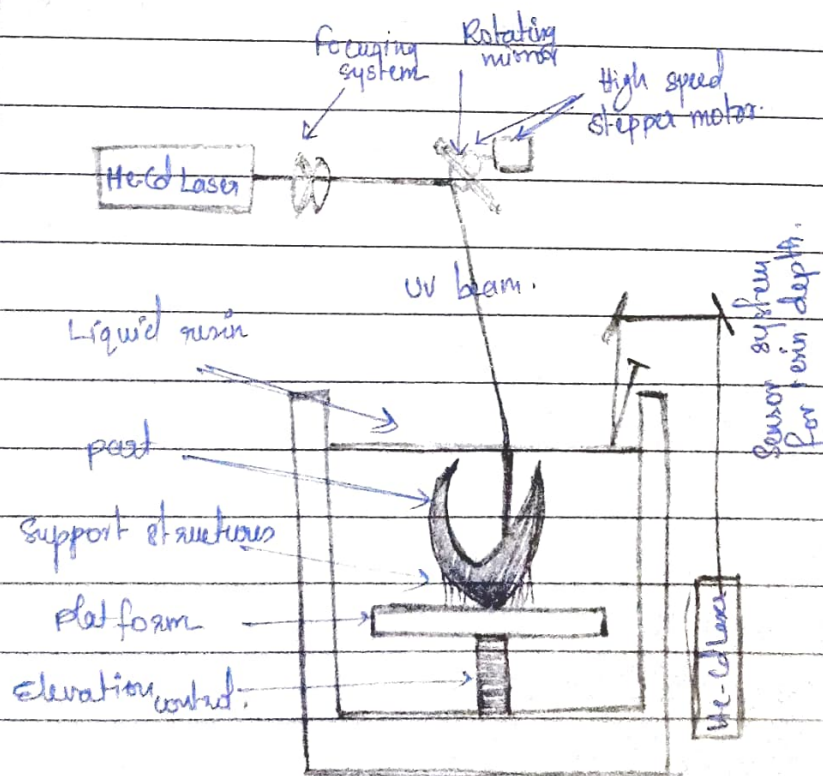
Its structure and parts are user friendly which can be used by a non-technical person.



③ Rapid prototyping technology employs various engineering.

### Stereolithography (SLA)

- (i) Works based on the principle of using liquid photometer into specific shapes.
- (ii) A vat which can be lowered and raised filled with photocurable liquid acrylate polymer.
- (iii) Laser generating UV beam is focussed in xy directions.
- (iv) The beam cures the portion of photo polymer and produces a solid body.
- (v) The process is repeated till the level b is reached as shown in the figure.
- (vi) Now the plat-form is lowered by distance ab.
- (vii) The another portion of the cylinder is shaped till the portion is reached.



# Fused decomposition modeling

- i) A gantry robot controlled extruder head moves in two principle direction over a table.
- ii) Table can be raised or lowered as needed.
- iii) Thermo plastic or wax filament is extruded through the small orifice of heated die.
- iv) Initial layer placed on a foam foundation with a constant rate.
- v) Extruder head follows a predetermined path from the file
- vi) After first layer the table is lowered and subsequent layers are formed.

