

Question 3:-List down the product development phases

- 1- **Understand the opportunity**
- 2- **Develop a concept**
- 3- **Implement a concept**

Question 4:-In product development what is Customer need analysis?

- What do customers want?
- How much are they willing to pay?

Question 5:-What are the major steps of reverse engineering? Define each step briefly?

1. Prescreening

choose a candidate product

2. Observation

Study of the product functionality and specifications Research available literature in order to acquire information about the product under test, Information should be collected, summarized, and analyzed, Test the product and record its functional parameters in the laboratory

3. Dissection

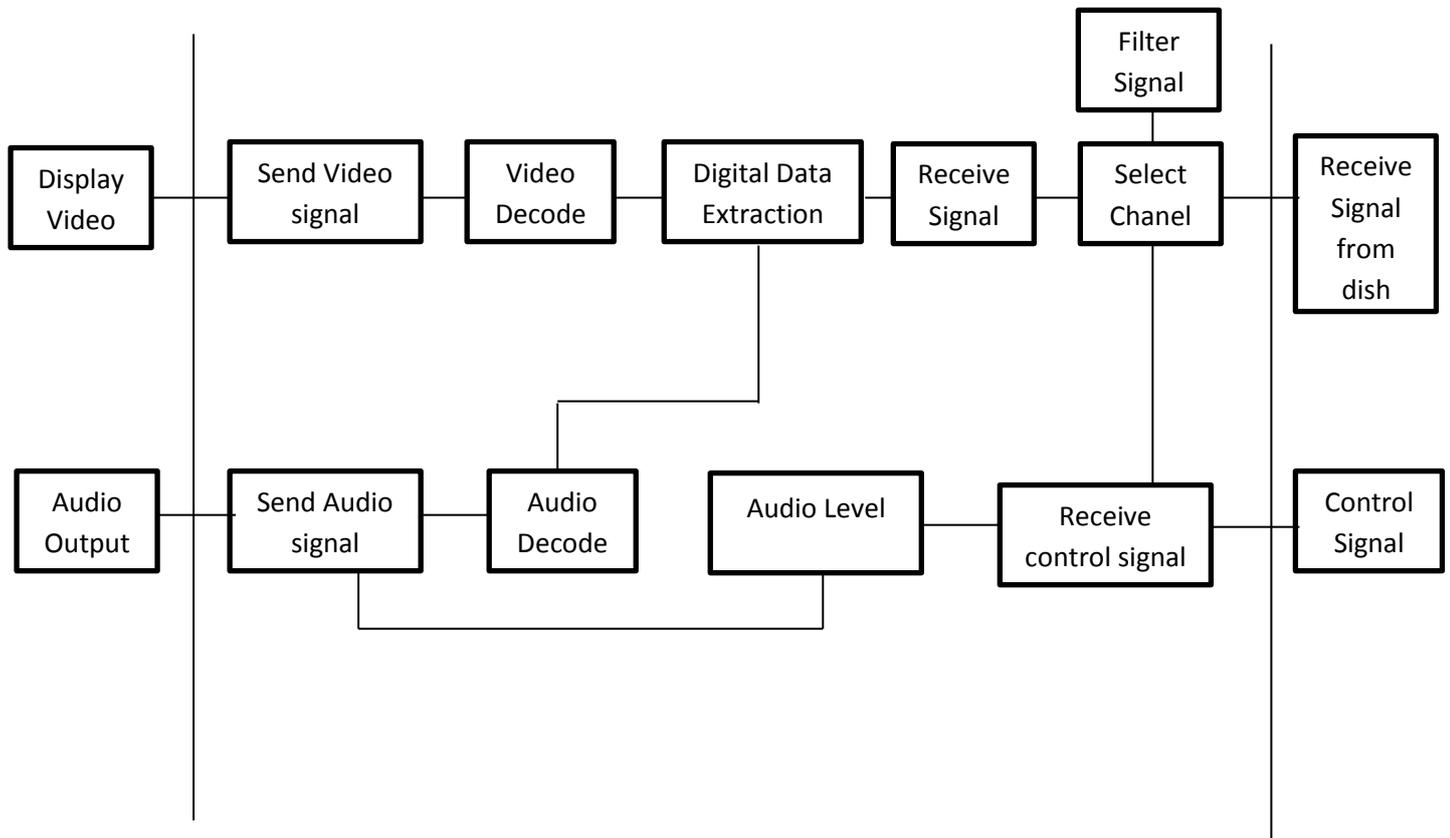
One sample product is disassembled. The other should be left intact and used for comparison later. All the parts and their functionality should be identified. Documents such as Bill of Materials (BOM) and tree diagram should be generated

4. Analysis

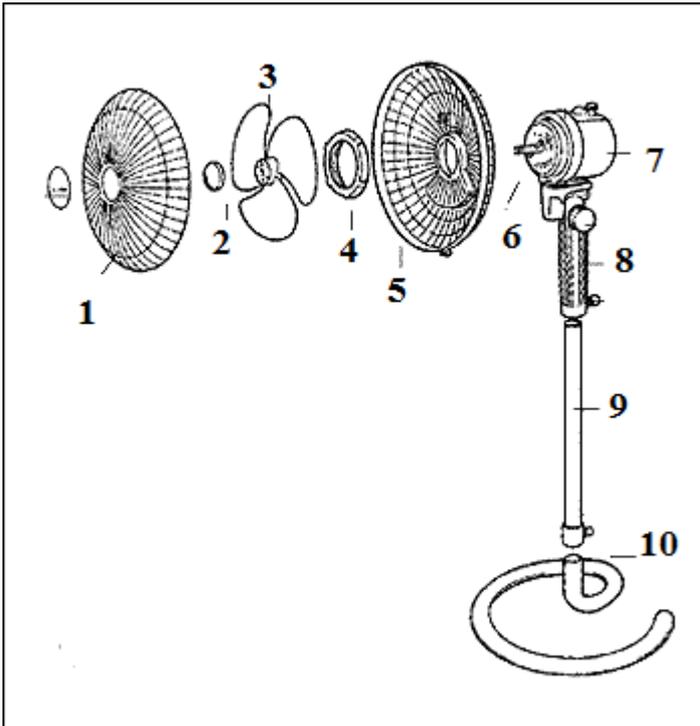
Understand the interface and connections between the subsystems and components Understand the functionality of all subsystems and components draw block diagrams, circuit schematics, and mechanical drawing. It might also involve modeling and simulation

Question 6:-For the digital satellite receiver bellow:

- 1- Draw the black box model and determine the input and output of the system
- 2- Develop a FAST diagram for TV.



Question 7: Given the following exploded view of fan build a single level BOM that describe the parts 1 to 10 with integrated SOP description.



Item#	Qnt	name	material	description	SOP description
1	1	Front Cover	plastic	Protect Blades	Dangerous to user
2	1	Nut	metal	Secure blades	Blades will run out the shaft Assembly will fail
3	1	blades	plastic	Move Air Forward	No air flow No resistance to torque
4	1	washer	metal	Provide gap Secure the Blades	Blades become unstable Blade may collide with rear cover Increase noise and friction
5	1	Rear cover	plastic	Protect Blades	Dangerous to user
6	1	shaft	metal	Transmit torque to blades	Blade won't rotate. No resistance to torque
7	1	motor	metal	Generate rotational movement	Frailer of the system
8	1	Operation keys	plastic	Power on/off Control speed	System will fail No control on speed
9	1	Support column	plastic	Support the system to proper position	The air flow won't reach desired locations
10	1	Base	plastic	Stabilize the system	The system will fall down

Question 8:- For the house of Quality diagram bellow for Power Screwdriver answer the following question

	Relative importan	Low weight of SD	Geometry of chuck	Few componenets	Battery capacity	Speed of spindle	Power Base PB36
The SD allows one-hand grip	4	●	○	○			4
The SD can access narrow areas	2		●	○			3
The SD can be locked in order to use manually	2		●	●			1
The SD maintains power for several hours	4				●		1
The SD drives screws faster than by hand	5		○	○		●	2
Technical difficulty	4	3	2	3	2		
Measurment units	kg	m	nr	min	rpm		
Object target values	0,3	0,02	22	10	150		
Objective measures	0,4	na	na	3	140		

1- What is the most important Design requirement that should be improved with respect to customer requirement and market needs? Justify your answer

Low weight of SD, due to its strong correlation to customer requirement "the SD allows one hand grip" which have a high importance to customer and due to competitor achievement in this requirement.

2- What is the Effect of Battery Capacity on the customer requirement "The SD allows one-hand grip"? Suggest a solution.

Battery capacity will affect "The SD allows one-hand grip" in a negative manner since the increase of battery capacity will increase the weight of SD and hence have a negative impact on customer requirement "The SD allows one-hand grip".

Solution:- try to find other kind of battery that can have greater capacity with lower weight.