

IE301 Product Design and innovation

Exercise (3) [Product Function Modeling]

- 1- *Decompose the problem of designing a new barbecue grill. Try a functional decomposition as well as a decomposition based on the user interactions with the product.*
- 2- *For the ballpoint pen shown in figure (3.1) , carry the following*
 - a- *Identify main and support functions of ballpoints and its components*
 - b- *Develop decomposition diagram considering user interaction and customer need*
 - c- *FAST diagram*

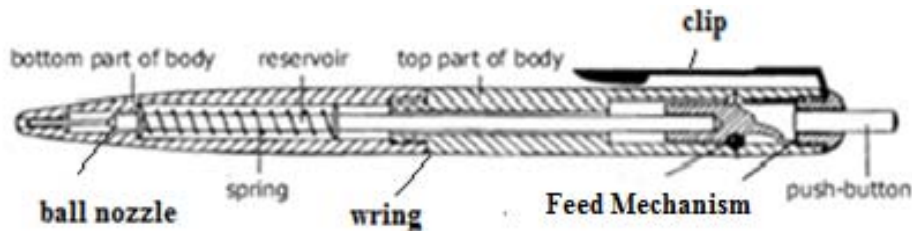
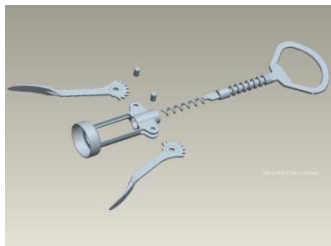


Figure 3.1: A ballpoint

- 3- *For the products shown in figure (3.2) , carry the following for one product.*
 - a) *Identify main and support functions of ballpoints and its components*
 - b) *Develop decomposition diagram considering user interaction and customer need*
 - c) *FAST diagram*



Line art drawing of a dry cell:

1. brass cap,
2. plastic seal,
3. expansion space,
4. porous cardboard,
5. zinc can,
6. carbon rod,
7. chemical mixture.

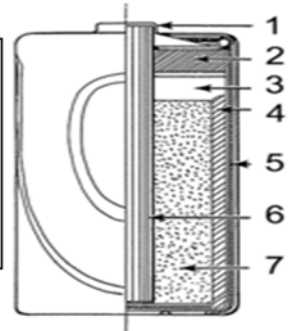


Figure 3.2a: A bottle Opener

Figure 3.2b: A battery



Figure 3.2d: A Nail Clipper



Figure 3.2c: A Utility Knife



Figure 3.2d: A Can Opener



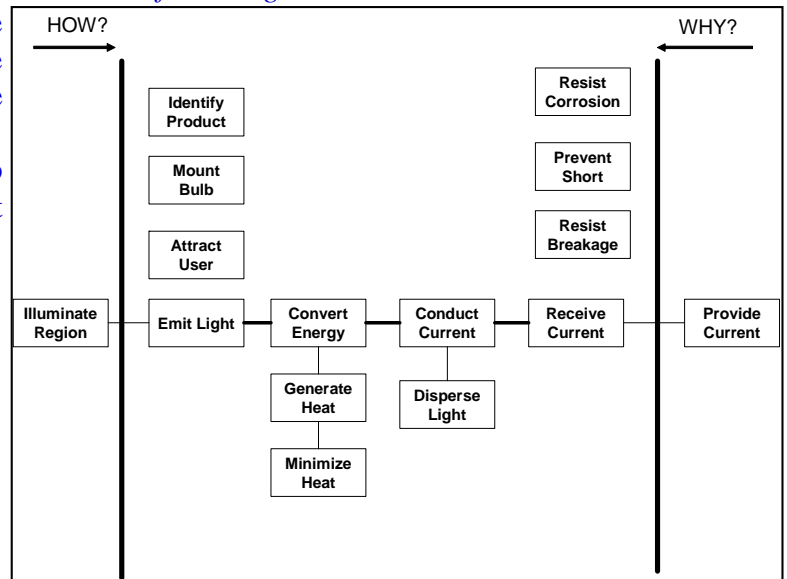
Figure 3.2e: A Wash Peg

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Exercise (3) [Product Function Modeling]

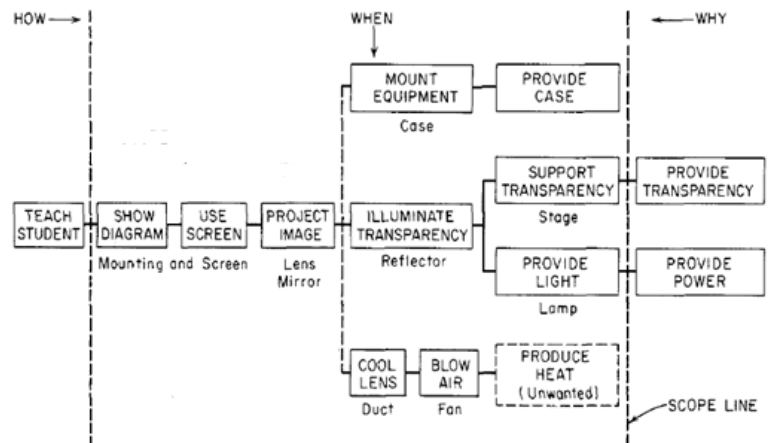
4- Using the shown **Light Bulb Technical-FAST** answer the following:

- Given that the customer has installed the Light bulb properly, what should the customer do in order to “Illuminate Region”?
- Which function or functions of the Bulb should fail such that the Light bulb will not illuminate region?
- Which functions could be used as performance measures for the purpose of quality control?
- What effects does moving the function “Resist Breakage” from the right side of the FAST to the Left side (beneath “Mount Bulb”), have on the way this function will be dealt with?



5- Using the shown projector technical-FAST diagram answer the following:

- If the projector has installed properly, what should be done in order to “teach student”?
- Which the function or functions of the project fail so that image will fail to appear?
- Which functions could be used as performance measures for the purpose of quality control?
- Indicate on the FAST diagram, the critical path and secondary path?



6- In analyzing a product, the following table is

used to connect components with the functions to which they contribute and hence identify areas of focus, determine: [3m]

- The total values indicated by arrow in the table and Fill the value in the corresponding cell.
- How can you decide on improvement requirement?

Pen Components	Total Component Cost ↓	Total Function value →	Functions of Pen					Total Value of function for component ↓
			F1	F2	F3	F4	F5	
P1					10	30	30	
P2				40	15	20	10	
P3			70	7	9	5		
P4			50	12	20		10	
P5					70	10		
			60	30		90	20	
Total cost of function →								

Component cost

Function value