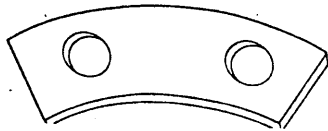


QUESTIONS TO DEVELOP DEPTH UNDERSTANDING OF  
VALUE ANALYSIS AND ENGINEERING APPROACHES AND TECHNIQUES

\* Indicates new, or part-new within past ten years

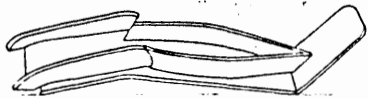
1. What is Value Analysis, or Value Engineering trying to do?  
a- How is it trying to do it?  
b- What is its approach?
4. What constitutes value in a product or service?
5. Who causes good value, or poor value, in a product or service?
6. How do the approaches reduce cost without lowering quality?
- \* 7. What four separate and distinct types of thinking are included in the VA disciplined thinking system?
8. What is USE function? Give three examples.
9. What is AESTHETIC function? Give three examples.
10. What is BASIC function? Give three examples.
11. What is a SECONDARY function? Give three examples.
12. Name: a-, the basic function of a wheelbarrow  
b-, two secondary functions in one you have in mind  
c-, one way you could eliminate all cost for the secondary functions you name, still provide all of the customer's needs and wants.
13. Name five functions in two-word verb-noun names, which cannot be stated in numerical measurements.
14. Name five functions in two-word verb-noun names, which can be stated in numerical measurements.
15. What is meant by evaluating a function in dollars?
16. Basically, how is a function evaluated?
17. How are interacting functions evaluated?
18. a-, Name a function in a product that can be evaluated by published data.  
b-, Tell how it would be done.
19. Name the basic function in the following problem.  
Tell how it would be evaluated.



12. Counterweight balance. Steel; cut from ring of  $\frac{1}{4}$ -inch steel, 1 inch across; each segment mounts on two studs; pieces approximately 3 inches long. 5,000 per year; 40 cents each. Mounts on large ring for counterbalance purposes.

- \* 20. What is meant by "Problem Setting"?
- \* 21. How is function study involved in "Problem Setting"?
22. What is the purpose served by sometimes separating, sometimes grouping the functions of a product or service?
23. Name, in a useful way, the principal function groups which might be required in a domestic vacuum cleaner.
24. What is the problem solving system of value analysis?
- \* 25. What do you understand "Mind Tuning" to mean?
- \* 26. a-, Why is mind tuning difficult?  
b-, Why is it essential?
27. Name a product or service in your recent experience and list twenty types of information, which you secured.
28. a-, When are assumptions handled?  
b-, How are they handled?

- \* 29. In analysis thinking, what types of studies of function are made?
- \* 30. What is the output of analysis thinking?
- 31. How do you develop the specific cost probably obtainable before starting creativity?
- 32. What are the most important basic requirements for good creative thinking?
- 33. What is the specific output of good creative thinking?
- 34. What characterizes, a-, poor Judgement Thinking?  
b-, good Judgement Thinking?
- 35. What is the specific output of good Judgement Thinking?
- \* 36. Name and explain one of the VA Decision Matrixes.
- \* 37. What prepares the manager to effectively plan for, arrange for, and expedite implementation.
- 38. Give basic steps of one system for achieving prompt implementation.
- 39. Where do roadblocks, which stop or impede the improvement of value, show up?
- 40. Identify five common situations in which roadblocks and thinking on a subject.
- 41. Name five "Generalities" which often stop thinking.
- 42. Name three ways to end action-blocking by a generality.
- 43. Name three significant difficulties often encountered in getting good costs, and properly interpreting them.
- 44. Name three effective criteria which might be used to determine who was the Best Source, or accurate and useful facts on some situation.
- 45. Name five "Best Sources" for information to use in improving the value in the following problem. Performance is already good.



19. *Bronze arcing horn.* 15 inches long by 2 inches wide; fabricated from formed sheet brass by brazing; other dimensions approximately as illustrated; 3,000 per year; \$6.50 each. Function is to cool an arc so it will extinguish.

- 46. Name three situations in which you would call in an industry specialist, to bring specialized knowledge and assistance.
- 47. A-, What do you tell and show an industry specialist, invited to assist you.  
b-, What would you expect of him?
- 48. Name four reasons why persons are sometimes too reluctant to call industry specialists for knowledge and help.
- 49. Name three ways of paying a vendor for the contribution of his skills and knowledge.
- 50. How would you search for a specialized process or material, which would, if it existed solve your problem, but which was as yet unknown to you?

ANSWERS TO THE 50 QUESTIONS

1. End all costs which do not contribute to Use or Aesthetic functions which the customer wants.
2. By a depth study of all functions and the creative development of alternatives which would produce them.
3. To study functions. Identify them, classify them. Separate them. Group them. Create specific problems then solve them.
4. Good quality with costs as low as or a little lower than competition.
5. Good value is caused by getting a little better answers than competition does.
6. By concentrating on the functions which the customer wants, getting them for competitive cost, and eliminating costs which are not essential to customer function.
7. Information development, Analysis, Creative, Judgement.
8. USE function is the utilitarian function the customer gets from the product or service. Electric range - cooks food. Broom - cleans floor. Bottle - contains liquid.
9. Aesthetic Function is the function which pleases the customer, but does nothing utilitarian for him. Jewelry - the appearance. Toaster - the external shape and surface treatment. Furniture - the attractive graining of the wood.
10. Basic function is the function for which the customer buys the product or service. Pencil - make marks. Refrigerator - Preserve food. Automobile - transport people. Neck Tie - conform to custom.
11. A Secondary function is a function required to cause the means which has been chosen to accomplish the basic function to work. If steel is used to accomplish the basic function, painting or plating to prevent rust is a secondary function. If electronic gear is chosen for the basic function, protecting it from dust and water becomes a required secondary function. If a motor is used for the basic function, the mounting of it is a required secondary function.
12. a. Transport material.  
b. Paint the wood handles for preservation.  
Lubricate the wheel occasionally.  
c. Make the handles of stainless steel.  
Provide lifetime sealed-in lubrication.
13. Support chair. Cut log. Clean face. Melt steel. Cook food.
14. Conduct current. Support weight. Enclose volume. Transmit torque. Provide heat.
15. Determining the probable lowest cost which, considering the present state of the art, and the opportunities for creativity will probably provide it.
16. By comparisons.
17. By first arranging them in suitable order, then evaluating from the top of the list, taking into consideration the solutions of the upper functions as each succeeding one is evaluated.
18. Conduct current in wire.  
Evaluate by determining the cost of the minimum amount of copper which would conduct that amount of current that distance. Same for aluminium. Same for Iron, or other materials.

19. Provide weight. Compare to the lowest cost way to provide that amount of weight. A chunk of steel, lead, concrete etc.
20. Studying the problem enough. "Heart" of the problem or problems become obvious, then stating the problem in words pointed directly at the needed solution. If the problem has more than one only semi-related parts, each is stated separately and in words which promote creativity. Amount of accomplishment needed is determined.
21. Entire problem is put into function and cost terms. Functions are separated, grouped, evaluated, classified. It is determined what costs it is expected to achieve for the main functions, then problems are set directly pointed at those solutions.
22. To get the functions which logically form one creative problem into one problem.
23. Provide power. Provide suction. Separate dust from air. Provide convenient handling. Please the housewife.
24. First a "Mind Tuning" so that exactly the right and the same problem is in the mind of each, then four kinds of thinking, one at a time, each thoroughly done before the other is started. Information development. Analysis. Creativity. Judgement.
25. Involving each of the "Work Group" enough with the question "Exactly What am I Trying To Do", so that all work on exactly the same problem at the same time.
26. a. Experience shows that each in a group have a somewhat different idea and "feeling" about the problem. It is difficult to get them to modify it enough to be in perfect harmony with others in the group. But it can be done.  
b. The full mental impact of the minds on the problem is only secured if all are trying to reach exactly the same objective at the same time. Thinking moves faster, and more effectively.
27. A terminal. How much current? How put on? When put on? Where is product used? When was it designed? When was design last reviewed? What terminal vendor was asked to look at it? What did he suggest? Why that shape? Does it have to be removed or replaced? How is it made? Why is it needed? Why its shape? What quantity per year? What size of manufacturing lot? Is appearance essential? How often is it removed? Has mechanical instead of soldered construction been studied? Is its thickness for mechanical strength or conductivity? What simpler shape has been tried?
28. a. During Information Development.  
b. Items thought to be fact are re-studied to determine if they are indeed fact, or assumption. In areas where facts are not known, but more criteria would be helpful, thinking develops some criteria that are probably true. These are tested, and problem solutions are promoted by them, always bearing in mind that they are probable truths, not sure truths.
29. Same answer as question 21.
30. A sense of magnitude and direction. The problem "Set" in one or more precisely worded problems, ready for Creative thinking, usually beginning with "How might we -----".
31. During Information and Analysis Thinking. Functions are evaluated. Differing approaches are considered. The extent of the need is determined. "What it makes sense to accomplish" is established from all of these factors.

32. A no-negative environment. Complete deferred judgement. People who have pre-learned how to contribute in a "Creative study". A good leader who will stop the judging that always comes. Generally all of the same administrative level. No bosses. Some with a background of knowledge in the field.
33. A long list of "Idea Seeds". That is, differing approaches to the problem or some important part of it, which will serve to start thinking along that line in the Judgement step.
34. a. A group of people going over the list of seed ideas from creativity "crossing out" those that are not practical.  
b. One person, two at the most, going very slowly thru the list, stopping at each item, with some real thought, "What new direction might that take our investigations into"? Followed by "How can we improve or expand each suggestion"? Next, selecting some of the best which would meet the needs of the problem and "How can we minimize the objections and maximize the benefits from those solutions"?
35. A usable approach which would meet the performance and cost needs of the problem, pending tests, and perhaps some more extraneous knowledge which might make it into an even better solution.
36. One from England. Desirable factors are listed and arranged in order of most important. They are given numbers accordingly - highest is best. Alternatives with costs are listed. They are arranged on a grid. Numerical multiplications and additions are made to indicate true relationships. Final decisions are assisted by the information in this form.
37. If the manager has followed the newer Value Engineering "Manager Guidance Program" he has reviewed the project at each step of disciplined thinking. After Information. After Analysis and problem setting. After Creativity. After Judgement. So he is well informed now to promptly and efficiently manage the implementation.
38. Manager needs the implementation to meet his profit objectives. He assigns it. He sets progress dates. He reviews it on each progress date, or by exception, at any time progress is behind schedule. He arranges for any un-expected difficulty to be immediately referred to the VE men who did the work, for their further attention. He is well informed because of his familiarity with the project due to the "Manager Guidance program".
39. Everywhere.
40. We tried it before. We will never use plastic. We will not "Cheapen" the product. That product area has been thoroughly studied, we won't waste time on it now. Cost is not important on this project, we are dealing with lives.
41. We make it ourselves. We can't depend upon any one else for the quality we need. Our costs are lower than anyone else's. Every time we've changed that, we've gotten into trouble. Treated wood is the cheapest material for that type of parts.
42. Get some solid information. Show a similar task which a competitor handles by the blocked method. Invite a vendor to "Show and Tell" in the blocked area.

43. Costs are often not prepared to provide meaningful information for comparing alternatives. Cost people know the misleading nature of costs if they are used in a manner for which they are not suited, and are reluctant to give them out. Meaningful costs may not be available, may not have been put together.
44. Does this person know more about this situation than any one else in the country - at least as much? Has this person had responsibility which brought him into possession of the facts. Is it in the area of responsibility of this person to know all that is available about this situation?
45. A bronze casting specialist. A brazing specialist. A fabricated bronze specialist. A specialist on quenching electric arcs. A welding specialist.
46. A terminal problem. A miniature casting need. Probable application for a high performance plastic.
47. a. Everything about the functions required, the limitations, the alternatives he is competing with, the quantities and the potential. Do not give him competing costs.  
b. I would expect him to show and quote on his materials processes and products for accomplishing the functions. Also perhaps some approaches which did not use his services but which might help me to good solutions of my problems.
48. The feeling that it is a weakness to ask for help. A belief that a persons manager would down-rate him for not being able to solve all of his own problems. A management policy or practice of not calling in assistance. A belief that it was unsafe to let anyone outside of the company know what the company was working on.
49. Buy from him, in the field of the work. Buy from him some extra in other fields. Pay him a lump sum for his contribution.
50. I would search in research and development areas in fields close to it. I would make my needs known to several men in research work in fields which might have such process or material in development. I would avidly read new process and new product publications to find, either a product similar to it, or the name of a company doing research work in a field near to it.