Operations Research

1. Operations research is the application of scientific method to the study of alternatives in a problem situation, with a view to providing a quantitative basis for arriving at an optimum solution in terms of the goal sought.

2. OR is the application of the scientific method to management problems that can be expressed in quantitative terms. The method used is the construction of mathematical models that permit comparisons of alternative courses of action and determination of the course that will bring optimum results. Its purpose is to aid the executive in decision making.

3. OR is the use of the scientific method to provide criteria for decisions concerning the actions of people, machines and other resources in a system involving repeatable operations.

In the three definitions of OR note the key words - scientific method, quantitative, model, comparison, optimum and decision making.

Operations Research (OR) is an outgrowth of Frederick Taylor's Scientific Management movement. OR makes great use of sophisticated mathematical techniques. It is synonymous with operations analysis and management science, but it differs from industrial engineering in that it uses an interdisciplinary approach, that is it employs teams of experts so that all aspects of a problem may be taken into account.

OR has proved most successful where all the factors in the problems can be quantified. OR relies heavily on higher mathematics and the use of computers.

Important concepts in OR are the concept of a system and the concept of optimum.

In OR, a system is a set of interacting variables, but each system is part of a larger system. For example, a single bureau is a system in which the variables include the procedures, the equipment, the organization structure and the people. Changes in procedure may make it necessary to get new equipment or to change the organization structure or it may affect workers' attitude or make it necessary to learn new skills. If some of the people quit, it may be necessary to hire others with lower skills - this may then require changes in procedure, equipment, or in organization structure. Any change in any one of the variables is likely to affect the others. A Bureau is part of a larger system - the Department as a whole; any change in it is likely to affect at least some of the variables in other Bureaus.

System Analysis uses many of the same procedures as OR but System Analysis is merely the analysis of a system to identify the controllable and uncontrollable variables and to determine how the system actually operates. System Analysis is often a part of OR.

Optimum solution is the one that either maximizes the overall gains or minimizes the overall losses in a given situation. This is the solution an executive tries to arrive at when he weighs possible courses of action. OR is used to help determine this optimum by reducing the many variables to mathematical terms, which will sometimes represent actual numbers and sometimes mathematical probabilites.

OR is particularly useful in problems concerning:

1. allocation
2. inventory
3. routing
4. replacement
5. queuing (waiting lines)
6. sequencing and coordination
7. search (how much information to acquire)

Steps in OR problem solving:

1. Formulate the problem
2. Develop a hypothesis
3. Derive a solution to the problem
4. Test the solution
5. Establish a system of controls over the solution to see that all elements of the plan are working as expected.

The difference between the above steps and normal problem solving is that the hypothesis is generally expressed as mathematical model and the solution may be derived by mathematical procedures above. In most cases where a scientific method is used OR uses experimentation particularly with the terms used in the mathematical model.

Quantitative Analysis - OR Techniques

Quantitative Analysis differs only subtly from OR. It is a study of mathematical models which describe various operations. The purpose is to maximize productivity and minimize costs. The following QA techiques are also OR techniques.

Linear programming makes it possible to select the optimum when there is a large number of variables, each of which may be given any one of a number of different values. The relationship between the variables must be linear that is, a change in one variable must produce a proportionate in another. For example, the relationship between hours worked and output is often a linear one, a 5% increase in work hours will often mean a 5% increase in output.

Nonlinear programming: solves problems in which the relationships among the variables are not linear.

Simulation: especially applicable to "what if" problems - Often uses a mathematical model in which each of the terms represents one of the variables and to observe the effect on the others when different values are given to one or more of the terms.

Monte Carlo method: a method of obtaining an approximate solution to a numerical problem by the use of random numbers.

Random Walk method: a variance - reducing method in which experimentation with probabilistic variables is traced to determine results of a significant nature.

Queuing or waiting line: since people or objects form the queue at random times and service time also varies a table of random numbers is used to simulate the situation at various times.

Networking: techniques used in critical-path scheduling and PERT where project involves thousands of steps - uses higher math and computers to manipulate crew sizes, slack times, etc. to best advantage.

Game Theory: provides a basis for determining, under certain specified conditions, the particular strategy that will result in maximum gain or minimum loss no matter what opponents do or do not do.

Decomposition: used when a problem is very complex and it is impossible to start solving as a whole in the beginning. The solution from one part is used as input to a second part and the output of the last part may be used to reevaluate one or all of the partial solutions.

Convex programming: a particular case of nonlinear programming in which the function to be maximized or minimized and the constraints are appropriately convex or concave functions of the controlled variable.

Dynamic programming: a procedure by optimization of a multistage problem solution wherein a number of decisions are available at each stage of the process.

Integer Programming: a class of procedures for locating the maximum or minimum of a function subject to constraints, where some or all variables must have integer values.

Mathematical programming: a procedure for locating the maximum or minimum of a function subject to constraints.

Quadratic programming: a particular case of nonlinear programming in which the function to be maximized or minimized is a quadratic function and the constraints are linear functions.

Less sophisticated techniques are:

Critical path scheduling: a method of scheduling work by means of diagrams that show which jobs must be completed before other jobs can be started. Jobs are indicated by arrows hence also called arrow diagramming.

Gantt chart: a chart on which progress in the various parts of a project is plotted against time.

PERT: Program Evaluation Review Technique. A more elaborate version of the critical path technique which takes more factors into account.

PRACTICE QUESTIONS OPERATIONS RESEARCH, MANAGEMENT ANALYSIS, QUANTITATIVE ANALYSIS

1. With a management staff of 15 capable analysts which of the following organizational approaches would generally be best for over-all results?

   (A) Organization by specialists in fields, such as management, organization, systems analysis.
   (B) Organization by clientele to be served, such as hospitals, police, education, social services.
   (C) Organization where all 15 report directly to head of the management staff.
   (D) Organization by specialized study groups with flexibility in assigning staff under a qualified project leader.

2. In conducting a general management survey to identify problems and opportunities which of the following would it be least necessary to consider?

   (A) Identifying program and planning deficiencies in each functional area.
   (B) Organization problems.
   (C) Sound management practices not being used.
   (D) The qualifications of the supervisory personnel.

3. Which of the following statements most accurately defines "operations research"?

   (A) A highly sophisticated system used in the analysis of management problems.
   (B) A specialized application of electronic data processing in the analysis of management problems.
   (C) Research on operating problems.
   (D) The application of sophisticated mathematical tools to the analysis of management problems.

4. Theoretically, an ideal organization structure can be set up for each enterprise. In actual practice the ideal organization structure is seldom, if ever, obtained. Of the following, the one that is of least influence in determining the organization structure, is the

   (A) existence of agreements and favors among members of the organization
   (B) funds available
   (C) growing trend of management to discard established forms in favor of new forms
   (D) opinions and beliefs of top executives.

5. To which one of the following is it most important that the functional or technical staff specialist in a large organization devote major attention?

(A) Conducting audits of line operations.
(B) Controlling of people in the line organization.
(C) Developing improved approaches, plans and procedures and assisting the line organization in their implementation.
(D) Providing advice to his superior and to operating units.

6. In the planning for reorganization of a City department, which one of the following principles relating to the assignment of functions is <u>not</u> correct?

(A) Line and staff functions should be separated.
(B) Separate functions should be assigned to separate organizational units.
(C) There should be no disturbance of the previously assigned tasks of personnel.
(D) There should generally be no overlapping among organizational elements.

7. Results are best accomplished within an organization when the budgets and plans are developed by the

(A) budget office, independent of the operating units
(B) head of the operating unit based on analysis of prior year's operations after discussion with his superior
(C) head of the operating unit with general guidelines and data from higher authority and the budget office, and input from key personnel
(D) head of the organization unit based on an analysis of prior year's operations.

8. The "management process" is a term used to describe the responsibilities common to

(A) all levels of management
(B) first line supervisors
(C) middle management jobs
(D) top management jobs.

9. Of the following, committees are best used for

(A) advising the head of the organization
(B) improving functional work
(C) making executive decisions
(D) making specific planning decisions.

10. Which of the following would not be a part of a management control system?

(A) An object test of new ideas or methods in operation.
(B) Determination of need for organization improvement.
(C) Objective comparison of operating results.
(D) Provision of information useful for revising objectives, programs, and operations.

11. Of the following, the one which a line role generally does not include is

(A) controlling results and performance
(B) coordinating work and exchanging ideas with other line organizations
(C) implementation of approved plans developed by staff
(D) planning work and making operating decisions.

12. In a normal curve, one standard deviation would include most nearly what percentage of the cases involved?

(A) 50%
(B) 68%
(C) 95%
(D) 99%

13. "The Office Layout Chart is a sketch of the physical arrangments of the office to which has been added the flow lines of the principal work performed there." Which one of the following states the best advantage of superimposing the work flow onto the desk layout?

(A) Lighting and acoustics can be improved.
(B) Line and staff relationships can be determined.
(C) Obvious misarrangements can be corrected.
(D) The number of delays can be determined.

14. An advantage of the Multiple Process Chart over the Flow Process Chart is that the Multiple Process Chart shows the

(A) individual worker's activity
(B) number of delays
(C) sequence of operations
(D) simultaneous flow of work in several departments.

15. Of the following, which is the major advantage of a microfilm record retentions system?

(A) Filing can follow the terminal digit system.
(B) Retrieving documents from the files is faster.
(C) Significant space is saved in storing records.
(D) To read a microfilm record, a film reader is not necessary.

16. Which one of the following questions should the management analyst generally consider first?

(A) How is it being done? and Why should it be done that way?
(B) What is being done? and Why is it necessary?
(C) When should this step be done? and Why?
(D) Who should do the job? and Why should he do it?

17. Assume that you are in the process of eliminating unnecessary forms. The answer to which one of the following questions would be least relevant?

(A) Could the information be obtained elsewhere?
(B) Is the form properly designed?
(C) Is the form used as intended?
(D) Is the purpose of the form essential to the operation?

18. Use of color in forms adds to their cost. Sometimes, however, the use of color will greatly simplify procedure and more than pay for itself in time saved and errors eliminated. This is especially true when

(A) a form passes through many reviewers
(B) considerable sorting is required
(C) the form is other than a standard size
(D) the form will not be sent through the mail.

19. Of the following techniques, the one generally employed and considered best in Forms Design is to divide writing lines into boxes with captions printed in small type

(A) centered in the lower part of the box
(B) centered in the upper part of the box
(C) in the upper left-hand corner of the box
(D) in the lower right-hand corner of the box.

20. The type of chart illustrated below is generally known as a

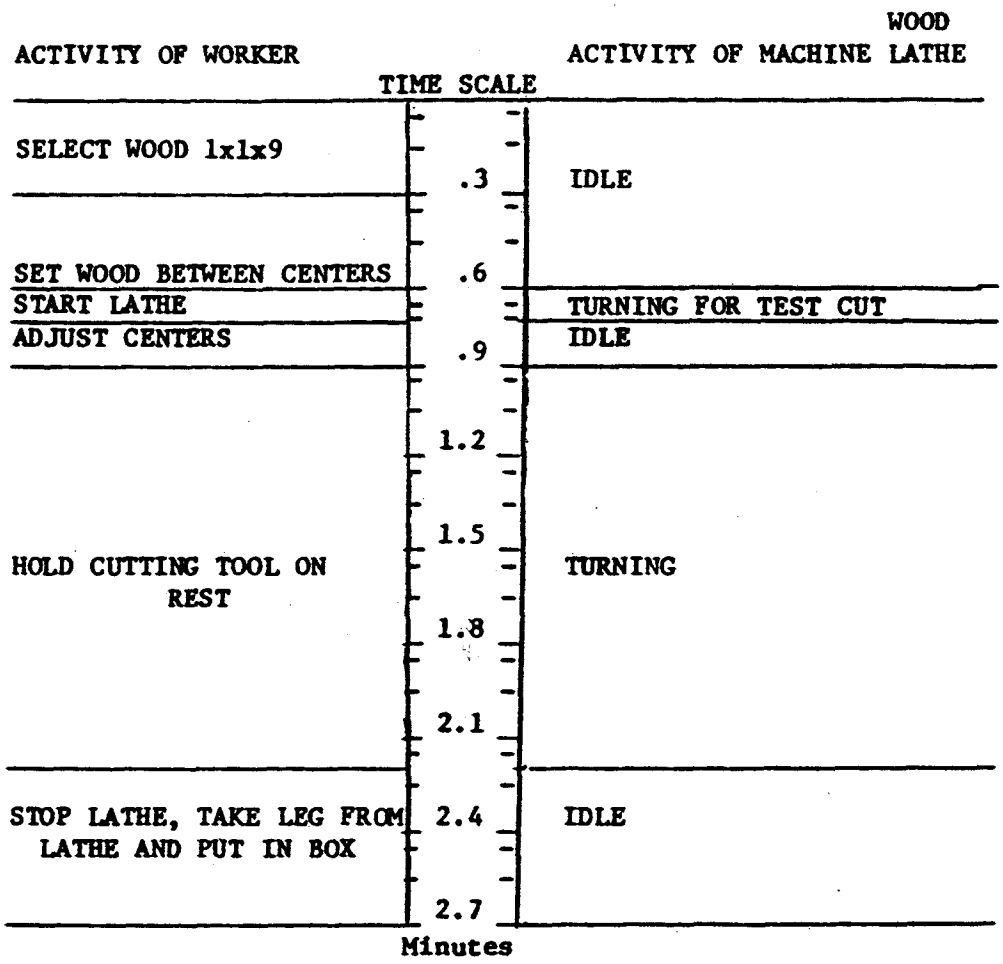
(A) Flow Chart
(B) Gantt Chart
(C) Work Simplification Chart
(D) Motion-Time Study Chart.

MONDAY

NAME OF WORKER	1st Hour	2nd Hour	3rd Hour	4th Hour	5th Hour	6th Hour	7th Hour	8th Hour
J. Jones	100 100	25 100	150 150	150 75	150 150	150 175	150 150	150 150
B. Brown	20 10	25 20	25 25	25 25	25 20	25 25	25 25	25 25
R. Roe	60 120	60 80	30	20				

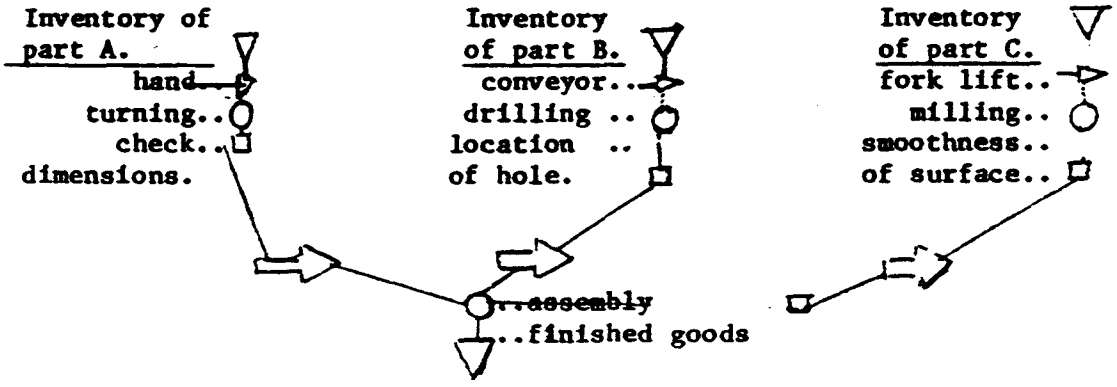
21. The type of chart illustrated below is generally known as a

(A) Flow Chart
(B) Gantt Chart
(C) Simo Chart
(D) Work Simplication Chart.



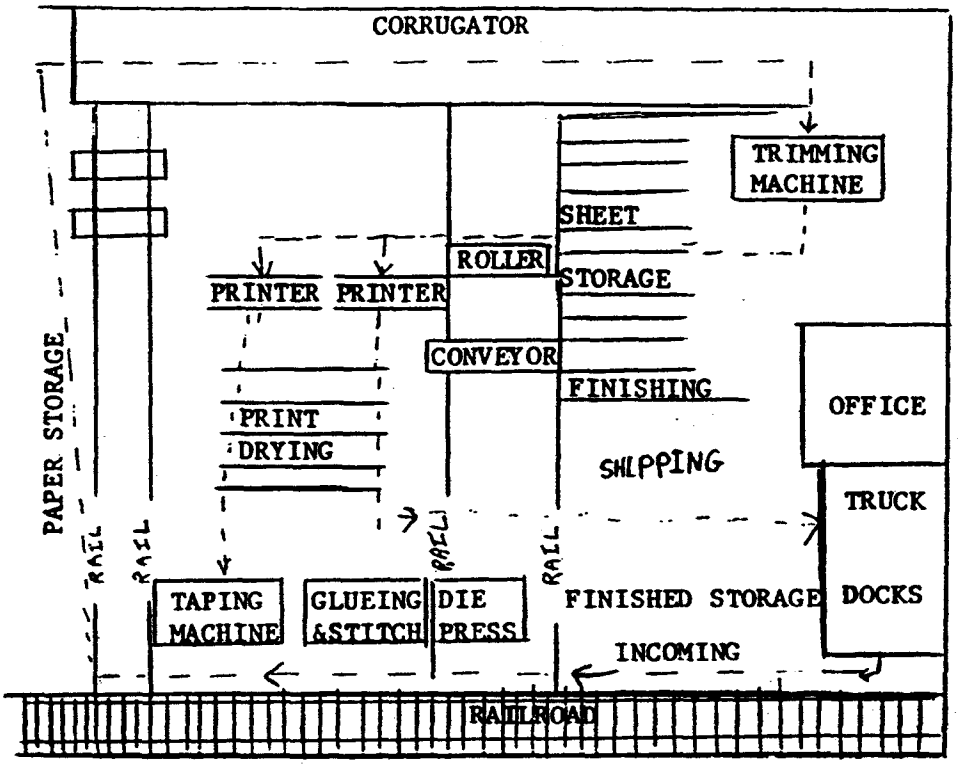
22. The type of chart illustrated below is generally known as

(A) a Multiple Activity Chart
(B) a Motion-Time Chart
(C) a Work Place Layout Chart
(D) an Operation Process Chart.



23. The one illustrated below is generally known as a

(A) Gantt Chart
(B) Multiple Activity Chart
(C) Planned Flow Diagram
(D) Work Place Diagram.



24. The type of chart illustrated below is generally known as

(A) an Analysis Chart
(B) a Flow Process Chart
(C) a Man or Material Chart
(D) a Multiple Activity Chart.

	PRESENT		PROPOSED		DIFFERENCE	
	No.	Time	No.	Time	No.	Time
OPERATIONS						
TRANSPORTATIONS						
INSPECTIONS						
DELAYS						
STORAGES						
DISTANCE TRAVELED		FT		FT		FT

JOB

CHART BEGINS
CHART ENDS
CHARTED BY
DATE

DETAILS OF PRESENT / PROPOSED METHOD	OPERATIONS / TRANSPORT / INSPECTION / DELAY / STORAGE	DISTANCE BY FEET	TIME IN MINUTES	DETAILS OF PRESENT / PROPOSED METHOD	OPERATIONS / TRANSPORT / INSPECTION / DELAY / STORAGE	DISTANCE BY FEET	TIME IN MINUTES
1				1			
2				2			
3				3			
4				4			
5				5			
6				6			
7				7			
8				8			

25. Many forms authorities advocate the construction of a functional forms file or index. If such a file is set up, the most effective way of classifying forms for such an index is classification by

(A) department
(B) form number
(C) name or type of form
(D) subject to which the form applies.

26. An interrelated pattern of jobs which makes up the structure of a system is known as

(A) chain of command
(B) cybernetics
(C) the formal organization
(D) the maintenance pattern.

27. A transparent sheet of film containing multiple rows of microimages is characteristic of which one of the following types of microfilm?

(A) Aperture
(B) Jacket
(C) Microfiche
(D) Roll or reel.

28. Primary responsibility for training and development of employees generally rests with

(A) outside training agencies
(B) the individual who needs training
(C) the line supervisor
(D) the training specialist in the Personnel Office.

29. Which of the following approaches usually provides the best communication in the objectives and values of a new program which is to be introduced?

(A) A general written description of the program by the program manager for review by those who share responsibility
(B) An effective verbal presentation by the program manager to those affected
(C) Development of the plan and operational approach in carrying out the program by the program manager assisted by his key subordinates
(D) Development of the plan by the program manager's supervisor.

30. The term "total systems concept", as used in electronic data processing, refers

(A) only to the computer and its associated electronic accessories
(B) only to the paper information output, or "software" aspect
(C) to a large computer-based information handling system, which supplies the information needs of an entire agency or corporation
(D) to all of the automated and manual information systems in a specific sub-division of an organization.

31. Of the following, scientific management can best be considered as an attempt to establish work procedures

(A) in fields of scientific endeavors
(B) which are beneficial only to bosses
(C) which require less control
(D) utilizing the concept of a man-machine system.

32. The major failing of efficiency engineering was that it

(A) overlooked the human factor
(B) required experts to implement the techniques
(C) was not based on true scientific principles
(D) was too costly and time consuming.

33. Which of the following organizations is most noted throughout the world for its training in management?

(A) American Management Association.
(B) American Political Science Association.
(C) Society for the Advancement of Management.
(D) Systems and Procedures Association.

34. The general method of arriving at program objectives should be

(A) a trial and error process
(B) developed as the program progresses
(C) included in the program plan
(D) left to the discretion of the immediate supervisors.

35. The review and appraisal of an organization to determine waste and deficiencies, improved methods, better means of control, more efficient operations and greater use of human and physical facilities is known as

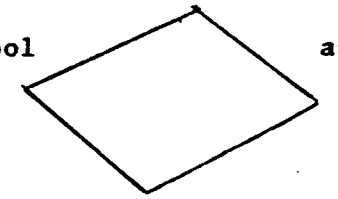
(A) a management audit
(B) a manpower survey
(C) a work simplification study
(D) an operations audit.

36. When data are grouped into a frequency distribution, the "median" is best defined as

(A) the 50% point in the distribution
(B) the largest single range in the distribution
(C) the smallest single range in the distribution
(D) the point of greatest concentration in the distribution.

37. The manual, visual and mental elements which an operation may be analyzed in time and motion study are denoted by the term

(A) measurement
(B) positioning
(C) standards
(D) therbligs.

38. Of the following, the symbol  as used in a systems flow chart denotes

(A) decision
(B) document
(C) manual operation
(D) process.

39. Of the following agencies of City government, the one with the largest expense budget for the current fiscal year is the

(A) Department of Environmental Protection
(B) Department of Social Services
(C) Department of General Services
(D) Police Department.

40. A feasibility study is the first phase in the process of conversion from manual to computerized data processing. The phases, in sequence, are

(A) the feasibility study, system conversion, system installation, follow up
(B) the feasibility study, system design, installation
(C) the feasibility study, system design, follow up, installation
(D) the feasibility study, system design, system conversion, installation.

41. An "operational definition" is best defined as one that

(A) indicates the process of measuring the term itself
(B) is a special definition not commonly accepted
(C) is a substitute for a dictionary definition
(D) stipulates what is intuitively meant by the term.

42. In designing a research study, the best way to reduce error variance is to

(A) compute a two-way analysis of variance
(B) control as much systematic variance as possible
(C) reduce the size of the samples selected
(D) select the measurement instruments carefully.

43. In planning a survey covering a non-EDP manual system which of the following is normally most useful in arriving at conclusions?

(A) Flow charts and work distribution charts
(B) Job descriptions
(C) Organization charts
(D) Review of the existing written procedures.

44. In assessing the feasibility of installing a proposed electronic data processing system, the factor which would most tend to mitigate against such an installation is

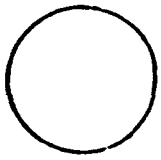
(A) a substantial amount of repetitive and reasonably constant data
(B) established, standardized reporting formats
(C) standard, often-repeated operations
(D) widely dispersed and highly individualized sources of information.

45. In running an effective computer center, which of the following is <u>least</u> important?

(A) Careful planning of the equipment, functions, and personnel for the center.
(B) Centralizing all data processing functions in the computer center.
(C) Creation of performance and cost standards for the center.
(D) Organizing center functions into distinct systems design programming and operations segments.

46. Of the following, the symbol  as used in the construction of flow process charts denotes

(A) delay
(B) inspection
(C) storage
(D) transportation.

47. Of the following, the symbol  as used in the preparation of computer systems flow charts denotes

(A) auxiliary operation
(B) display
(C) magnetic tape
(D) punched tape.

48. Of the following, the symbol  as used in the preparation of computer systems flow charts denotes

(A) communications link
(B) connector
(C) keying
(D) merge.

49. A punch card designed for re-use for data requiring less than the capacity of a standard size punch card is best termed a

(A) composite card
(B) multiple use card
(C) stub card
(D) tumble card.

50. A device which will accept data at the speed of the input system and feed the data into the computer at speeds approximating computer speeds is best termed a

(A) buffer
(B) converter
(C) reader
(D) storage or memory unit.

51. An important aspect to keep in mind during the decision-making process is that

(A) all possible alternatives for attaining goals should be sought out and considered
(B) considering various alternatives only leads to confusion
(C) once a decision has been made it cannot be retracted
(D) there is only one correct method to reach any goal.

52. Implementation of accountability requires

(A) a leader who will not hesitate to take punitive action
(B) an established system of communication from the bottom to the top
(C) explicit directives from leaders
(D) too much expense to justify it.

53. Of the following, the major difference between systems and procedures analysis and work simplification is:

(A) The former complicates organizational routine and the latter simplifies it
(B) The former is objective and the latter is subjective
(C) The former generally utilizes expert advice and the latter is a "do-it-yourself" improvement by supervisors and workers
(D) There is no difference other than in name.

54. Systems development is concerned with providing

(A) a specific set of work procedures
(B) an overall framework to describe general relationships
(C) definitions of particular organizational functions
(D) organizational symbolism.

55. Organizational systems and procedures should be

(A) developed as problems arise as no design can anticipate adequately the requirements of an organization
(B) developed jointly by experts in systems and procedures and the people who are responsible for implementing them
(C) developed solely by experts in systems and procedures
(D) eliminated whenever possible to save unnecessary expense.

56. The chief danger of a decentralized control system is that

(A) excessive reports and communications will be generated
(B) problem areas may not be detected readily
(C) the expense will become prohibitive
(D) this will result in too many "chiefs".

57. Of the following, management guides and controls clerical work principally through

(A) close supervision and constant checking of personnel
(B) spot checking of clerical procedures
(C) strong sanction for clerical supervisors
(D) the use of printed forms.

58. Which of the following is most important before conducting fact finding interviews?

(A) Becoming acquainted with all personnel to be interviewed
(B) Explaining the techniques you plan to use
(C) Explaining to the operating officials the purpose and scope of the study
(D) Orientation of the physical layout.

59. Of the following, the one that is <u>not</u> essential in carrying out a comprehensive work improvement program is

(A) standards of performance
(B) supervisory training
(C) work count/task list
(D) work distribution chart.

60. Which of the following control techniques is most useful on large, complex systems projects?

(A) A general work plan.
(B) Gantt Chart.
(C) Monthly progress report
(D) PERT Chart.

61. The action which is most effective in gaining acceptance of a study by the agency which is being studied is

(A) a directive from the agency head to install a study based on recommendations included in a report
(B) a lecture-type presentation following approval of the procedures
(C) a written procedure in narrative form covering the proposed system with visual presentations and discussions
(D) procedural charts showing the "before" and "after" situation, forms, steps, etc. to the employees affected.

62. Which of the following is <u>not</u> an advantage in the use of oral instructions as compared with written instructions?

(A) Oral instructions can easily be changed.
(B) Oral instruction is superior in transmitting complex directives.
(C) Oral instructions facilitate exchange of information between a superior and his subordinate.
(D) Oral instructions with discussions make it easier to ascertain understanding.

63. Which organization principle is most closely related to procedureal analysis and improvement?

(A) Duplication, overlapping, and conflict should be eliminated.
(B) Managerial authority should be clearly defined.
(C) The objectives of the organization should be clearly defined.
(D) Top management should be freed of burdensome detail.

64. Which one of the following is the major objective of operational audits?

(A) Detecting fraud
(B) Determining organization problems
(C) Determining the number of personnel needed
(D) Recommending opportunities for improving operating and management practices.

65. Of the following, the formalization of organization structure is best achieved by

(A) a narrative description of the plan of organization
(B) functional charts
(C) job descriptions together with organization charts
(D) multi-flow charts.

66. Budget planning is most useful when it achieves

(A) cost control
(B) forecast of receipts
(C) performance review
(D) personnel reduction.

67. The underlying principle of sound administration is to

(A) base administration on investigation of facts
(B) have plenty of resources available
(C) hire a strong administrator
(D) establish a broad policy.

68. Although questionnaires are not the best survey tool the management analyst has to use, there are times when a good questionnaire can expedite the "fact-finding" phase of a management survey. Which of the following should be avoided in the design and distribution of the questionnaire?

(A) Questions should be framed so that answers can be classified and tabulated for analysis.
(B) Those receiving the questionnaire must be knowledgeable enough to accurately provide the information desired.
(C) The questionnaire should enable the respondent to answer in a narrative manner.
(D) The questionnaire should require a minimum amount of writing.

69. Of the following, the formula which is used to calculate the arithmetic mean from data grouped in a frequency distribution is

(A) $M = \frac{N}{\Sigma fx}$

(B) $M = N\ (\Sigma fx)$

(C) $M = \frac{\Sigma fx}{N}$

(D) $M = \frac{\Sigma x}{fN}$

70. Arranging large groups of numbers in frequency distributions

(A) gives a more composite picture of the total group than a random listing
(B) is misleading in most cases
(C) is unnecessary in most instances
(D) presents the data in a form whereby further manipulation of the group is eliminated.

71. After a budget has been developed it serves to

(A) assist the accounting department in posting expenditures
(B) measure the effectiveness of department managers
(C) provide a yardstick against which actual costs are measured
(D) provide the operating department with total expenditures to date.

72. Of the following, which formula is used to determine staffing requirements?

(A) $\frac{\text{Hours per man-day}}{\text{Volume X Standard}}$ = Employees Needed

(B) $\frac{\text{Hours per man-day X Standard}}{\text{Volume}}$ = Employees Needed

(C) $\frac{\text{Hours per man-day X Volume}}{\text{Standard}}$ = Employees Needed

(D) $\frac{\text{Volume X Standard}}{\text{Hours per man-day}}$ = Employees Needed

73. Of the following, which formula is used to determine the number of days required to process work?

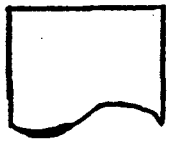
(A) $\frac{\text{Employees X Daily Output}}{\text{Volume}}$ = Days to Process Work

(B) $\frac{\text{Employees X Volume}}{\text{Daily Output}}$ = Days to Process Work

(C) $\frac{\text{Volume}}{\text{Employees X Daily Output}}$ = Days to Process Work

(D) $\frac{\text{Volume X Daily Output}}{\text{Employees}}$ = Days to Process Work

74. Identify this symbol, as used in a Systems Flow Chart.



(A) Document
(B) Decision
(C) Preparation
(D) Process

75. Of the following, the main advantage of a form letter over a dictated letter is that a form letter

(A) is more expressive
(B) is neater
(C) may be mailed in a window envelope
(D) requires less secretarial time.

76. The term that may be defined as "A systematic analysis of all factors affecting work being done or all factors that will affect work to be done in order to save effort, time or money" is

(A) flow process charting
(B) work flow analysis
(C) work measurement
(D) work simplification.

77. Generally, the <u>least</u> important basic factor to be considered in developing office layout improvements is to locate

(A) office equipment, reference facilities, and files as close as practicable to those using them
(B) persons as close as practicable to the persons from whom he receives his work
(C) persons as close as practicable to windows and/or adequate ventilation
(D) persons who are friendly with each other close together to improve morale.

78. Of the following, the one which is <u>least</u> effective in reducing administrative costs is

(A) applying objective measurement techniques to determine the time required to perform a given task
(B) establishing budgets on the basis of historial performance data
(C) motivating supervisors and managers in the importance of cost reduction
(D) selecting the best method -- manual, mechanical, or electronic -- to process the essential work.

79. "Fire-Fighting" is a common expression in management terminology. Of the following, which best describes "fire-fighting" as an analyst's approach to solving paperwork problems?

(A) A complete review of all phases of the department's processing functions.
(B) A studied determination of the proper equipment to process the work.
(C) An analysis of each form that is being processed and the logical reasons for its processing.
(D) The solution of problems as they arise, usually at the request of operating personnel.

80. Assume that a procedures analyst with a proven record of accomplishment on many projects is having difficulties on his present assignment. Of the following, the best course of action for his superior to take is to

(A) assume there is a personality conflict involved and transfer the analyst to another project
(B) give the analyst some time off
(C) review the nature of the project to determine whether or not the analyst is equipped to handle the assignment
(D) suggest that the analyst seek counseling.

81. The computer device which would offer the greatest speed in reading input is the

(A) CRT display
(B) magnetic tape
(C) optical scanner
(D) paper tape.

82. Which of the following steps is <u>least</u> desirable in designing an Electronic Data Processing System?

(A) Design the EDP system first, then relate it to current operations.
(B) Develop a corollary chart for the corresponding flow of information.
(C) Develop a flow chart for the functions affected by the system.
(D) Obtain from available EDP equipment that which best fits current operations.

83. Electronic Data Processing equipment can produce more information faster than can be generated by any other means. Because this is true one wonders whether our ability to generate information has not far outstripped our ability to assimilate it. In view of this, a persistent danger management faces is in

(A) determining the budget for management information systems
(B) determining what information is of real worth
(C) finding enough computer personnel
(D) keeping their computers fully occupied.

84. The one of the following that is an advantage of a visual display terminal over the typewriter-type terminal employed in an on-line system is:

(A) Information retrieval is somewhat faster.
(B) Operators can be trained more easily.
(C) There is no advantage.
(D) They are less expensive to operate.

85. Use of the systems approach is most likely to lead to

(A) consideration of the impact on the whole organization of actions taken in any part of that organization
(B) the placing of restrictions on departmental authority
(C) use of mathematical models to suboptimize production
(D) consideration of the activities of each unit of an organization as a totality without regard to the remainder of the organization.

86. The matrix summary or decision matrix is a useful tool for making choices. Its effectiveness is most dependent upon the user's ability to

(A) write a computer program (Fortran or Cobol)
(B) assign weights representing the relative importance of the objectives
(C) solve a set of two equations with two unknowns
(D) work with matrix algebra.

87. The methods of operations research, statistical decision-making and linear programming have been referred to as "the tool kit of the manager" by Peter Drucker. Utilization of these tools is <u>least</u> useful in the performance of which of the following functions?

(A) Elimination of the need for using judgment when making decisions.
(B) Facilitation of decision-making without the need for sub-optimization.
(C) Reduction of time and cost in various management areas.
(D) Accounting for risks and assumptions in the decision-making process.

88. The ability of operations researchers to solve complicated problems rests on their use of models. These models can best be described as

(A) mathematical statements of the problem
(B) physical constructs that simulate a work layout
(C) toy-like representations of employees in work environments
(D) role-playing simulations.

89. PERT is a recently developed system used primarily to

(A) evaluate the quality of applicants' backgrounds
(B) analyze and control the timing aspects of a major project
(C) control the total expenditure of agency funds within a monthly or quarterly time period
(D) analyze and control the differential effect on costs of purchasing in different quantities.

90. Of the following, computers are normally most effective in handling

(A) large masses of data requiring simple processing
(B) small amounts of data requiring constantly changing complex processing
(C) data for which reported values are often subject to inaccuracies
(D) large amounts of data requiring continual programming and reprocessing.

ANSWERS TO MANAGEMENT ANALYST QUESTIONS

1. D; 2. D; 3. D; 4. C; 5. C; 6. C; 7. C; 8. A; 9. A; 10. B;
11. B; 12. B; 13. C; 14. D; 15. C; 16. B; 17. B; 18. B; 19. C; 20. B;
21. C; 22. D; 23. C; 24. B; 25. D; 26. C; 27. C; 28. C; 29. C; 30. C;
31. D; 32. A; 33. A; 34. C; 35. A; 36. A; 37. D; 38. A; 39. B; 40. D;
41. A; 42. B; 43. A; 44. D; 45. B; 46. D; 47. C; 48. A; 49. D; 50. A;
51. A; 52. B; 53. C; 54. B; 55. B; 56. B; 57. D; 58. C; 59. B; 60. D;
61. C and/or D; 62. B; 63. A; 64. D; 65. C; 66. A and/or C; 67. A; 68. C;
69. C; 70. A; 71. C; 72. D; 73. C; 74. A; 75. D; 76. D; 77. D; 78. B;
79. D; 80. C; 81. A; 82. A; 83. B; 84. A; 85. A; 86. B; 87. A; 88. A;
89. B; 90. A.