

# **Curriculum for Analysts**

## **Operations Research**

**Purpose:** To familiarize participants with the definition of operations research and to help them understand its utility in procedural and operational studies and analysis concerning the agency's organization and operations.

**Rationale:** Participants need to leave this course knowing that operations research is concerned with achieving the most effective and efficient use of an organization's resources, such as its financial and human resources, its capital resources and its raw materials. They should also have an understanding of how this is applied to keep an organization running, how to monitor and evaluate the organization and how to understand the change process of an organization.

**Topics covered:**

- defining operations research
- office organization
- job analysis
- systems and procedures
- office work simplification
- planned change and organizational development
- flow chart symbols
- common questions for investigating an out of control process
- conducting a survey:
  - collection of numerical data
  - reports
- charts for reports:
  - bar
  - scatter
  - line
  - area
- decision matrix
- project planning charts:
  - Pert
  - Gantt
- project assessment

## Practice Questions Operations Research

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 field, such as management, organization, systems analysts.
  - (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. 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.
3. 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 sub-optimize production.
  - (D) Consideration of the activities of each unit of an organization as a totality without regard to the remainder of the organization.
4. 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.
5. 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 operation
  - (D) the maintenance pattern

6. 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.
7. 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
8. 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
9. 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.
10. 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 least 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.

Answers: 1D; 2D; 3A; 4B; 5C; 6A; 7D; 8A; 9A; 10A

## OPERATIONAL RESEARCH QUESTIONS FOR STAFF ANALYST TRAINEE

1. When ongoing process problems are occurring in a unit, for example inter-office mail from the mailroom is 3 to 5 days late, who should be asked about the nature of the problem?
  - a) the commissioner
  - b) the deputy commissioner
  - c) the executive managers
  - d) the delivery staff
2. When an organizational change is being instituted, what outcome can always be anticipated?
  - a) resistance
  - b) full cooperation if a detailed plan is devised
  - c) long term increase in productivity
  - d) a series of perfect solutions
3. Which of the following statement most accurately defines "operations research"?
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4. Use of the systems approach is most likely to lead to
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5. 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
6. 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

7. "The Office Layout Chart is a sketch of the physical arrangements 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
8. 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/she do it?
9. 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
10. 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
11. 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
12. 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
13. 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

14. Organizational systems and procedures should be
- developed as problems arise as no design can anticipate adequately the requirements of an organization
  - developed jointly by experts in systems and procedures and the people who are responsible for implementing them
  - developed solely by experts in systems and procedures
  - eliminated whenever possible to save unnecessary expense
15. On a general organization chart, staff positions normally should be pictured
- directly above the line positions to which they report
  - to the sides of the main flow lines
  - within the box of the highest level subordinate positions pictured
  - directly below the line position which report to them
16. Of the following, the most usual reason for unsatisfactory line staff relationships is
- inept use of the abilities of staff personnel by line management
  - the higher salaries paid to line officials
  - excessive consultation between line officials and staff officials at the same organizational level
  - a feeling among the staff members that only lower level line members appreciate their work
17. Of the following, the one which generally is the most intangible planning factor is
- budget dollars allocated to a function
  - square feet of space for office use
  - number of personnel in various titles
  - emotional impact of a proposed personnel policy among workers
18. Agency "x" is moving into a new building. It has 1500 employees presently on its staff and does not contemplate much variance from this level. The new building contains 100 available offices each with a maximum capacity of 30 employees. It has been decided that only  $\frac{2}{3}$  of the maximum capacity of each office will be utilized. The total number of offices that will be occupied by Agency "x" is
- a) 30    b) 66    c) 75    d) 90
19. Listed below are four steps commonly used in trying to solve administrative problems. These four steps are not listed in order. If they were listed in the proper order, which step should be taken first.
- choosing the most practical solution to the problem
  - analyzing the essential facts about the problem
  - correctly identifying the problem
  - following up to see if the solution chosen really works
- a) 3    b) 1    c) 2    d) 4