

Q52. Which of the following is an appropriate tool that implements a deliverable-oriented decomposition of a project into smaller components?

- a) Critical path method (CPM)
- b) Gantt chart (Gantt)
- c) Program evaluation and review technique (PERT)
- d) Work breakdown structure (WBS)

Q53. Which of the following is an appropriate description of scope management?

- a) The process of determining and documenting a list of all project goals, tasks, deliverables, deadlines, and budgets as a part of the planning process
- b) The process of identifying, analyzing, and responding to any risk that arises over the life cycle of a project to help the project remain on track and achieve its goal
- c) The process of planning, estimating, budgeting, and controlling project costs
- d) The process of wisely managing the amount of time allocated to a project in order to meet the scheduled delivery date and conclude all work by or before the project completion date

Q51. Which of the following is one of the major responsibilities of a project manager?

- a) Coding programs and debugging errors
- b) Evaluating the quality of project deliverables
- c) Organizing project members to achieve a planned result within a budget and schedule
- d) Providing the user requirements at the beginning of the project

Q53. In project time management, which of the following is the amount of time that the start of a successor activity requires to be delayed after the finish of a predecessor activity?

- a) Free float b) Lag c) Lead d) Total float

Q61. Which of the following is an appropriate feasibility evaluation when checking whether the lifetime benefits of the proposed information system is greater than its lifetime costs?

- a) Economic feasibility
- b) Operational feasibility
- c) Scheduling feasibility
- d) Technical feasibility

Q51. Based on the definition of project management process groups in ISO 21500, which of the following is an activity that is to be implemented in the planning process group among the project management processes?

- a) To define scope
- b) To develop a project charter
- c) To identify stakeholders
- d) To perform quality assurance

Q52. In project time management, which of the following descriptions is appropriate for “slack time”?

- a) It is the amount of time between the earliest start time and earliest finish time of an activity or between the latest start time and latest finish time of an activity.
- b) It is the amount of time for which a non-critical path activity can be deferred without delaying the project.
- c) It is the amount of time that an activity can be deferred without delaying the earliest start time of any succeeding activity or violating a schedule constraint.
- d) It is the amount of time that an activity can be delayed past its latest start time or latest finish time.

Q53. When the duration for painting a house is estimated, which of the following is an appropriate technique that estimates the duration on the basis of the actual duration of a similar painting job in the past of the same house or other historical data from similar work?

- a) Analogous estimate
- b) Parametric estimate
- c) Reserve analysis
- d) Three-point estimate

Q50. Which of the following is an appropriate description of an extreme programming (XP) practice?

- a) After the code is created, and it is confirmed that it can be integrated, test cases are created.
- b) Integration of the code and testing are continuously repeated.
- c) The code that passed the tests is not refactored until the next iteration.
- d) The customer is responsible for the specification of unit tests.

Q51. According to PMBOK, which of the following is the description of scope creep?

- a) Any change to the project scope that requires an adjustment to the project cost or schedule
- b) The approved version of a scope statement, work breakdown structure (WBS), and its associated WBS dictionary
- c) The process of monitoring the status of the project and product scope and managing changes to the scope baseline
- d) The uncontrolled expansion to product or project scope without adjustments to time, cost, and resources

Q54. Which of the following is an explanation of the function point method?

- a) The development scale is estimated by adding up the number of steps required for each program to be developed.
- b) The development scale is estimated by searching for past examples and then analyzing and evaluating the results and the differences of these examples from the system to be developed.
- c) The development scale is estimated from the counts and characteristics of external inputs and outputs, internal logical files, external inquiries, and external interface files.
- d) The number of person-hours required for each activity is estimated by creating a WBS of the activities required for a development project.

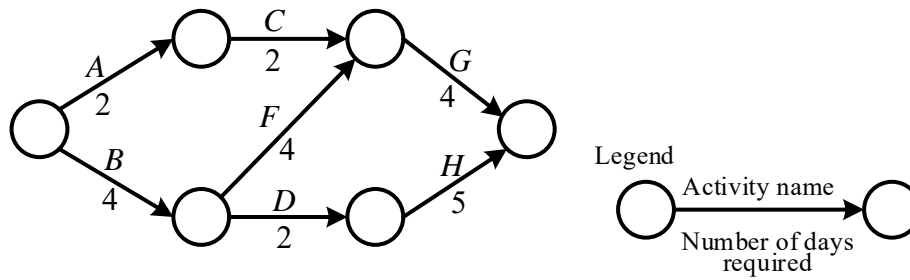
Q53. Which of the following is the technique for estimating activity durations where past information is statistically analyzed and various coefficients are determined?

- a) Analogous estimate
- b) Bottom-up estimate
- c) Parametric estimate
- d) Three-point estimate

Q55. In order to analyze the trend of issues that occur in a project, the number of issues by management item, such as the stakeholders, cost, schedule, quality, etc., are arranged in order starting with the highest number of issues in the form of a bar graph, and a diagram is prepared in which the number of issues accumulated in this order are superimposed in the form of a line graph. Which of the following is this diagram?

- | | |
|-----------------------------|--------------------|
| a) Cause and effect diagram | b) Control chart |
| c) Pareto diagram | d) Scatter diagram |

Q51. Which of the following is an appropriate explanation of the PERT diagram as shown in the figure below?



- a) The critical path is $A - C - G$.
- b) This project needs at least 11 days.
- c) When the activity F becomes unnecessary, the project will end 1 day earlier.
- d) When the activity H has a delay of 2 days, it will cause the project to be delayed by 2 days.

Q54. Which of the following is an appropriate cost estimation technique that estimates the cost of an activity or project using the historical data from a similar project?

- a) Analogous estimating
- b) Bottom-up estimating
- c) Function point method
- d) Parametric estimating

Q52. Which of the following is an appropriate description for group decision-making techniques used in an estimate activity durations process?

- a) A group of experts, guided by historical information, can provide duration estimate information or recommended maximum activity durations from prior similar projects.
- b) The estimates from such techniques may include contingency reserves, sometimes referred to as time reserves or buffers, in the project schedule to account for schedule uncertainty.
- c) These are team-based approaches, such as brainstorming, the Delphi or nominal group techniques, which are useful for engaging team members to improve estimate accuracy and commitment to the emerging estimates.
- d) These techniques use a statistical relationship between historical data and other variables to calculate an estimates of activity parameters, such as cost, budget, and duration.

Q53. Which of the following is an appropriate description of the activities on the critical path of a project?

- a) Any activity on the critical path is called a critical path activity.
- b) The critical path is the sequence of activities that represents the shortest path through a project.
- c) The critical path must contain the activity that has the longest duration compared to the other all activities.
- d) The sum of activities on the critical path determines the longest possible project duration.

Q54. Which of the following is an appropriate cost estimation technique that uses parametric models to create an objective estimate based on each element size and the complexity of the system (e.g., number of input files, screens, etc.) to be built?

- a) Analogous estimating
- b) Bottom-up estimating
- c) Function point method
- d) Three-point estimating

Q51. Which of the following is an appropriate description of the Responsibility Assignment Matrix that is used for project human resource management?

- a) Allocating the current engagement level of the stakeholders.
- b) Allocating work packages to those who are responsible for project work.
- c) Defining the limits of the project sponsor's responsibilities.
- d) Defining the terms of reference of the project manager.

Q52. Which of the following is the structure that illustrates the relationship between project activity and the units of project that will perform those activities?

- a) Organizational Breakdown Structure
- b) Product Breakdown Structure
- c) Responsibility Assignment Matrix
- d) Work Breakdown Structure

Q53. According to the PMBOK Guide – Fifth Edition, which of the following is an appropriate definition of a project stakeholder?

- a) A person or group who provides resources and support for the project, program, or portfolio and is accountable for enabling success.
- b) An individual, group, or organization, who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project.
- c) An organizational structure that standardizes the project-related governance processes and facilitates the sharing of resources, methodologies, tools, and techniques.
- d) The person assigned by the performing organization to lead the team that is responsible for achieving the project objectives.

- Q54.** Which of the following is an appropriate explanation of the Function Point method that is used for system development estimation?
- a) It is a method for estimating the overall workload where the development work is broken down into units of work items and then the workload for each item is accumulated on the basis of a predefined standard value for the unit of workload.
 - b) It is a method for estimating the person-hours and period of time required to complete development, on the assumption that the development scale is known. It can be applied to all fields, not just to the business field.
 - c) It is a method for estimating the scale and person-hours of development on the basis of the past experience of a similar system, where past data is used for the same areas and past experience for different areas.
 - d) It is a method for estimating the scale of a system where the functions of the system are quantitatively measured by using elements such as the number of I/O data items and the number of files, and an adjustment is performed on the basis of the complexity and characteristics of the application.

Q51. According to PMBOK, which of the following processes is included in the Executing Process Group?

- a) Process of auditing the quality requirements and the results from quality control measurements to ensure that appropriate quality, standards and operational definitions are properly implemented
- b) Process of checking and recording results of executing the quality activities to assess performance and recommend necessary changes
- c) Process of estimating the type and quantities of material, people, equipment, or supplies required to perform each activity
- d) Process of prioritizing risks for further analysis or action by assessing and combining their probability of occurrence and impact

Q52. Which of the following is an appropriate description of “Lead” relationship in project time management?

- a) It is the amount of time by which a successor activity can be advanced with respect to a predecessor activity.
- b) It is the amount of time by which a successor activity will be delayed with respect to a predecessor activity.
- c) It is the amount of time that a schedule activity can be delayed or extended from its early start date without delaying the project completion date or violating a schedule constraint.
- d) It is the number of work periods (hours, days) required to complete individual activities with the estimated resources.

Q54. Company A is going to launch a new software product and the sales team then has to demonstrate it to the customers. There is a risk that the sales team does not understand the product and cannot provide good demonstrations. As a consequence, the sales team will make fewer sales and there will be less revenue for the company. So, the management decided to provide good training for the sales team. Which of the following is the best method to manage the risk?

- a) Risk acceptance b) Risk exploitation c) Risk mitigation d) Risk transfer

Q56. Which of the following is an appropriate purpose of using a Work Breakdown Structure (WBS) in a software development project?

- a) To clarify the time sequence of activities, and understand the critical path that should be intensively managed
- b) To decompose a development task into smaller sub-tasks of a manageable size, and organize them into a hierarchical structure
- c) To optimize the total cost when there is a trade-off relationship between the number of days and the cost that is required for development
- d) To show the schedule of an activity by using a bar, and clarify the start point and end point of the activity as well as the progress at the current point

Q52. According to PMBOK, which of the following combinations of processes pertains to project integration management?

- A. Control costs
- B. Develop project charter
- C. Direct and manage project work
- D. Identify risks
- E. Manage communications
- F. Perform integrated change control

- a) A, B, E b) B, C, E c) B, C, F d) C, D, F

Q53. According to PMBOK, which of the following is an appropriate explanation concerning the scope creep in project scope management?

- a) A hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables.
- b) Any change to the project scope. It almost always requires an adjustment to the project cost or schedule.
- c) The sum of the products, services, and results to be provided as a project.
- d) The uncontrolled expansion to product or project scope without adjustments to time, cost, and resources.

Q51. According to PMBOK, which of the following is an appropriate explanation of project definition?

- a) It is a group of related projects, subprograms, and program activities managed in a coordinated way to obtain benefits not available from managing them individually.
- b) It is a number of people who are gathered to undertake a common job with different tasks with the aim of finishing all the tasks timeously to satisfy their customers or stakeholders.
- c) It is a temporary endeavor undertaken to create a unique product, service, or result.
- d) It is the application of knowledge, skills, tools, and techniques to a program to meet the program requirements and to obtain benefits and control not available by managing projects individually.

Q53. In the Earned Value Management technique, which of the following is used to calculate the Cost Performance Index (CPI)?

- a) $\text{Earned Value (EV)} - \text{Planned Value (PV)}$
- b) $\text{Earned Value (EV)} / \text{Planned Value (PV)}$
- c) $\text{Earned Value (EV)} - \text{Actual Cost (AC)}$
- d) $\text{Earned Value (EV)} / \text{Actual Cost (AC)}$

Q54. According to PMBOK, which of the following is the project management knowledge area that includes the activities of make-or-buy decisions, development time and material contracts, and selection of sellers from bidders?

- a) Project Communication Management
- b) Project Cost Management
- c) Project Integration Management
- d) Project Procurement Management

Q55. Which of the following is an action that is carried out during the work breakdown structure (WBS) creation process in project scope management?

- a) Defining activities for creating deliverables
- b) Estimating the man-hours of the work and then estimating costs
- c) Ordering the work into a schedule
- d) Subdividing the work hierarchically

Q58. Which of the following is the most appropriate sentence describing the difference between intermediate COCOMO and COCOMO II?

- a) Intermediate COCOMO consists of one overall model based on lines of code, whereas COCOMO II consists of three different models, depending on the available knowledge of product to be built.
- b) Intermediate COCOMO estimates cost based on object point, whereas COCOMO II estimates cost based on function points.
- c) Intermediate COCOMO has 11 cost drivers, whereas COCOMO II has 17 multiplicative cost drivers.
- d) In intermediate COCOMO, exponent b varies between 1.01 and 1.26, depending on the variety of parameters of the model, whereas in COCOMO II, the value of b takes on three different values, depending on whether the mode of the product to be built is organic ($b=1.05$), semi-detached ($b=1.12$), or embedded ($b=1.20$).

Q53. Which of the following is an appropriate tool that implements a deliverable-oriented decomposition of a project into smaller components?

- a) Critical Path Management (CPM)
- b) Gantt Chart (Gantt)
- c) Project Evaluation and Review Technique (PERT)
- d) Work Breakdown Structure (WBS)

Q53. Each letter (i.e., P, D, C, and A) of the “PDCA” cycle used for progress management of system development and quality management of software is the first letter of the corresponding word. Which of the following is the word that is represented by the third letter “C”?

- a) Challenge b) Change c) Check d) Control

Q55. According to ITIL (IT Infrastructure Library), CSA (Configuration Status Accounting) is the recording and reporting of all current and historical data concerned with each CI (Configuration Item) throughout its life-cycle. Which of the following is an appropriate activity that is performed as part of CSA?

- a) Closing project or phase
- b) Collecting requirements
- c) Monitoring and controlling project work
- d) Performing integrated change control

Q56. According to “A Guide to the Project Management Body of Knowledge” (PMBOK Guide), which of the following is the knowledge area that includes the processes and activities to identify, define, combine, unify, and coordinate the various processes and project management activities within the Project Management Process Groups?

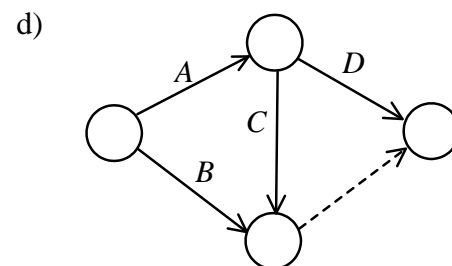
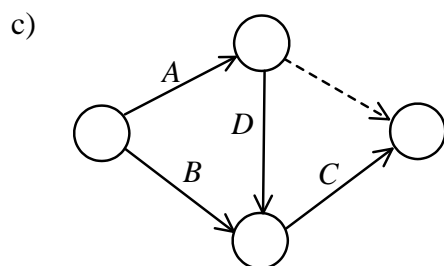
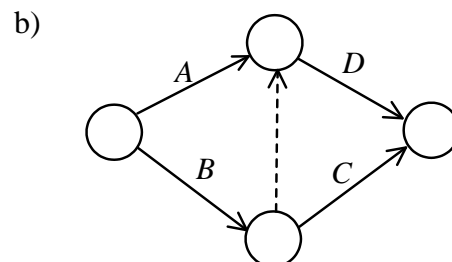
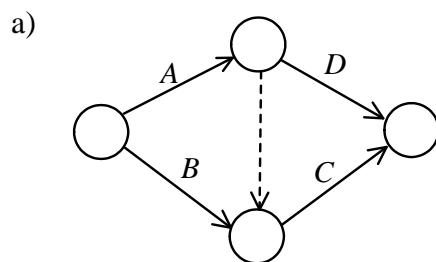
- a) Project communications management
- b) Project integration management
- c) Project quality management
- d) Project scope management

Q51. Which of the following is a characteristic of a project?

- a) A project is both unique and temporary.
- b) A project is neither unique nor temporary.
- c) A project is not unique but is temporary.
- d) A project is unique but not temporary.

Q52. There are four activities *A* through *D* shown in the table below. Activities *A* and *B* can be performed in parallel. However, the other activities cannot be done until their preceding activities are completed. For example, *C* cannot begin until *B* is completed. Which of the following is the appropriate arrow diagram that corresponds to this table? Here, a dotted line shows a dummy activity.

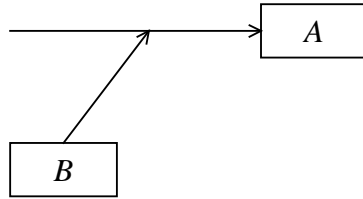
Activity	Preceding activity
<i>A</i>	—
<i>B</i>	—
<i>C</i>	<i>B</i>
<i>D</i>	<i>A, B</i>



Q53. Which of the following is an appropriate purpose of using a WBS (Work Breakdown Structure) in software development?

- a) To clarify the time sequence of activities, and understand the critical path that should be intensively managed
- b) To decompose all development activities into smaller steps with a manageable size, and organize them into a hierarchical structure
- c) To optimize the total cost when there is a trade-off relationship between the number of days and cost that are required for development
- d) To show the schedule of each activity by using a horizontal bar, and clarify not only the start and end points of each activity but also the progress at the current point

Q54. The figure below shows part of a so-called fishbone diagram. Which of the following is the relationship between *A* and *B*?



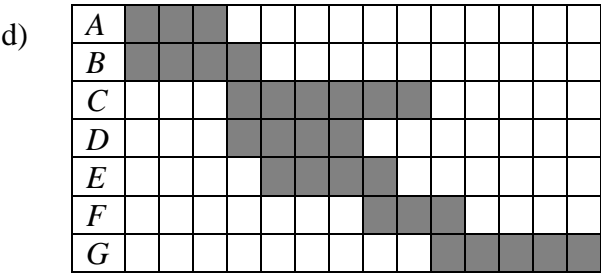
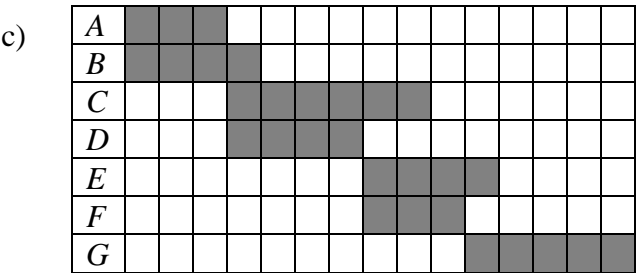
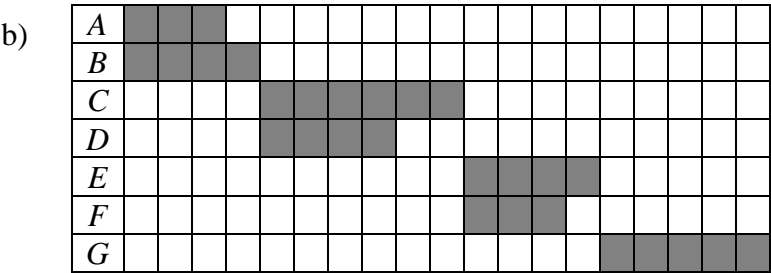
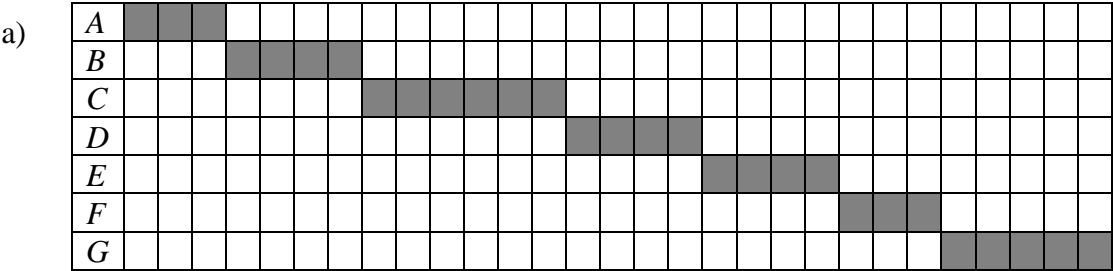
- a) *B* is a cause of *A*.
- b) *B* is a means of *A*.
- c) *B* is a purpose of *A*.
- d) *B* is an attribute of *A*.

Q55. Which of the following is an explanation concerning a Pareto chart?

- a) It is used to identify problems by sorting the classified items in descending order of frequency of occurrence and illustrating a bar chart with a cumulative line chart.
- b) It is used to objectively manage the variation in the data occurring in time series by expressing it as a line graph and using control limit lines.
- c) It is used to systematically arrange the relationships between cause and effect in a fishbone format, and clarify which causes are related to a particular result.
- d) It is used to understand the variation in quality by classifying the collected data into several sections and plotting the number of data belonging to each section as a bar graph.

Q56. The table below shows seven activities, their relationships, and the number of days required to complete each activity in a software development project. When the activities *A* and *B* begin simultaneously and are performed in parallel, which of the following is an appropriate Gantt chart that corresponds to this table?

Activity	Preceding activity	Number of days required
<i>A</i>	–	3
<i>B</i>	–	4
<i>C</i>	<i>A</i>	6
<i>D</i>	<i>A</i>	4
<i>E</i>	<i>B</i>	4
<i>F</i>	<i>D</i>	3
<i>G</i>	<i>C, E</i>	5



Q56. Which of the following is an activity that is performed during the WBS creation process in project scope management?

- a) Arranging the schedule on the basis of the flow of project activities
- b) Defining project activities that create deliverables
- c) Estimating the cost by calculating person-hours for each project activity
- d) Segmenting project activities hierarchically into smaller parts or pieces

Q55. A chart or a diagram is created to resolve a quality problem. After the trends of factors are analyzed, it is determined whether more than 80% of all the factors belong to a small group of factors. Which of the following is effective for this purpose?

- a) Cause and effect diagram
- b) Control chart
- c) Pareto chart
- d) Scatter diagram

Q56. Which of the following is an appropriate description of how to estimate person-months in software development?

- a) In COCOMO, person-hours are estimated in units of deliverables or processes on the basis of the WBS (Work Breakdown Structure) and then accumulated in a bottom-up approach.
- b) In LOC method, when the development conditions are similar to those used for the previous software development, person-hours are estimated on the basis of the previous record.
- c) In the function point method, the function points are defined and classified on the basis of external input, external output, internal logical file, external interface file, and external inquiry.
- d) In the standard task method, the number of program steps is estimated, and the person-hours required for development are calculated on the basis of the estimated program steps.

Q56. Which of the following is a chart or a diagram that is often used in quality control to rank issues or problems in descending order of frequency?

- a) Cause-and-effect diagram
- b) Control chart
- c) Pareto chart
- d) Scatter diagram

Q57. Which of the following is the most appropriate indicator that is directly helpful in managing software quality in a system development project?

- a) Number of completed work packages that compose a WBS
- b) Period of time required to adequately review each deliverable
- c) Productivity of individual programming
- d) Program version and modification level

Q56. Which of the following is the most appropriate indicator used for the progress management of a program test?

- a) The amount of correction made to the program
- b) The amount of test data created
- c) The number of test items completed
- d) The number of times that the program is restarted

Q57. In a system development project, EVM (Earned Value Management) is used for managing its performance. Which of the following is the most appropriate status that is indicated by the fact that the value “EV–AC” is positive? Here, “AC” is the total costs actually incurred for project tasks at any point in time, and “EV” is the estimated cost of the project tasks that have been done up to that point.

- | | |
|----------------------|--------------------|
| a) Ahead of schedule | b) Behind schedule |
| c) Over budget | d) Under budget |

Q58. In software development that uses the waterfall model, which of the following is an appropriate description concerning the cost of fixing errors detected during an operational test?

- a) Coding errors affect the work scope for all succeeding phases, so those errors cost more to fix than the requirements definition errors.
- b) External design errors affect not only the program but also manuals and other documents, so those errors cost more to fix than coding errors.
- c) Internal design errors can usually be detected during the design review, so those errors cost less to fix than coding errors.
- d) Test case errors require more work than only the correction and re-execution of the test cases, so those errors cost more to fix than external design errors.

Q59. Which of the following is a chart or a diagram that shows the quality of a product in order of time and is used for determining whether or not the production process is in a stable state within the control limits?

- a) Cause and effect diagram
- b) Control chart
- c) Pareto chart
- d) Scatter diagram

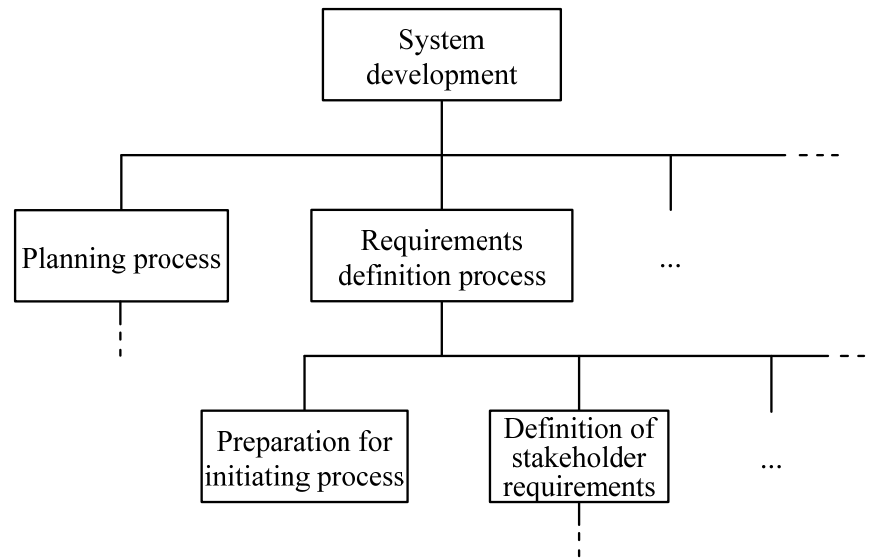
Q54. Which of the following is an appropriate explanation concerning a milestone in project management?

- a) A milestone is a major event in a project schedule that is easily identifiable by such things as the completion of a significant deliverable and the occurrence of an event.
- b) A milestone is conducted at the mid-term or end of a project by an outside facilitator in order to provide the project stakeholders with the opportunity to be candid.
- c) The goal of a milestone is to identify and mitigate problems with large projects as early in the project as possible to minimize their impact.
- d) The purpose of a milestone is to visually and structurally provide the relationships among all the project deliverables and their various components.

Q57. Which of the following is the project management knowledge area that includes the processes of creating a staffing management plan, acquiring project team, developing project team, and managing project team?

- a) Communications management
- b) Human resource management
- c) Integration management
- d) Scope management

Q56. Which of the following is the term that refers to a detailed breakdown of a project into a hierarchy of activities as shown in the figure below?



a) CPM

b) E

c) PERT

d) WBS

Q78. Which of the following is an appropriate chart that can be used for planning the work schedule and for keeping track of the progress status in a project?

- a) Composite bar chart
- b) Control chart
- c) Gantt chart
- d) Pareto chart

Q58. Which of the following is an appropriate description concerning quality management in system development?

- a) Although performance such as response time and batch processing time is not included in quality management, marginal performance should be measured because its impact on business operations is significant.
- b) In the development where a system is divided into several subsystems, if the quality of each subsystem can be assured, the quality of the entire system can also be assured at the same time.
- c) The sufficiency level of functions required for the system, as well as all deliverables such as documents, should be subject to quality management.
- d) When a system is developed by combining commercial products and self-developed programs, only self-developed programs should be subject to quality management.

Q55. Which of the following is the project management tool whereby the project activities and their relationships can be graphically represented, and the project manager can understand how the various activities flow towards completion in order of time?

- a) Gantt chart
- b) Network diagram
- c) Sequence diagram
- d) WBS

Q57. Which of the following is the appropriate element that is used to calculate slack time in the PERT (Program Evaluation and Review Technique)?

- a) The earliest of the earliest start times of the successor activities
- b) The earliest of the latest start times of the successor activities
- c) The latest of the earliest start times of the successor activities
- d) The latest of the latest start times of the successor activities

Q58. Which of the following is the method used for estimating the scales or person-months in system development where the five basic components—external input, external output, internal logical file, external interface file, and external inquiry—are defined and classified with their complexity weights?

- a) COCOMO
- b) Function point method
- c) LOC method
- d) Standard task method

Q59. Which of the following is the risk response which accepts the cost of damages because risk impact is assumed to be small when the risk becomes exposed?

- a) Risk avoidance
- b) Risk reduction
- c) Risk retention
- d) Risk transfer

Q60. Which of the following is an appropriate characteristic of the single-step (so-called “big bang”) migration method?

- a) It requires an application that provides a connection between the new and old systems.
- b) Operational costs are additionally required for parallel operations.
- c) Problems during migration to the new system have serious impacts.
- d) The new and old systems are operated in parallel, and then migration to the new system is performed at a certain point in time.

Q58. The execution plan for the system development project is prepared, and the critical path is obtained. Which of the following is the activity that can be understood by means of the critical path?

- a) The activity that requires the greatest cost
- b) The activity that requires the most attention in securing the quality of the system
- c) The activity whose delay directly leads to the delay of the whole project
- d) The activity whose execution sequence can be changed

Q59. Which of the following appropriately describes the purpose of using WBS (Work Breakdown Structure) in software development?

- a) To divide development work into small tasks in a top-down manner, thereby facilitating work management
- b) To estimate development cost and place the full weight of cost management
- c) To find the critical path at an early stage and focus on such a path
- d) To make a work schedule in consideration of available resources

Q60. Which of the following is an appropriate characteristic of a Gantt chart used in progress control?

- a) It can clarify critical paths which are key points for progress control.
- b) It can clarify the impact of a delay of one activity on other activities.
- c) It can clearly show the order relation between activities.
- d) It can compare the planned schedule and actual results.

Q49. When the development department and the operations department of a system are organized separately, which of the following is the appropriate method for smooth and effective transfer from development to operations?

- a) After the operational test is completed, the development department explains the system specifications and the operations method to the operations department.
- b) Only the operations department performs the operational test without support from the development department for efficiency.
- c) The development department performs the operational test, creates an operations manual, and delivers it to the operations department.
- d) The operations department proactively participates in the system development and provides advice from the viewpoint of operations.

Q51. Which of the following is the most appropriate description concerning the changes in network configuration after the beginning of operations?

- a) It is necessary to update the equipment control log, network diagram, etc. on a timely basis so that the network configuration can be changed at any time as needed.
- b) Management with network management software is more difficult as the network configuration becomes more complicated. Therefore, an experienced engineer must change the configuration.
- c) The network configuration must be changed after all business applications are stopped to ensure network security.
- d) The network configuration must be fully studied at the time of network construction. The configuration should not be changed after the beginning of operations.

Q52. Which of the following is an appropriate description concerning maintenance of applications?

- a) Consider maintenance activity completed, when the test by the maintenance engineer in charge is finished.
- b) Record the completion of maintenance in order to prevent maintenance activities from being left uncompleted.
- c) Register the program into the library under full operations after the successful completion of the test, and then report to the maintenance approver.
- d) Update the library directly under full operations, when the change can be considered to be simple.

Q48. Which of the following is used for estimating the scale of system development with the function point method?

- a) Number of developers
- b) Number of program steps
- c) Number of screens
- d) Number of users

Q49. In a system environment requiring continuous availability as well as a high level of reliability, which of the following is the most appropriate term that stands for the capability to automatically switch over to a standby or redundant database, a server, or a network when the previously active one fails to operate properly?

- a) Fail-over
- b) Fail-proof
- c) Fail-safe
- d) Fail-soft

Q79. There are seven activities A through G shown in the table below. Activities A and B can be performed concurrently, but the others cannot be done until their preceding activities are completed. For example, C cannot begin until A is completed. Which of the following is the critical path of these activities?

Activity	Preceding activity	Used Time (days)
A	—	4
B	—	5
C	A	5
D	A	6
E	B, C	5
F	D	4
G	E	5

- a) $A \rightarrow C \rightarrow E \rightarrow G$
- b) $A \rightarrow D \rightarrow F$
- c) $B \rightarrow C \rightarrow D \rightarrow F$
- d) $B \rightarrow E \rightarrow G$

Q56. Which of the following appropriately describes the purpose of using WBS (Work Breakdown Structure) in software development?

- a) To divide development work into small tasks in a top-down manner, thereby facilitating work management
- b) To estimate development cost and place the full weight of cost management
- c) To find the critical path at an early stage and focus on such a path
- d) To make a work schedule in consideration of available resources

Q57. Which of the following appropriately explains the function point method, which is one of the estimation methods used in system development?

- a) It is a method for estimating the person-hours and time period for development on the assumption that the scale of development is figured out. This method can be applicable not only to business area but also to all areas.
- b) It is a method for estimating the system size by evaluating system functions quantitatively on the basis of the amount of input/output data, the number of files, etc. and by making proper adjustments based on the complexity and characteristics of the application.
- c) It is a method for looking into the differences among systems on the basis of the data of similar systems experienced in the past and estimating the size and person-hours by using the past data for the similar portions and the empirically predicted data for the different portions.
- d) It is a method for predetermining the reference values per unit of workload, dividing all the work items into the unit work items, and thereby estimating the total workload by making up all of them.

Q56. An implementation plan for a system development project was drawn up, and the critical path was determined. Which of the following tasks can be identified by the critical path?

- a) Tasks directly connected with the delay of the entire project
- b) Tasks entailing the highest cost
- c) Tasks in which the greatest care should be exercised in terms of system quality
- d) Tasks where the execution sequence can be changed

Q54. When the triangular distribution formula in the three-point estimation technique is used, which of the following is the expected duration in days required for an activity? The estimates are as shown below.

Conditions – Estimates for the duration of the activity

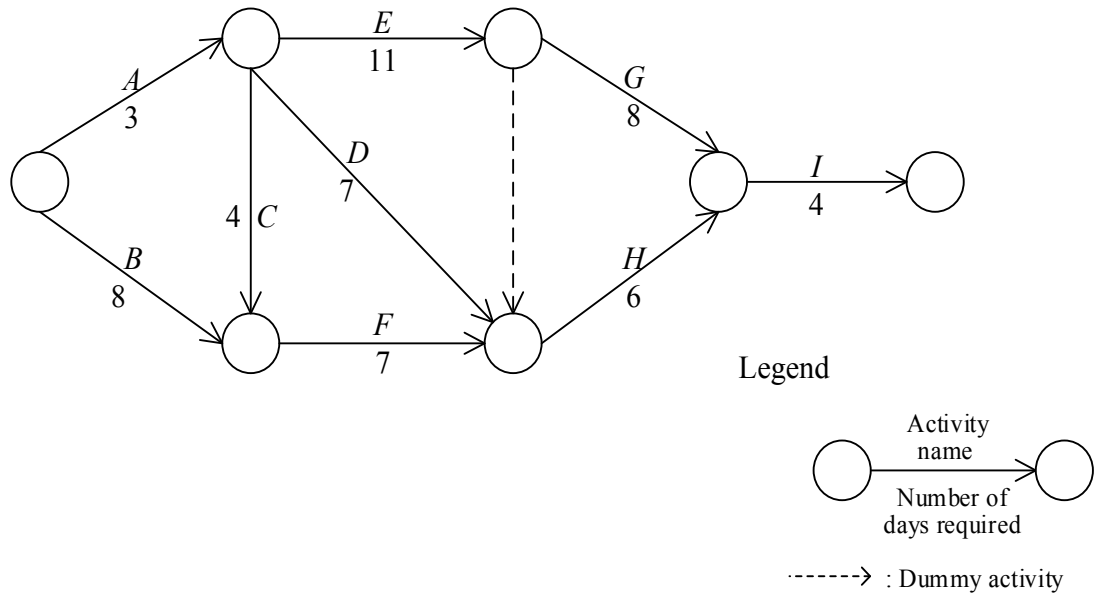
Case 1: Two (2) days – if an experienced employee is assigned to this activity

Case 2: Four (4) days – if an average employee is assigned to this activity

Case 3: Twelve (12) days – if an inexperienced employee is assigned to this activity

- a) 4 b) 5 c) 6 d) 7

Q55. The arrow diagram below shows a project's activities and milestones. Which of the following is the minimum project completion time in days?



a) 20

b) 24

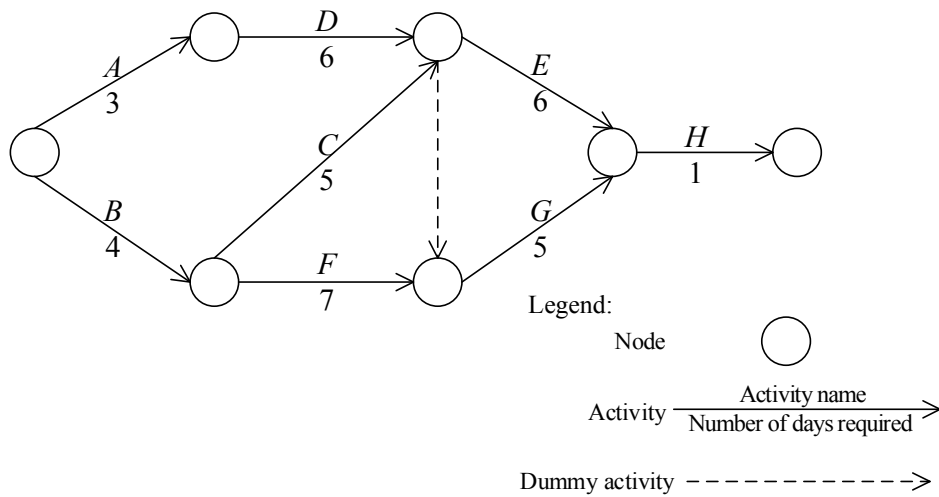
c) 25

d) 26

Q52. A project is planned to complete in 12 months and the budget for the completion of the project is \$100,000. After six months, it is found that \$60,000 was spent, but only 40% of the work has been completed. If the Cost Performance Index (CPI) is not changed, what is the estimated amount (in dollars) required to complete **the remaining tasks** of the project?

- a) 40,000 b) 60,000 c) 90,000 d) 150,000

Q54. The activities and nodes of a project are shown in the arrow diagram below. Which of the following is the effect of extending the duration of activity *C* by 3 days?



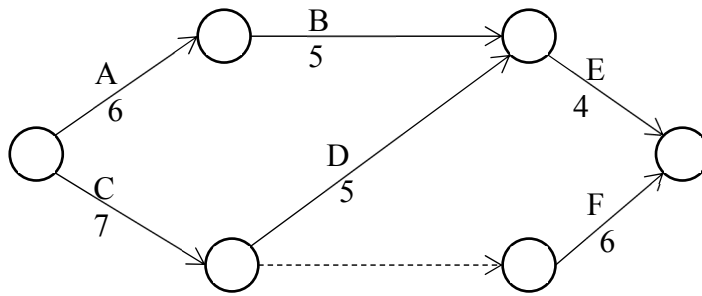
- a) The project duration is not affected.
- b) The project duration is extended by 1 day.
- c) The project duration is extended by 2 days.
- d) The project duration is extended by 3 days.

Q54. In system development, when the relationship between person-months and the duration (months) is represented in the approximate expression shown below, and the total person-month is 4096, how many months does it take?

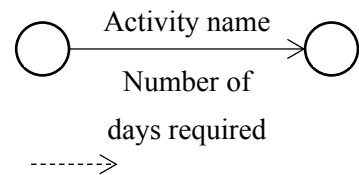
$$\text{Duration} = 2.5 \times \text{person-months}^{1/3}$$

- a) 16 b) 40 c) 64 d) 160

Q52. The activities and milestones of a project are shown in the arrow diagram below. Which of the following is an impact of reducing the duration of activity, D, by 3 days?



Legend:



Dummy activity

- a) Project duration is not changed.
- b) Project duration is reduced by 1 day.
- c) Project duration is reduced by 2 days.
- d) Project duration is reduced by 3 days.

Q53. The functional size of a new system was estimated to be 500 function points (FP). Apart from development, the project requires 10 person-months in total for installation of the system and education of developers. Additionally, for project management, 10% of the total person-months of development, installation, and education is required. How many person-months are required in total for this project? Here, the productivity in development is 10 FPs per person-month.

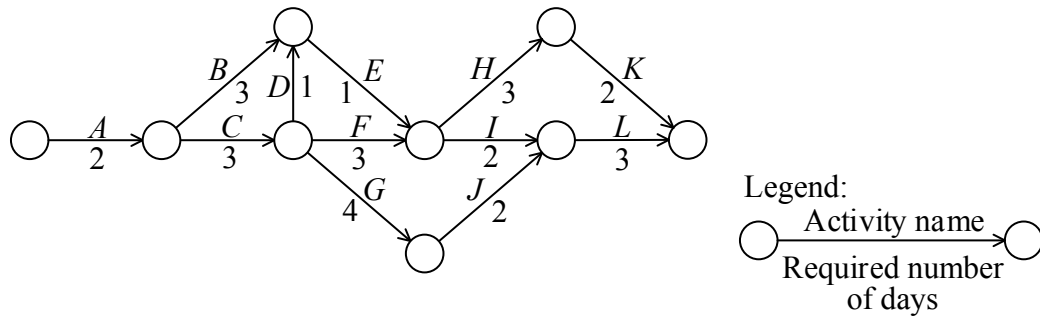
- a) 51 b) 60 c) 65 d) 66

Q52. A project with a development period of 10 months and the person-hours required for development as 200 person-months is planned. Which of the following is the number of staff members required during the peak time based on the distribution sheet shown below? Here, the number of staff members does not change from the start till the end of every process.

Item \ Process name	Requirements definition	Design	Development/ Test	System test
Allocation of person-hours (%)	16	33	42	9
Allocation of time period (%)	20	30	40	10

- a) 18 b) 20 c) 21 d) 22

Q53. Which of the following is the critical path of the project activities shown in the figure below?



- a) $A \rightarrow B \rightarrow E \rightarrow I \rightarrow L$
- b) $A \rightarrow C \rightarrow D \rightarrow E \rightarrow H \rightarrow K$
- c) $A \rightarrow C \rightarrow F \rightarrow I \rightarrow L$
- d) $A \rightarrow C \rightarrow G \rightarrow J \rightarrow L$

Q52. Screens are created for a system that is composed of a total of 100 screens. The breakdown of the 100 screens classified on the basis of size and complexity is shown below.

Number of screens with a “Small” size and “Low” complexity: 30

Number of screens with a “Medium” size and “Medium” complexity: 40

Number of screens with a “Large” size and “Medium” complexity: 20

Number of screens with a “Large” size and “High” complexity: 10

If the total number of person-days for creating all screens is estimated by using the number of person-days for creation shown in the table below, how many person-days are required? Here, a review and revision of all the screens requires five (5) person-days, and project management requires 20% of the total person-days, including the person-days for review and revision.

Number of person-days for creating each screen

Unit: Person-day

Complexity Size	Low	Medium	High
Small	0.4	0.6	0.8
Medium	0.6	0.9	1.0
Large	0.8	1.0	1.2

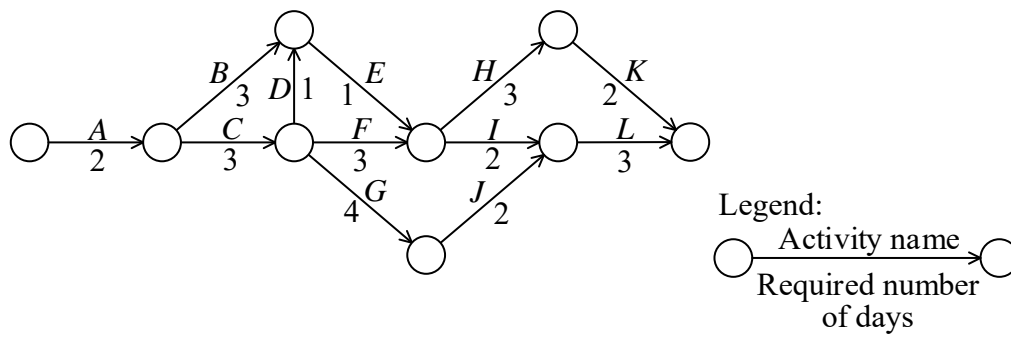
a) 80

b) 85

c) 101

d) 102

Q54. Which of the following is the critical path of the project activities shown in the figure below?



- a) A -> B -> E -> I -> L
- c) A -> C -> F -> I -> L

- b) A -> C -> D -> E -> H -> K
- d) A -> C -> G -> J -> L

Q52. By using the triangular distribution formula of the three-point estimation technique, which of the following is the expected duration (in days) required for an activity? The estimations are as shown below.

Conditions – Estimations for the activity duration

Case 1: Two (2) days. If an experienced employee is assigned for this activity.

Case 2: Four (4) days. If a general employee is assigned for this activity.

Case3: Twelve (12) days. If an unexperienced employee is assigned for this activity.

a) 4

b) 5

c) 6

d) 7

Q53. A project is planned to complete in 12 months and the budget for the completion of the project is \$100,000. After six months, it is found that \$60,000 are spent, but only 40% of the work is completed. If the Cost Performance Index (CPI) is not changed, what is the estimated amount (in dollars) required to complete **the remaining tasks** of the project?

- a) 40,000 b) 60,000 c) 90,000 d) 150,000

Q56. For servers, the total cost of ownership (TCO) is calculated over a period of 5-years. The purchase price of the servers is \$120,500 and the other annual costs are listed as below.

Area of Cost	Annual Cost (\$)
Insurance	2,030
Maintenance	1,000
Repair (average)	700
Registration	270

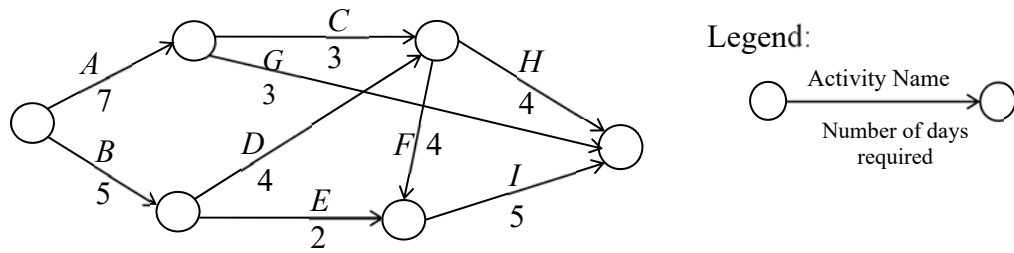
What is the TCO of the servers (in dollars)?

- a) 28,100 b) 120,500 c) 140,500 d) 622,500

Q72. When trial production is performed for components to be loaded into electrical appliances, which of the following is the development method with the least overall cost? Here, the construction time of each process is six (6) months for the creation process, three (3) months for the modification process, and two (2) months for the evaluation process. Moreover, the cost per one (1) person-month is 6,000 dollars for the creation process, and 10,000 dollars for each of the modification process and evaluation process. However, costs other than the three (3) costs of the person-month cost, purchase cost, and outsourcing cost are not taken into consideration.

	Development method	Purchase cost (dollars)	Outsourcing cost (dollars)	Number of persons per month (persons)		
				Creation process	Modification process	Evaluation process
a)	Purchasing samples and modifying them in-house	200,000	0	0	4	1
b)	Outsourcing in batch	0	350,000	0	0	0
c)	Modifying in-house assets	0	0	0	10	3
d)	Creating new products in-house	0	0	10	0	2

Q53. The following arrow diagram shows the activities and the milestones of a project. What is the minimum project completion time in days?



(a) 10

(b) 12

(c) 14

(d) 19

Q55. What is the function point value of a program that has the functions and characteristics described in the table below? Here, the correction coefficient of complexity is 0.75.

User function type	Count	Weighting coefficient
External input	1	4
External output	2	5
Internal logical file	1	10
External interface file	0	7
External inquiry	0	4

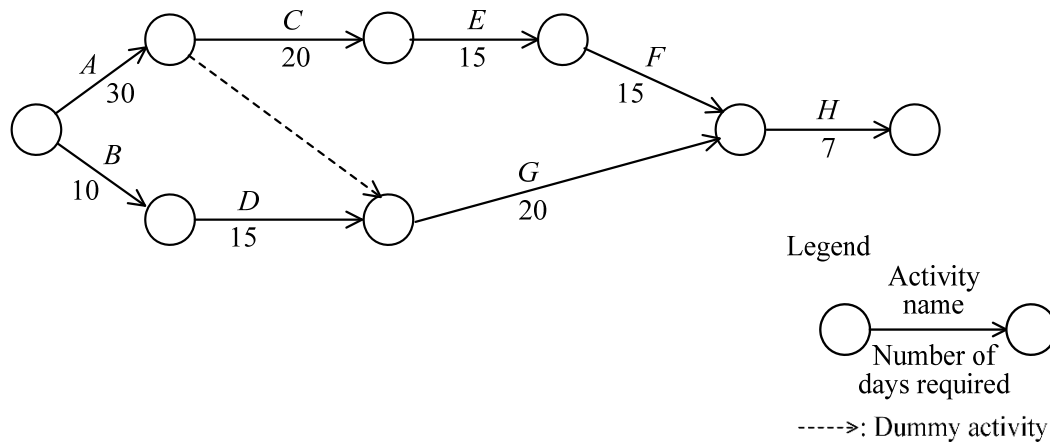
a) 18

b) 24

c) 30

d) 32

Q54. As shown in the arrow diagram below, there is a project consisting of eight activities A through G. Which of the following is the appropriate combination of the earliest finish time (EFT) and latest start time (LST) of activity G?



	EFT	LST
a)	30	60
b)	30	80
c)	50	60
d)	50	80

Q55. According to EVM (Earned Value Management), the budget of a software development project is \$10,000 and the project duration is planned for 10 weeks. After 4 weeks, it is revealed that only 30% of the work has been completed against a cost of \$4,200. What is the cost performance index?

- a) 0.126 b) 0.300 c) 0.420 d) 0.714

Q52. A project has been defined to contain the activities along with their required times for completion as shown in the table below. Which of the following is the critical path for this project?

Activity Number	Activity	Time (weeks)	Immediate Predecessor's Activity Number
1	Collection requirements	3	
2	Analyze process	2	1
3	Analyze data	2	2
4	Design Process	6	2
5	Design data	3	3
6	Design screens	2	3,4
7	Design reports	4	4,5
8	Programming	5	6,7
9	Test and Documentation	7	7
10	Install	2	8,9

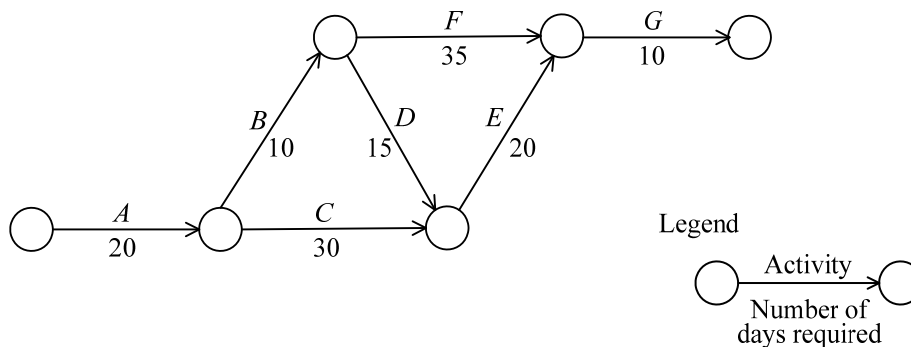
a) 1-2-3-5-7-9-10

b) 1-2-3-5-7-8-10

c) 1-2-4-7-9-10

d) 1-2-4-6-8-10

Q56. The arrow diagram below shows the original plan of a project.



If the project plan is changed as shown in the table below, which of the following impacts project completion date?

Activities	Changes
<i>A, F, and G</i>	These activities are completed on schedule as planned.
<i>B</i>	This activity is completed on the 33rd day after the start of the project.
<i>C</i>	The activity is completed 2 days earlier than planned.
<i>D and E</i>	These activities are completed 1 day later than planned.

- The project completion date is accelerated by 1 day.
- The project completion date is delayed by 1 day.
- The project completion date is delayed by 3 days.
- The project completion date is neither accelerated nor delayed.

Q57. A company is creating a development plan for job A. The first developer can perform this job alone in 10 days. Moreover, the first developer can perform this job in 6 days with the second developer. How many days will be required for the second developer to perform this job alone? Here, owing to communication, the work efficiency for each developer is reduced by 10% and the decimal needs to be rounded up.

- a) 10 b) 11 c) 12 d) 15

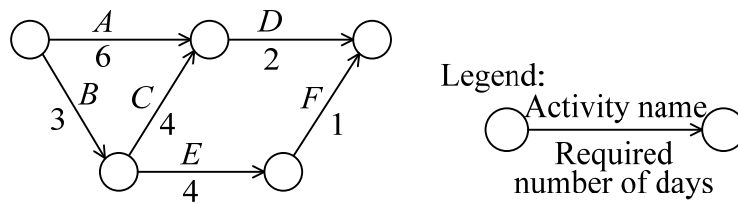
Q54. In a project to create the screens for a system that is composed of 100 screens in all, there are 30 small size screens of low complexity, 40 medium size screens of medium complexity, 20 large screens of medium complexity, and 10 large screens of high complexity. When the number of person-days is estimated on the basis of the standard task method with the standard number of person-days as shown in the table below, how many person-days are required to complete the project? Here, a review of all the screens requires five person-days, and project management requires 20% of the total person-days including the person-days for review.

[Standard number of person-days per screen] Unit: Person-day

Size \ Complexity	Low	Medium	High
Small	0.4	0.6	0.8
Medium	0.6	0.9	1.0
Large	0.8	1.0	1.2

- a) 80 b) 85 c) 101 d) 102

Q55. In the arrow diagram shown in the figure below, in order to reduce the time period of the entire project, some activities from activity *A* through *E* are reduced by one day each. Which of the following is a combination of activities by which the entire project can be shortened by two days?



a) *A, C, E*

b) *A, D*

c) *B, C, E*

d) *B, D*

Q56. What is the function point value of a program that has the functions and characteristics shown in the table below? Here, the correction coefficient of complexity is 0.75.

User function type	Count	Weighting coefficient
External input	1	4
External output	2	5
Internal logical file	1	10
External interface file	0	7
External inquiry	0	4

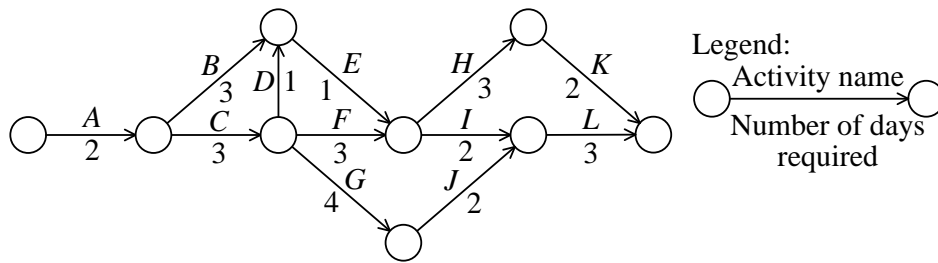
a) 18

b) 24

c) 30

d) 32

Q54. Which of the following is the critical path of the project activities shown in the arrow diagram below?



- a) $A \rightarrow B \rightarrow E \rightarrow I \rightarrow L$ b) $A \rightarrow C \rightarrow D \rightarrow E \rightarrow H \rightarrow K$
c) $A \rightarrow C \rightarrow F \rightarrow I \rightarrow L$ d) $A \rightarrow C \rightarrow G \rightarrow J \rightarrow L$

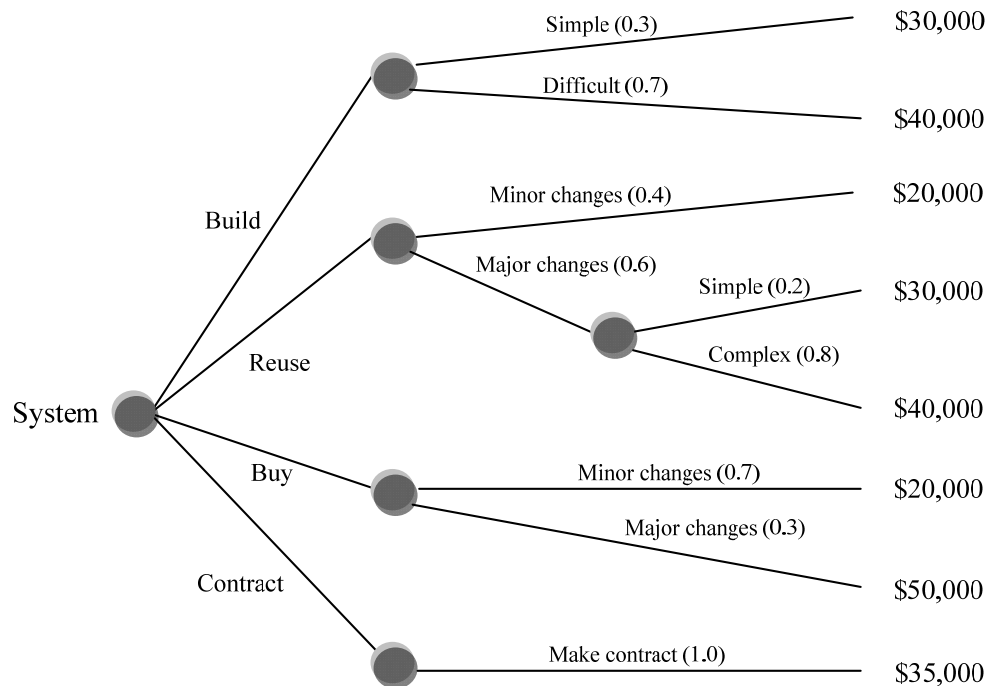
Q57. When the creation status of design documents is as described in the table below, how many person-hours are additionally needed to complete the creation of all three types of design documents?

Design document	Number of pages created	Required person-hours per page	Number of pages created until now
Basic design document	80	5	80
Outline design document	300	2	200
Detailed design document	500	2	50

- a) 550 b) 900 c) 1100 d) 2000

Q58. When the new procurement of a system is undertaken on the basis of the decision tree shown below, which of the following is the most appropriate course of action to be selected from a viewpoint of the lowest expected cost? Here, values enclosed in parentheses indicate the probability of each option, and the rightmost value is the estimated cost of each option. The expected cost of each choice (i.e., Build, Reuse, Buy, or Contract) is calculated as follows:

$$\text{Expected cost} = \sum (\text{"probability of each option"} \times \text{"estimated cost of each option"})$$



a) Build

b) Buy

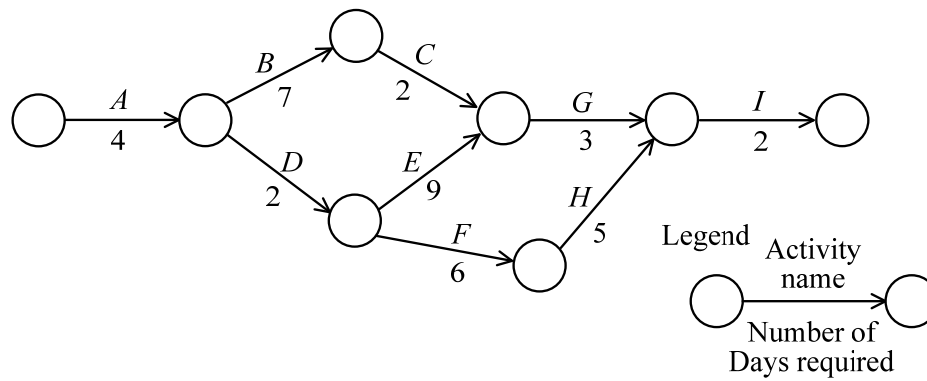
c) Contract

d) Reuse

Q59. The development scale of a new system is estimated as 500 Function Points (FPs). In the project for developing this system, in addition to the person-hours for development, 10 person-months are necessary for the installation of the system and the education of developers. Also, 10% of the person-hours for development, installation, and education are required for project management. How many person-months in total are necessary for this project? Here, the productivity in development is 10 FPs per one person-month.

- a) 51 b) 61 c) 65 d) 66

Q54. As shown in the arrow diagram below, there exists a project consisting of nine activities *A* through *I*. When the number of days required for activity *E* is shortened from 9 days to 6 days, by how many days can the minimum number of days required for this project be shortened?

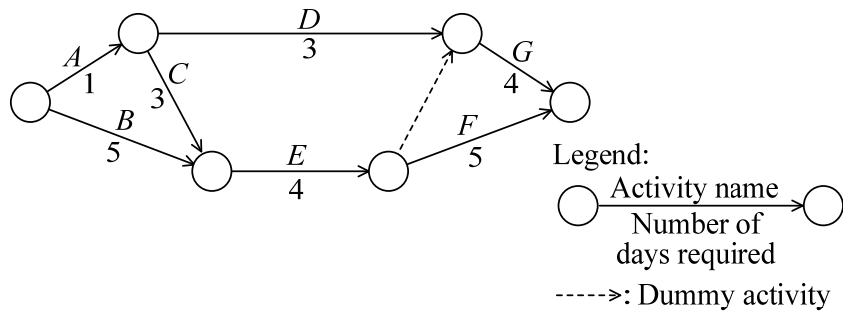


- a) 0 (Cannot be reduced)
- b) 1
- c) 2
- d) 3

Q4. There is a series of project activities to be performed by two staff members, Mr. *X* and Mr. *Y*. When each of them works alone, it can be completed by Mr. *X* in 3 hours and by Mr. *Y* in 6 hours. When Mr. *X* starts to work at 9:00 a.m. and then Mr. *Y* starts to work with Mr. *X* at 10:00 a.m., which of the following is the time at which all the activities are completed? Here, the activities can be divided and performed in parallel by the two members without any loss of productivity.

- a) 10:20 a.m. b) 10:40 a.m. c) 11:20 a.m. d) 11:40 a.m.

Q54. The arrow diagram shown below is created for time management of a project. Which of the following is the critical path?



- a) $A \rightarrow C \rightarrow E \rightarrow F$
c) $B \rightarrow E \rightarrow F$

- b) $A \rightarrow D \rightarrow G$
d) $B \rightarrow E \rightarrow G$

Q55. What is the function point value of a program that has the functions and characteristics shown in the table below? Here, the correction coefficient of complexity is 0.75.

User function type	Count	Weighting factor
External input	1	4
External output	2	5
Internal logical file	1	10
External interface file	0	7
External inquiry	0	4

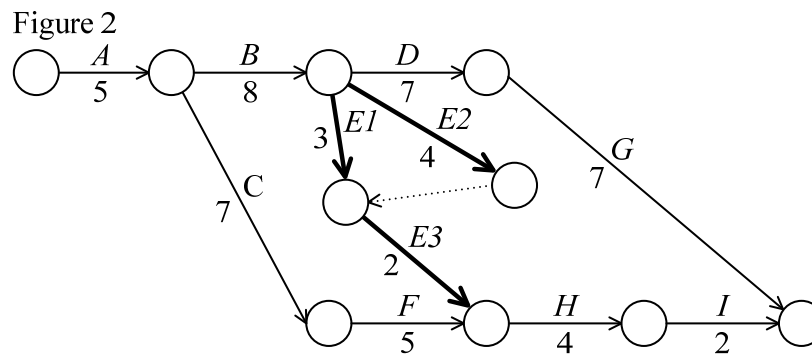
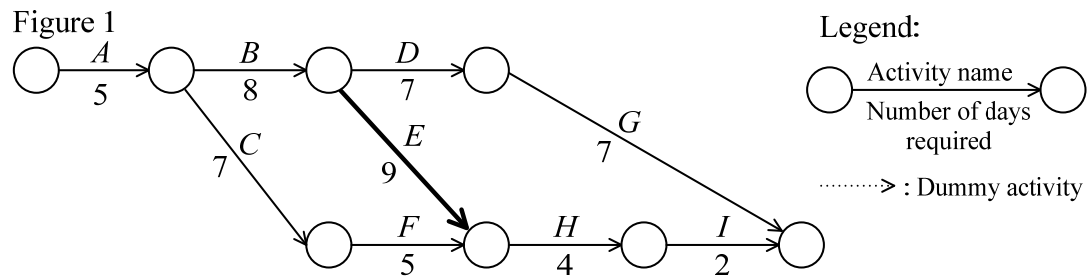
a) 18

b) 24

c) 30

d) 32

Q55. The fast-tracking technique is used to shorten a project schedule. The original plan is shown in Figure 1 below. When activity *E* is divided into activities *E1*, *E2*, and *E3* as shown in the revised plan in Figure 2, by how many days is the overall schedule from the beginning to the end of the project shortened?



a) 1

b) 2

c) 3

d) 4

Q55. The workload required to develop a system is estimated at 80 person-months if it is carried out by one person. When four staff members with the same productivity work together to develop the system, each member's productivity is expected to decrease by 20%. How many working days does it take for the four members to develop this system? Here, this development work can be equally divided into four parts, and the four members can perform each individual part in parallel. In addition, each member can work 22 working days per month.

- a) 352 b) 440 c) 528 d) 550

Q56. When an application program has functions and characteristics shown in the table below, which of the following is the function point value of the program? Here the correction coefficient of complexity is 0.5.

User function type	Number of items	Weighting factor
External input	2	4
External output	1	5
External inquiry	1	4
Internal logical file	0	10
External interface file	1	7

- a) 10 b) 12 c) 15 d) 24

Q77. An acceptance inspection is to be conducted on a purchased component that has a non-defective ratio of 0.9 and a defective ratio of 0.1. Four plans *A* through *D* are proposed for this acceptance inspection. The costs per non-defective and per defective for each plan are shown in the table below. Which of the following is the plan that has the lowest expected cost?

Plan	Cost per non-defective component	Cost per defective component
<i>A</i>	0	1,500
<i>B</i>	40	1,000
<i>C</i>	80	500
<i>D</i>	120	200

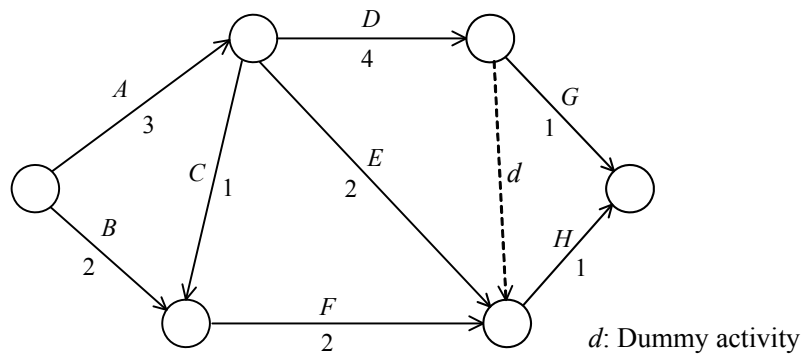
a) *A*

b) *B*

c) *C*

d) *D*

Q55. When a certain project includes activities A through H as shown in the arrow diagram below, which of the following is the earliest start date of activity H ? Here, the number shown beside an arrow indicates the number of days required for each activity, and the project starts on day zero (0).



- a) 4 b) 5 c) 6 d) 7

Q57. It takes 36 days for Mr. *A* to complete a certain task, and 18 days for Mr. *B* to complete the same task. When Mr. *A* performs the task together with Mr. *B*, approximately how many days does it take to complete the task? Here, the task can be divided and performed in parallel, and both Mr. *A* and Mr. *B* can achieve an average working efficiency of 90 % every day during the cooperative task.

- a) 11 b) 12 c) 13 d) 14

Q58. When the number of programs composing the system and the number of person-days required for coding per program are as shown in the table below, what is the minimum number of staff members required to develop the system in 95 days? Here, in addition to coding, the activities of design and testing are also necessary to develop the system, and those activities require eight times as many person-days as coding.

	Number of programs	Number of person-days required for coding per program
Input processing	20	1
Output processing	10	3
Calculation processing	5	9

- a) 8 b) 9 c) 12 d) 13

Q61. Company *A* issues an ID in the format shown below in the member registration processing. The table below shows the transition of the number of IDs issued by the end of each fiscal year. When this trend is assumed to continue in the future, in which fiscal year is Company *A* expected to run out of IDs in this format? Here, the IDs of resigned members are managed as vacant numbers and are not reused.

[Format of the ID]

XXNNN (e.g., AZ059)

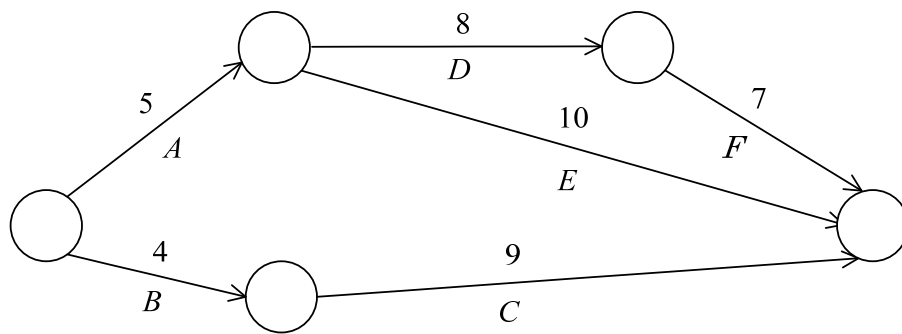
- For *X*, use an uppercase alphabetic character (A through Z).
- For *N*, use a number (0 through 9).

[Transition of the cumulative number of IDs issued by the end of each fiscal year]

Fiscal year	2007	2008	2009	2010
Cumulative number of IDs issued	317,000	383,000	447,000	512,000

- a) Fiscal year 2011
- b) Fiscal year 2012
- c) Fiscal year 2013
- d) Fiscal year 2014

Q54. In an arrow diagram shown below, when the number of days required to complete activity F can be reduced to one day from seven days, how many days can be reduced by the time all the activities A through F are completed? Here, in the diagram, each number shown beside the arrow indicates the number of days required to complete the activity.



a) 4

b) 5

c) 6

d) 7

Q55. The table below shows the series of activities for a certain project. The numbers in the table indicate how long (in weeks) it takes to complete each activity. Prior to starting each activity, the previous activities shown in the table must be completed. What is the total float (in weeks) of activity *C*? Here, the total float of an activity is the amount of time by which it may be extended or delayed without delaying completion of the project, assuming no extension or delay in any other activity.

Activity	Time (weeks)	Previous activity
<i>A</i>	5	—
<i>B</i>	2	—
<i>C</i>	2	<i>A</i>
<i>D</i>	7	<i>B</i>
<i>E</i>	5	<i>C, D</i>
<i>F</i>	8	<i>E</i>
<i>F</i>		—
(Completed)		<i>F</i>

- a) 1 b) 2 c) 3 d) 4

Q56. The person-months required to develop a system were originally estimated at 150 person-months. 60 person-months have been invested so far, 30% of the total system has been completed, and the project is behind schedule. By how many person-months does the project overrun the original estimate in order to complete the development of this system, on the assumption that the same productivity is maintained in the future?

- a) 50 b) 90 c) 105 d) 140

Q56. A painter has 20 houses and 4 shops to paint. In comparison with the shop, the house usually takes half the time to paint. The painter has finished painting 10 houses in 3 days. If the painter continues to work at the same pace, how many days does it take to complete the remaining work?

- a) 3.0 b) 3.6 c) 5.4 d) 8.4

Q57. The table below shows the series of activities for a certain project. The numbers in the table indicate the cost of each activity and how long (in weeks) it takes to complete each activity. Prior to starting each activity, the previous activities shown in the table must be completed. When the weekly cost of the project is minimized without delay of the project, what is the highest weekly cost in dollars during this project? Here, the weekly cost remains stable and unchanged during each activity.

Activity	Time (in weeks)	Cost (\$)	Previous activities
A	3	900	—
B	2	400	—
C	1	250	—
D	7	4200	A
E	6	900	B
F	2	350	C
G	4	1800	D, E
(Completed)	—	—	G

- a) 600 b) 700 c) 750 d) 800

Q62. The membership registration process in company *A* issues IDs in the format defined below. The table shows the transition of the number of issued IDs at the end of each fiscal year. On the assumption that this tendency continues in years to come, when are the IDs in this format expected to be exhausted? Here, the IDs withdrawn from membership are treated as missing numbers and are not be reused.

[ID format]

XXNNN (e.g. AZ059)

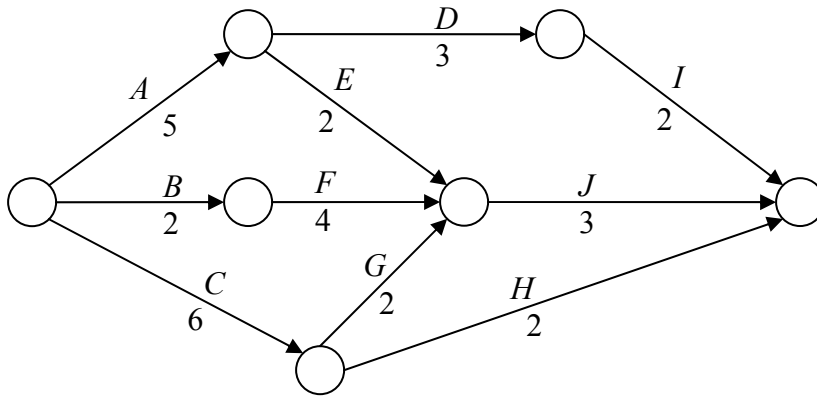
- “X” represents one of the uppercase alphabets (26 characters of A to Z).
- “N” represents one of the numbers (10 characters of 0 to 9).

[Transition of the number of issued IDs at the end of each fiscal year]

Fiscal year	2006	2007	2008	2009
Number of issued IDs (accumulated)	317,000	383,000	447,000	512,000

- | | |
|---------------------|---------------------|
| a) Fiscal year 2010 | b) Fiscal year 2011 |
| c) Fiscal year 2012 | d) Fiscal year 2013 |

Q76. In an arrow diagram shown below, at least how many days are needed to complete all the activities *A* through *J*? Here, in the diagram, each number shown beside the arrow indicates the number of days required for the activity.



a) 8

b) 9

c) 10

d) 11

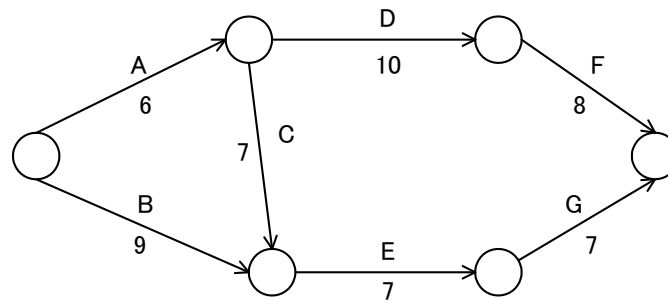
Q78. The sales staff at Company *A* wants to depart from Company *A*, visit customer companies *B*, *C*, and *D* once, respectively, and return to Company *A*. The table shows time required to move from one company to another. How long is the shortest time (in minutes) required for the visit?

Unit: minute

From \ To	Company <i>A</i>	Company <i>B</i>	Company <i>C</i>	Company <i>D</i>
Company <i>A</i>	–	20	35	40
Company <i>B</i>	20	–	50	25
Company <i>C</i>	35	50	–	30
Company <i>D</i>	40	25	30	–

- a) 95 b) 110 c) 140 d) 150

Q48. In an arrow diagram shown below, how many days are needed in minimum to complete all the activities A through G? Here, in the diagram, each number shown beside the arrow indicates the number of days required to complete the activity.



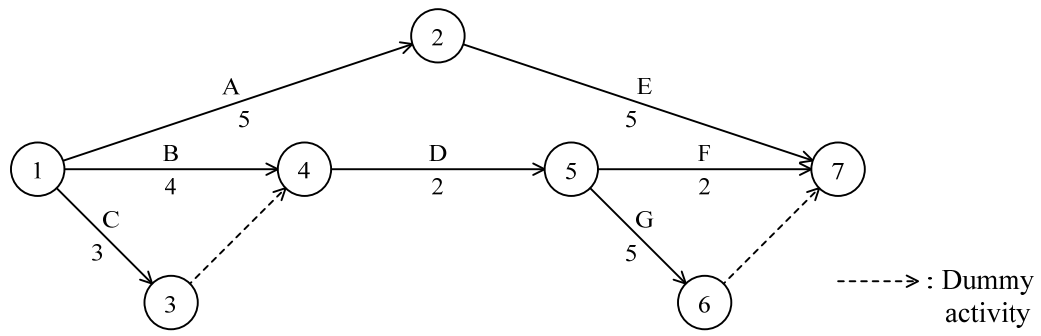
a) 10

b) 23

c) 24

d) 27

Q76. How many days in total are required in the critical path of the arrow diagram? Here, the number shown beside the arrow indicates the number of days for each activity.



a) 7

b) 8

c) 10

d) 11

- Q46.** There are seven activities, a through g shown in the table below. At least how many days does it take to complete these seven activities? Here, activities a and b can be performed concurrently, but the others cannot be done until their preceding activities are completed. For example, c cannot begin until a is completed. The optimistic time estimate is x in days, the most likely or normal time estimate is y , and the pessimistic time estimate is z . The expected time T_e is computed using the formula $(x + 4y + z)/6$.

Unit: day

Activity	Preceding activity	Optimistic x	Normal y	Pessimistic z	T_e $(x + 4y + z) / 6$
a	--	2	4	6	4.00
b	--	3	5	9	5.33
c	a	4	5	7	5.17
d	a	4	6	10	6.33
e	b, c	4	5	7	5.17
f	d	3	4	8	4.50
g	e	3	5	8	5.17

- a) 15.67 b) 19.51 c) 19.69 d) 20.00

- Q77.** The activities *A* to *E* shown below are planned in a system development project. What is the highest possible weekly cost (in dollars) of this project?

Activity	Description	Time (weeks)	Cost (\$/week)	Preceding activity
<i>A</i>	Setting up	3	1,100	
<i>B</i>	Data collection	4	600	
<i>C</i>	Analysis	6	900	<i>A, B</i>
<i>D</i>	Design	7	850	<i>B</i>
<i>E</i>	Documentation	2	500	<i>C</i>

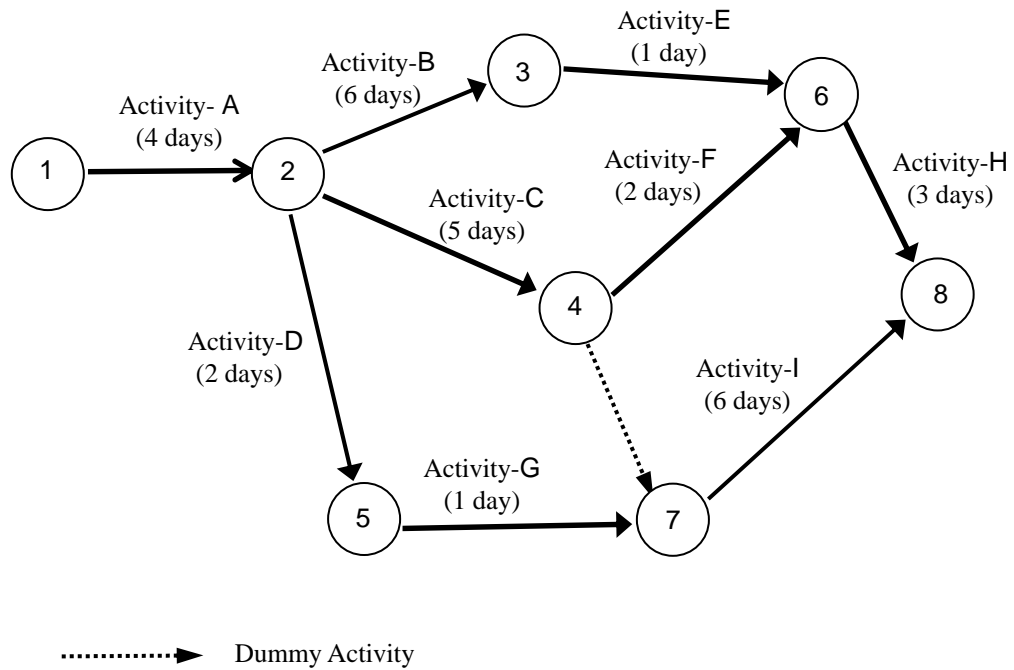
- a) 1,100 b) 1,700 c) 1,750 d) 1,950

Q79. The following table shows the duration for the optimistic, most likely, and pessimistic scenarios in a program development. How many hours are required to complete all the activities on a “three point estimate” basis?

Development activities	Estimated duration (hours)		
	Optimistic	Most likely	Pessimistic
Requirement understanding	1.0	1.5	2.0
Design	2.0	2.5	3.0
Coding	4.5	6.5	7.0
Testing	2.5	4.5	5.0

- a) 14 b) 14.5 c) 15 d) 17

Q78. In order to shorten the cumulative duration of activities on the critical path by one day, which of the following is the appropriate action to be taken?



- a) To shorten the activities **B** and **F** by one day respectively
- b) To shorten the activity **B** by one day
- c) To shorten the activity **H** by one day
- d) To shorten the activity **I** by one day