

**Q3.** Which of the following is an appropriate explanation of normal distribution?

- a) A continuous, bathtub-shaped distribution that is used to express the failure rate
- b) A continuous, bell-shaped distribution that is symmetric about its mean
- c) A discrete distribution that expresses the probability of an event occurring a given number of times in a fixed interval
- d) A discrete distribution where all events have the same probability to occur

**Q75.** Which of the following is an explanation of accountability at the executive managerial level?

- a) A company has a responsibility to explain the content and performance of business activities to shareholders and other interested parties.
- b) A company quantifies the cost of environmental maintenance and its effects and announces them periodically as financial information.
- c) Investors and analysts must be provided with accurate information that is necessary for investment decisions in a timely manner and on an ongoing basis.
- d) Rules, manuals, and verification systems are established on the basis of corporate ethics, and corporate management is performed in accordance with the relevant laws.

**Q76.** Which of the following can secure employment and create employment opportunities across an entire society by shortening work hours per employee?

- a) Cafeteria plan
- b) Free agent system
- c) Work sharing
- d) Work-life balance

**Q79.** In financial statements, which of the following shows the company's assets, liabilities, and net assets at a certain point in time and indicates the company's financial situation?

- a) Balance sheet
- b) Statement of cash flows
- c) Statement of changes in equity
- d) Statement of profit or loss



**Q80.** Which of the following is an action that is taken in order to improve the cash flow?

- a) Pay the notes payable on a shorter timeline.
- b) Receive payment on the notes receivable on a longer timeline.
- c) Shorten the time period for collecting accounts receivable.
- d) Shorten the time period for making payments on accounts payable.

**Q63.** Which of the following is a description of BPO?

- a) It refers to a company not having its own server and operating a system by renting a part of the processing capability or the storage capacity of a server that is owned by a communication service provider.
- b) It refers to a company not having its own software and using functions of software that an external specialized vendor provides via a network.
- c) It refers to the outsourcing of a whole business process of a specific department of the company, such as the administration department or the call center, together with the operation of a business system to an external specialized vendor.
- d) It refers to utilizing employees from a staffing company with lower personnel expenditures than those of the company to reduce the cost of software development.

**Q73.** Which of the following is an appropriate description of Initial Coin Offering (ICO)?

- a) A crowd-funding method in which backers contribute money toward an idea or a startup and get rewards like physical products
- b) A fundraising method that is mainly used by a financially stable company which wants to expand and develop to the public
- c) A popular fundraising method that is used primarily by a startup, normally through utilizing cryptocurrency
- d) A process of offering shares of a private corporation to the public in a new stock issuance

**Q75.** Which of the following is a management organization that creates a cross-functional team between project and functional organizations to flexibly respond to changes in the business environment?

- a) Divisional organization
- b) Line and staff organization
- c) Matrix organization
- d) Project organization

**Q76.** Which of the following is an example of Green IT?

- a) Development of a powerful in-house data center
- b) Development of efficient in-house software
- c) Using a desktop PC instead of a thin client laptop
- d) Using web conferencing instead of travelling to meetings

**Q77.** Which of the following is a description of a CIO?

- a) The chief executive that governs the planning and execution of strategies in the area of finances, such as fund-raising or financial reporting
- b) The chief executive that governs the planning and execution of strategies regarding information management and information systems
- c) The chief executive that governs the planning and execution of technological strategies and R&D plans of the company
- d) The chief executive that governs the planning of business strategies and the execution of business

**Q78.** Which of the following is the appropriate description concerning creation and operation of a Business Continuity Plan (BCP)?

- a) In addition to natural disasters, device failure in information systems and malware infections are also included in the scope of examination.
- b) The planning contents are important matters related to the business strategy and therefore, only senior managers are notified.
- c) The planning contents are restricted to those activities performed by the company.
- d) The recovery of business processes dependent on IT is prioritized according to technical easiness of recovery.

**Q80.** Which of the following is an appropriate description of the scope of software protection under WTO's Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)?

- a) Algorithms and programming languages are protected.
- b) Application programs are protected but system programs such as an OS are not, as the value of the right is included in the hardware cost.
- c) Both source programs and object programs are protected.
- d) Documents that describe algorithms are protected, but programs created by using the algorithms are not.



**Q75.** Which of the following is an organizational structure of a corporation that is temporarily structured by specialists from each department to reach a specific goal over a limited period and operates independently from all other standing organizations?

- a) Company system organization
- b) Divisional system organization
- c) Functional organization
- d) Project organization

**Q76.** There are several quality control tools that have been used primarily for manufacturing and inspection departments. Which of the following is a combined graph containing a bar graph that shows the numeric values of individual items in descending order, and a line graph that shows the cumulative total of the composition ratios of these numeric values?

- a) Control chart
- b) Histogram
- c) Pareto chart
- d) Scatter diagram

**Q77.** In a sampling inspection, which of the following can be used to ascertain the probability of acceptance of a lot with a certain defective ratio?

- a) Bathtub curve
- b) Gompertz curve
- c) Logistic curve
- d) OC curve

**Q78.** Which of following is an expression for calculating the cost of goods sold (or cost of sales) of a manufacturing company?

- a)  $\text{Material cost in current period} + \text{Labor cost in current period} + \text{Expense in current period}$
- b)  $\text{Product inventory at beginning of period} + \text{Product manufacturing cost in current period} - \text{Product inventory at end of period}$
- c)  $\text{Product inventory at beginning of period} + \text{Product manufacturing cost in current period} - \text{Work in process inventory at end of period}$
- d)  $\text{Work in process inventory at beginning of period} + \text{Product manufacturing cost in current period} - \text{work in process inventory at end of period}$

**Q80.** Which of the following is the intellectual property right that does not require registration for protection in the World Trade Organization (WTO) member states?

- a) Copyright      b) Industrial design      c) Patent      d) Trademark

**Q61.** Which of the following is an explanation of an application architecture that constitutes enterprise architecture?

- a) It systematically describes the business processes or the information flows necessary for the business strategy.
- b) It systematically describes the contents of the data necessary for business operations, the relations or structures between the data, etc.
- c) It systematically describes the functions or system configurations that support business processes.
- d) It systematically describes the technical components necessary for the developments and operations of the information systems.

**Q64.** When examples of utilizing big data are classified according to the feedback destination of the analysis and the reflection timing, which of the following utilization examples corresponds to *D* in the table below?

		Reflection timing of analysis	
		Once every fixed period	Immediately
Feedback destination of analysis	All customers	<i>A</i>	<i>B</i>
	Individual customer	<i>C</i>	<i>D</i>

- a) Based on the location data acquired from the smartphone of a customer registered as a member and the purchase history data of the customer, recommended products from nearby retailers are displayed on the smartphone.
- b) From the large volume of purchase data collected and accumulated by using member cards, the preferences of each customer are analyzed, and coupons for the next month are issued according to the purchase volume of the previous month.
- c) The current traffic status of each road is published on the website by collecting and analyzing data of the position, speed, and other parameters of moving cars.
- d) The ranking of the largest-selling products of each month is extracted from the POS data of the last few years from sister stores, and images of the products corresponding to the current month are displayed on monitors inside the store.

**Q75.** In a company, which of the following is the main role of the manufacturing department?

- a) Attracting, developing, and sustaining the labor force and maintaining employee records
- b) Managing financial assets and maintaining financial records
- c) Producing products and services
- d) Selling products and services



**Q76.** Which of the following is an officer whose primary responsibility is the security of a company's information and data?

- a) CCO                      b) CIO                      c) CISO                      d) COO

**Q77.** Which of the following is a method of education and training in which trainees engage in simulated business activities, interact with other people to develop experiences, and try out different strategies?

- a) Case study      b) Debate      c) In-basket      d) Roll-playing

**Q78.** Which of the following is a method of inventory asset valuation to calculate the inventory unit price by the expression as shown below each time that a new inventory asset is received?

$$\frac{(\text{The costs of goods received} + \text{The costs of goods in stock})}{(\text{The quantity of goods received} + \text{The quantity of goods in stock})}$$

- a) Final acquisition cost method (Final purchase cost method)
- b) First-in first-out method
- c) Moving average method
- d) Periodic average method

**Q80.** Which of the following is an organization that manages the standardization of technologies used on the Internet, and develops the technical specifications as an RFC?

- a) ANSI                      b) IEEE                      c) IETF                      d) NIST

**Q64.** Which of the following is an explanation of BYOD (bring your own device)?

- a) Carrying information devices loaned by the company for use in work
- b) Configuring a usage environment for the personal use of personally-owned information devices
- c) Using employees' personally-owned information devices for work
- d) Using laptop computers or other devices owned by the company for personal use outside of the company

**Q75.** Which of the following is an explanation of a matrix organization?

- a) A temporary and flexible organization in which experts are gathered together from other departments to solve specific issues with a set time frame and goal
- b) An organization having functionally differentiated departments on the basis of specialized knowledge of the work, such as procurement, production, sales, and finance
- c) An organization in which members usually belong both to a functional department and to a department that executes specified business
- d) An organization in which self-contained management activities can be developed by possessing the functions and the profit responsibility necessary for the business execution on a per-product, per-customer, or per-region basis

**Q76.** Which of the following is an explanation of work sharing?

- a) A concept that aims for diverse and flexible working styles, for the purpose of realizing harmony between work and life
- b) A method that allows employees to select welfare services within a certain range
- c) A system that allows employees to choose their workplace or duty
- d) An initiative for securing employment through shortening of work hours per employee and review of work assignments

**Q77.** Which of the following is a process of discovering useful patterns and relationships by the analysis of large volume of data?

- a) Brainstorming
- b) Data mining
- c) Decision tree
- d) Document analysis



**Q80.** Which of the following is software whose copyright is abandoned and that can be used free of charge?

- a) Freeware
- b) Open Source Software
- c) Public Domain Software
- d) Shareware

**Q76.** Which of the following is an appropriate method to forecast the amount of revenue during an upcoming promotion at a store, based on historical data?

- a) Cluster analysis
- b) Delphi method
- c) Pareto analysis
- d) Regression analysis

**Q77.** Which of the following is an appropriate explanation of a scatter diagram?

- a) It is a chart used to determine if a relationship, pattern, or trend exists between two numeric attributes.
- b) It is a chart used to summarize the frequency distribution of a given attribute.
- c) It is a type of chart that contains both bars and a line graph, where individual values are represented in descending order by bars, and the cumulative total is represented by a line.
- d) It is a type of chart used to determine whether a process is in a stable state or not, and it plots characteristic values based on temporal transition.

**Q80.** Which of the following is an appropriate description of the scope of software protection under Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)?

- a) Algorithms and programming languages are protected.
- b) Application programs are protected but basic programs such as an OS are not covered, as the value of the right is included in the hardware cost.
- c) Both source programs and object programs are protected.
- d) Documents that describe algorithms are protected, but programs created by using the algorithms are not protected.

**Q66.** When a developmental process of utilizing big data is classified into the four (4) stages below, which of the following is an example that corresponds to the fourth stage?

[Developmental stages of big data utilization]

Stage 1: Confirmation of facts in the past and present (what was it before?)

Stage 2: Interpretation of the past and present status (why have/had it be so?)

Stage 3: Prediction of the occurrence of a possible event in the future (what is it likely to be?)

Stage 4: Development into a future activity (what should be done?)

- a) Based on the analysis results of the big data in which the operation histories of many users are stored, the operational errors and their causes that were not anticipated by the manufacturer at first are found.
- b) Based on the big data, cases of operational errors made by users and increase in the failure rate due to such cases are estimated and the user interface is improved to make it less likely to cause operational errors.
- c) By using a simulation that uses big data, an increase in the failure rate of a product is estimated when an operational error supposed occurs repeatedly.
- d) By using the Internet access function of a product, the operation histories of many users of the product are stored in big data, and the rate of using functions is clarified after the product is sold.

**Q76.** Which of the following is a characteristic of the OJT?

- a) A dedicated approach to education is possible by staying away from the work place.
- b) Because the boss or a senior associate imparts hands-on knowledge and technical education by staying close to practical affairs, the required competency can be acquired.
- c) Education that focuses on generalized knowledge and technology can be received.
- d) Regardless of the qualification of the boss or senior associate, occupational knowledge of a specific standard can be acquired.

**Q77.** Which of the following is a description of the ABC analysis?

- a) It analyzes a region in more detail based on various data (population, purchasing power, etc.) by dividing the region into a grid with multiple sections.
- b) It arranges products in the order of high sales or high gross profit, divides into levels based on the cumulative ratio, and then plans to increase the volume of the sales of products at the high levels.
- c) It classifies and aggregates multiple parts of the survey data by a factor and analyzes the sales capacity and status of purchasing the same products.
- d) It repeatedly surveys the same panelist (respondent) many times. This data is used to understand the trends in the region or changes in the purchasers.

**Q80.** Which of the following is a criminal act related to a computer virus according to the Convention on Cybercrime?

- a) A person creates a new virus to develop and test antivirus software.
- b) A person forwards a received e-mail that is infected with a virus without being aware of the infection.
- c) A person who finds a virus that is created by a stranger stores the virus for the purpose of subsequently running it on another person's computer.
- d) A person who receives and finds a virus offers it to an antivirus organization with a clear indication of the virus's presence.



**Q64.** Which of the following is an example of usage of big data by a company?

- a) A large amount of text on various social media channels is analyzed, and the products are improved.
- b) Employees in their 10th year of employment are extracted from the personnel information during the creation of a list of intended staff members for in-house training.
- c) The contact address is extracted from already-registered customer information for inquiries to the customer center.
- d) The sales profit ratio is calculated from the financial statements disclosed by the most important business partner.

**Q65.** Which of the following is an explanation of Business Intelligence (BI)?

- a) It is a method of ensuring continuous improvement in business operations by visualizing the business operations flow and applying the business operations improvement cycle.
- b) It is a method of improving the cost, quality, service, etc. by drastically reconstructing the business processes without being bound by the practices in the company.
- c) It is a method of supporting the speedup of decision-making of a company by utilizing accumulated internal and external data through classification, processing, and analysis.
- d) It is a method of using the entire system efficiently by mutually connecting different systems in the company and integrating the data and processes.

**Q78.** There are several quality control tools that have been used primarily for manufacturing and inspection departments. Which of the following sets two corresponding types of data on the vertical and horizontal axes, after which the measured values are plotted?

- a) Control chart
- b) Histogram
- c) Pareto chart
- d) Scatter diagram

**Q80.** Which of the following is an appropriate order of the workflow from transaction records to closing accounts?

- a) General Ledger → Journal Book → Trial Balance Sheet → Work Sheet → Financial Statements
- b) General Ledger → Journal Book → Work Sheet → Trial Balance Sheet → Financial Statements
- c) Journal Book → General Ledger → Trial Balance Sheet → Work Sheet → Financial Statements
- d) Journal Book → General Ledger → Work Sheet → Trial Balance Sheet → Financial Statements

**Q73.** Which of the following is a management organization that creates a cross-functional team between project and functional organizations in order to flexibly respond to changes in the business environment?

- a) Divisional organization
- b) Line and staff organization
- c) Matrix organization
- d) Project organization

**Q74.** Which of the following is the appropriate role of a facilitator in a meeting?

- a) To act as the chairperson and control the discussions so as to work out a conclusion that matches the intentions of the management
- b) To encourage the participants of the meeting to put forth their remarks and organize the flow of discussions from a neutral and impartial position
- c) To give advice only in discussions related to specific areas in which the facilitator specializes, such as technical or legal fields
- d) To offer specialized support for the administration of a meeting, such as adjusting the schedule, preparing materials, or creating minutes.

**Q75.** Which of the following is an explanation of an affinity diagram?

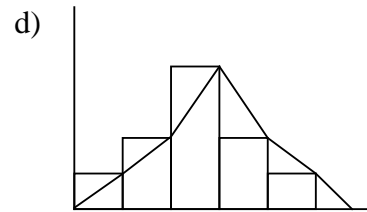
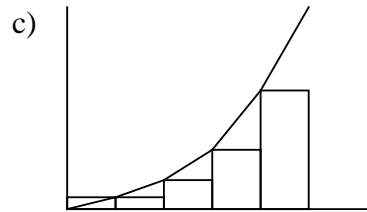
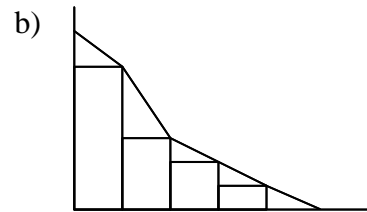
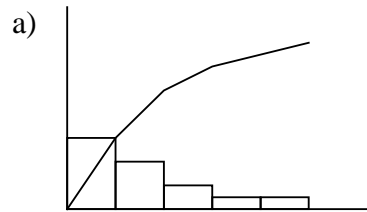
- a) It is a method by which along with the progress in a situation, measures are examined for problems that might have several outcomes, and the process leading to the desired result is decided.
- b) It is a method by which a causal relationship is clarified for events intertwined with complex factors.
- c) It is a method by which the collected information is categorized on the basis of a mutual relationship, and the problems to be resolved are clarified.
- d) It is a method by which the means and measures for achieving the purpose and objectives are developed sequentially, and the most appropriate means or measures are sought.

**Q76.** Which of the following is an example of Green by IT?

- a) Development of efficient in-house software
- b) Development of a powerful in-house Data Centre
- c) Using a desktop PC instead of a laptop thin client
- d) Using web conferencing instead of travelling to meetings



**Q77.** A factory has recorded the number of occurrences of defective products according to the cause of the defect. Based on this record, which of the following is a Pareto chart that shows the top causes of defective product occurrences and the cumulative total of percentages?



**Q79.** When the inventory unit price is determined by dividing the total purchase amount by the total quantity of items purchased, which of the following is an appropriate inventory method to be used?

- a) First-in first-out method
- b) Periodic average method
- c) Moving average method
- d) Final acquisition cost method (Final purchase cost method)

**Q80.** Which of the following is an appropriate description of the scope of software protection under WTO's Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)?

- a) Algorithms and programming languages are protected.
- b) Application programs are protected but basic programs such as an OS are not, as the value of the right is included in the hardware cost.
- c) Both source programs and object programs are protected.
- d) Documents that describe algorithms are protected, but programs created by using the algorithms are not.

**Q63.** Which of the following is an explanation of a project organization?

- a) An organization is structured to extend across multiple companies to actively utilize external management resources such as in strategic alliances or joint development.
- b) Each organizational unit, structured on the basis of product, region, etc., is given responsibility for profit.
- c) It is formed only for a certain period of time to solve a given problem, and it is dissolved when the problem is solved.
- d) Tasks are divided according to functions, and orders and instructions are given to subordinates for each function.

**Q67.** Which of the following descriptions corresponds to the CSR procurement?

- a) Choosing the product with the lowest price to minimize costs
- b) Having multiple suppliers to avoid situations in which procurement is not possible after disasters
- c) Indicating procurement standards that consider the environment, human rights, etc., and requesting suppliers to comply with these
- d) Using EDI for purchasing goods to perform prompt and accurate procurement

**Q76.** To secure transparency of business administration, which of the following is a concept that supervises and monitors a company's activities from the perspective of questions such as for whom the company runs its business, what the structure of the top management is like, and whether the organization has self-improvement capabilities?

- a) Core competence
- b) Corporate governance
- c) Corporate identity
- d) Stakeholder analysis

**Q77.** Which of the following items should be put under “Liabilities and Stockholder’s Equity” in a balance sheet?

- a) Cash                      b) Common stock                      c) Fixed assets                      d) Inventories

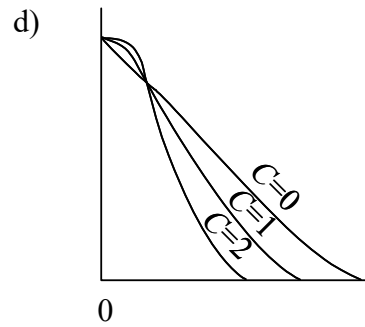
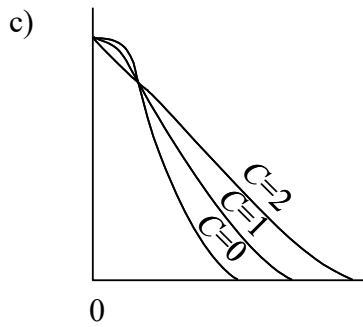
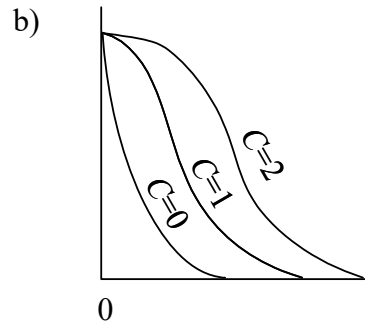
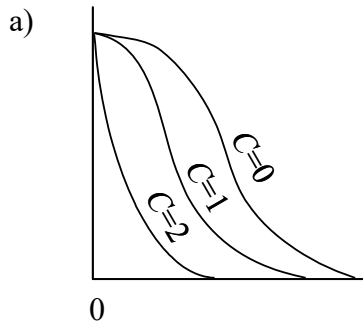
**Q78.** Which of the following type of financial statements shows the financial position of an enterprise at a particular point of time?

- a) Balance sheet
- b) Cash flow statement
- c) Income statement
- d) Statements of shareholders' equity



**Q80.** The horizontal and vertical axes of an Operating Characteristic (OC) curve in quality management generally represent the percent defective of a lot and the success rate of a lot, respectively. Samples of size  $n$  are extracted from a lot of size  $N$ , and when the number of defective samples is equal to or less than the pass quantity  $C$ , the lot is considered to have passed, and when it exceeds  $C$ , the lot is considered to have failed.

Which of the following is a diagram that represents the trend of change in the OC curve when  $N$  and  $n$  are fixed and  $C$  takes the values 0, 1, and 2?



**Q76.** Which of the following is a management organization that has a characteristic of both project and functional organizations to flexibly respond to changes in the business environment?

- a) Divisional organization
- b) Hierarchical organization
- c) Line and staff organization
- d) Matrix organization

**Q80.** Which of the following is **not** protected by “copyright” that is based on the World Trade Organization’s Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)?

- a) Database
- b) Free software publicly available on the Internet
- c) Programming language and its conventions
- d) Software operation manual

**Q71.** In IT investment opportunities, when the investment effect of five (5) years is evaluated on the basis of ROI (Return On Investment), which of the following four (4) opportunities *A* through *D* has the greatest effect? Here, the IRR (Internal Rate of Return) is zero (0).

*A*

Year	0	1	2	3	4	5
Profit		15	30	45	30	15
Amount of investment	100					

*B*

Year	0	1	2	3	4	5
Profit		105	75	45	15	0
Amount of investment	200					

*C*

Year	0	1	2	3	4	5
Profit		60	75	90	75	60
Amount of investment	300					

*D*

Year	0	1	2	3	4	5
Profit		105	105	105	105	105
Amount of investment	400					

- a) *A*                      b) *B*                      c) *C*                      d) *D*

**Q76.** Which of the following can secure employment and create employment opportunities in an entire society by shortening the work hours per employee?

- a) Cafeteria plan
- b) Free agent system
- c) Work sharing
- d) Work-life balance

**Q77.** Which of the following is an explanation of an ABC analysis method?

- a) A survey of the same panelists is repeatedly conducted. This data is used to understand trends in regions and changes in purchasing groups.
- b) Products are arranged in order of high sales or high gross margins, and then products are divided into various levels by using the cumulative ratio. Following this, an increase in sales volume is planned for the products at the high levels.
- c) Regions are divided into a grid with multiple sections, and detailed regional analysis is performed on the basis of various data, such as population and purchasing power.
- d) The sales potential and the purchasing record of a product are analyzed by classifying and aggregating multiple items of survey data by factor.

**Q79.** Which of the following is a technique that discovers useful information and relationships from large amounts of customer and market data retained by a company?

- a) Data dictionary
- b) Data flow diagram
- c) Data mining
- d) Data warehouse

**Q80.** Among the descriptions of personal data, which of the following is **not** an appropriate description from the viewpoint of “OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data”?

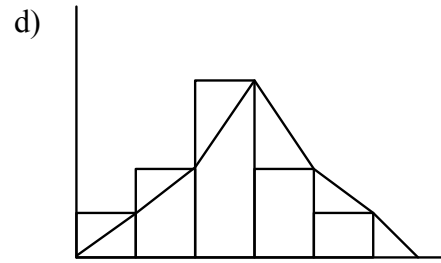
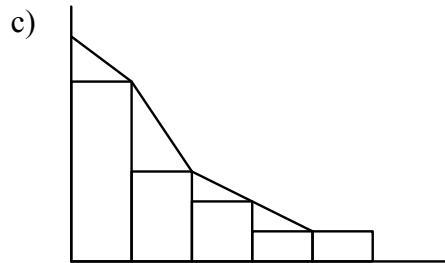
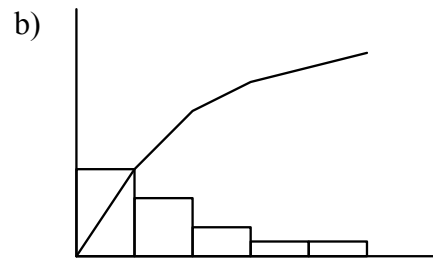
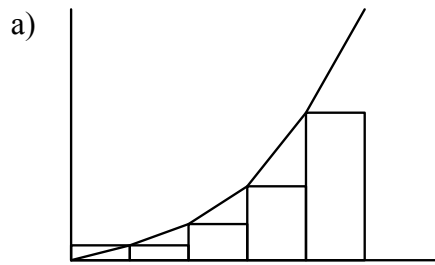
- a) Personal data should be allowed to be acquired without announcing the acquisition of such data.
- b) Personal data should be handled within the scope of the purpose of use agreed by the persons whose personal data are collected.
- c) Personal data should be kept accurate, complete, and up-to-date within the scope of the purpose of use.
- d) Personal data should be outsourced to a third party after the prior consent of the persons whose personal data are collected.



**Q4.** What is the distribution of arrival rate in an M/M/1 queuing model?

- a) Exponential distribution
- b) Geometric distribution
- c) Normal distribution
- d) Poisson distribution

**Q76.** Which of the following is an appropriate Pareto chart?



**Q80.** Which of the following is a criminal act related to a computer virus according to the Convention on Cybercrime?

- a) A person creates a new virus to develop and test antivirus software.
- b) A person forwards a received e-mail that is infected with a virus without being aware of the infection.
- c) A person who found a virus that was created by a stranger stores the virus for the purpose that he/she can later run it on another person's computer.
- d) A person who received and found a virus offers it to an antivirus organization with a clear indication of a virus's presence.

**Q80.** Which of the following is an appropriate description of the protection scope of software under the WTO's Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)?

- a) Algorithms and program languages are protected under the agreement.
- b) Application programs are protected under the agreement but basic programs such as an OS are not covered, because the value of the right is included in the hardware cost.
- c) Both source programs and object programs are protected by the agreement.
- d) Documents describing a mathematical formula are not protected under the agreement, but the mathematical formula itself is protected.

**Q74.** Which of the following is a chart or a diagram that is used to analyze possible relationships between two variables and is composed of a horizontal axis containing the measured values of one variable and a vertical axis representing the measurements of the other variable?

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

**Q76.** Which of the following is the forecasting technique that performs the procedure below in order to address problems that involve future prediction difficult to make by using other techniques?

[Procedure]

- (1) Select some experts as respondents to questions.
- (2) Aggregate the responses to questions for use in feedback, and ask questions again.
- (3) Process the responses statistically, and present the responses together with their distribution.

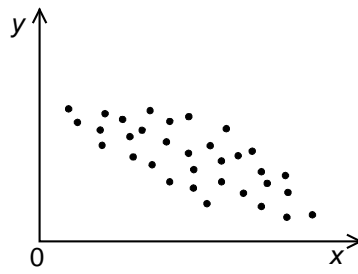
- |                            |                         |
|----------------------------|-------------------------|
| a) Cluster analysis method | b) Cross-section method |
| c) Delphi method           | d) Monte Carlo method   |

**Q78.** Which of the following is the form of organization that has the characteristics (1) through (4) described below?

- (1) The organization is formed by assembling necessary experts from all departments to achieve strategic objectives.
- (2) The organization is a strategic organization that responds to changes in the environment, and is independent of functional departments.
- (3) The organization has the flexibility to dissolve if the expected objectives are achieved.
- (4) A task force team belongs to this form of organization.

- |                            |                                |
|----------------------------|--------------------------------|
| a) Divisional organization | b) Line and staff organization |
| c) Matrix organization     | d) Project organization        |

**Q79.** The relationship between the value “ $x$ ” of a certain factor in the manufacture of a product and the value “ $y$ ” of a quality characteristic for the product is plotted as shown in the figure below,. Which of the following can be understood from this figure?



- a) In order to estimate  $y$  from  $x$ , a quadratic regression coefficient needs to be calculated.
- b) The correlation coefficient of  $x$  and  $y$  is negative.
- c) The correlation coefficient of  $x$  and  $y$  is positive.
- d) The regression expression for estimating  $y$  from  $x$  is the same as that for estimating  $x$  from  $y$ .



**Q80.** Which of the following is **not** protected by “copyright” that is based on the WTO’s Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)?

- a) Database
- b) Free software publicly available on the Internet
- c) Programming language and its conventions
- d) Software operation manual

**Q74.** Which of the following is an organization structure where employees report to both their individual immediate managers and a cross function leader and try to achieve coordination between program groups and centrally controlled groups of functional specialists?

- a) Divisional organization
- b) Functional organization
- c) Matrix organization
- d) Project organization

**Q75.** Which of the following is an explanation concerning the accountability at an executive managerial level?

- a) A company quantifies the cost involved in environmental maintenance and its effect, and announces them periodically as financial information.
- b) A management executive has responsibility for explaining the content and performance of business activities to shareholders and other interested parties.
- c) Appropriate information that is necessary for investment decisions is provided to investors and analysts on a timely and ongoing basis.
- d) Rules, manuals, and checking systems are established on the basis of corporate ethics, and corporate management is performed in accordance with laws.

**Q76.** Which of the following is a case example that is suitable for ABC analysis?

- a) A detailed forecast of sales and stock requirements needs to be analyzed to prevent a shortage of stock.
- b) Information about the combination of products that are purchased by customers needs to be analyzed.
- c) Market demand needs to be analyzed by conducting a questionnaire survey of opinion leaders in each region.
- d) The hot-selling products need to be analyzed on the basis of the sales value and gross profit of each product.

**Q78.** When a single-license software package is purchased in a company, which of the following is an activity that is usually permitted in conformity with the concept of the WTO's Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)?

- a) Installing the software package on a large number of computers that are used for the company's business
- b) Making a backup copy of software for the limited purposes, such as the licensee's personal use or a temporary copy for maintenance
- c) Modifying the software package for the company's internal use and using it on a large number of computers in the company
- d) Placing the software package on the company's internal Web site so that staff members can download and install it

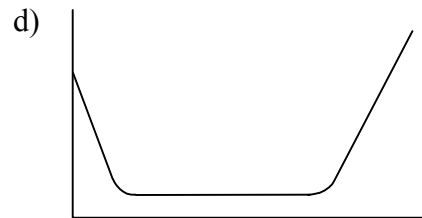
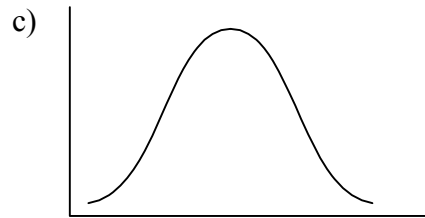
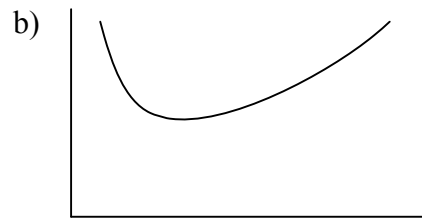
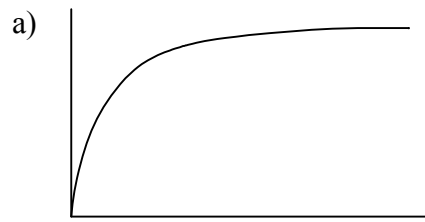
**Q80.** Among the descriptions concerning personal data, which of the following is **not** an appropriate description from the viewpoint of “OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data”?

- a) Personal data should be allowed to be acquired without announcing the acquisition of such data.
- b) Personal data should be handled within the scope of the purpose of use agreed by a data subject.
- c) Personal data should be kept accurate, complete, and up-to-date within the scope of the purpose of use.
- d) Personal data should be outsourced to a third party after the prior consent of the data subject.

**Q77.** Which of the following is an explanation of an affinity diagram?

- a) It is a method by which the causal relationship between events is clarified for events intertwined with complex factors.
- b) It is a method by which the collected information is grouped according to the mutual relationship, and the problems to be resolved are clarified.
- c) It is a method by which the means and measures are reviewed for problems that might have several outcomes along with the progress of a situation, and the process leading to the desired result is decided.
- d) It is a method by which the means and measures for achieving the purpose and objectives are developed sequentially, and the most appropriate means or measures are searched for.

**Q78.** Which of the following is the graph of an ABC analysis showing product sales for each product item? Here, the vertical axis represents sales, and the horizontal axis represents product items.





**Q79.** Which of the following is protected by “copyright” that is based on the WTO’s Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)?

- a) Algorithm
- b) Compiler program
- c) Programming language
- d) Protocol

**Q80.** When OSS released under GPL is changed and distributed, which of the following is an appropriate action that complies with the rules of GPL?

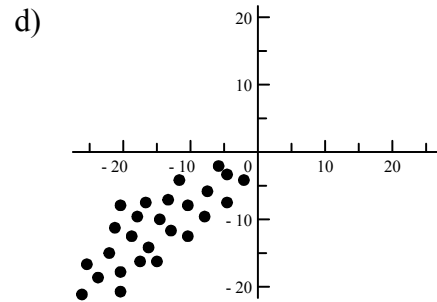
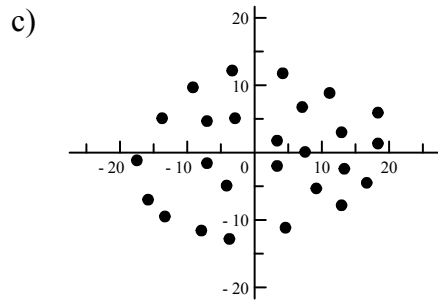
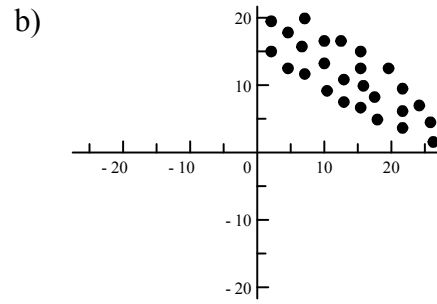
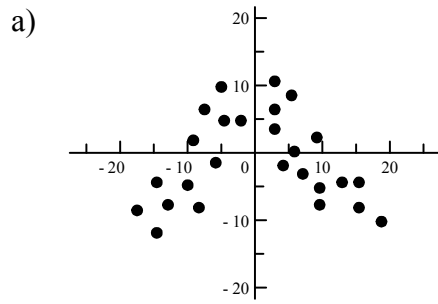
- a) A purchaser who obtains the derivative work must be strictly prohibited from redistributing copies.
- b) All the source code of the derivative work including the modified parts must be disclosed on an on-demand basis.
- c) The source code of a separate application that is statically linked to the derivative work does not need to be disclosed.
- d) When the source code of the derivative work is disclosed, compensation such as related costs cannot be demanded.

**Q77.** Which of the following is a specialization-oriented organization that is divided into groups, such as research and development, manufacturing, sales, human resources, general affairs, and accounting, according to the type of work performed?

- a) Divisional organization
- b) Functional organization
- c) Matrix organization
- d) Project organization

- Q79.** In the  $\bar{X}$ - $R$  control chart that is used to determine whether a process is in control or out of control, which of the following is a case where a cause of out-of-control plots should be investigated on the basis of the “Rule of Seven”?
- a) When a total of seven plots are above the center line
  - b) When a total of seven plots are out of the upper or lower control limit
  - c) When at least seven consecutive plots are above or below the center line
  - d) When at least seven consecutive plots are out of the upper or lower control limit

**Q80.** Which of the following is the scatter diagram that shows a “negative correlation”?



**Q75.** Which of the following is an appropriate explanation of IR (Investor Relations)?

- a) It is a business process of holding accountability to the investors and other stakeholders for the operational activities and business performance.
- b) It is a business process of implementing rules, manuals, and check systems based on the business ethics, and performing business activities in accordance with legal requirements and social norms.
- c) It is a business process of monitoring and checking whether the business management is adequate and appropriate so as to maintain the legitimacy of the business activities towards the investors.
- d) It is a business process of providing investors and analysts with accurate management information necessary for making investment decisions, on a timely and continuous basis.

**Q77.** Which of the following is a technique by which useful information and relationships are discovered and extracted from large amounts of customer and market data retained by a company?

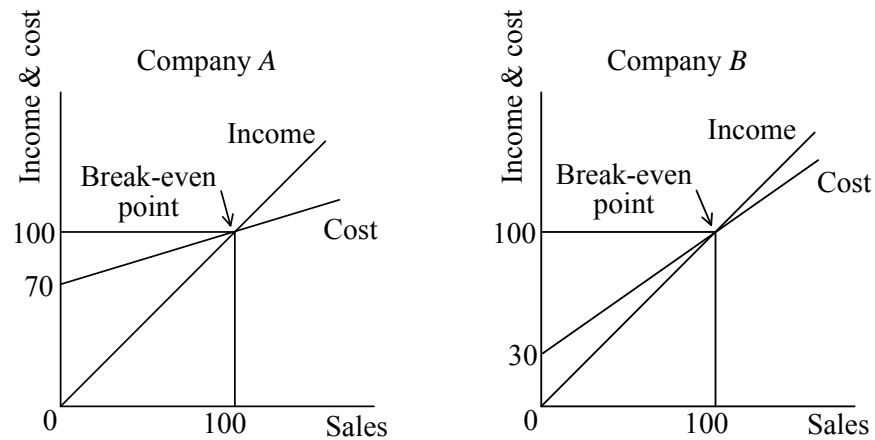
- a) Data dictionary
- b) Data flow diagram
- c) Data mining
- d) Data warehouse

**Q78.** Which of the following is a qualitative and exploratory forecasting approach that is used for obtaining the most reliable consensus of opinions from a group of experts through a series of questionnaires?

- a) Brainstorming
- b) Delphi method
- c) Focus group
- d) Tree diagram method



**Q80.** The figure below shows each break-even point of Company *A* and Company *B*. Which of the following is an appropriate description concerning the benefit-risk analysis of the two companies?



- Both companies have the same break-even point and fixed cost, so the profit and loss is also equal as long as the sales are equal.
- The break-even points of both companies are equal, so the sales necessary for making equal profits are also equal for both companies.
- The variable cost ratio of Company *A* is lower than Company *B*, and therefore, when the sales above the break-even point are equal, the profit of Company *A* is higher than Company *B*.
- When the sales of both companies above the break-even point are equal, Company *B* that has a lower fixed cost makes a higher profit than Company *A*.

**Q76.** Which of the following is an organization that is formed for a certain limited period of time to solve a problem and is disbanded when the problem is solved?

- a) Divisional organization
- b) Functional organization
- c) Matrix organization
- d) Project organization

**Q77.** Which of the following is a two-layered chart that is composed of a bar chart showing control items arranged in descending order of frequency and a line chart showing the cumulative percentage of each item?

- a) Control chart
- b) Gantt chart
- c) Pareto chart
- d) Radar chart

**Q78.** Which of the following is a method which can be used to calculate a predicted value based on actual values of the previous time period and in which each of the actual values is equally weighted?

- a) Exponential smoothing method
- b) Least-squares method
- c) Linear programming method
- d) Moving average method

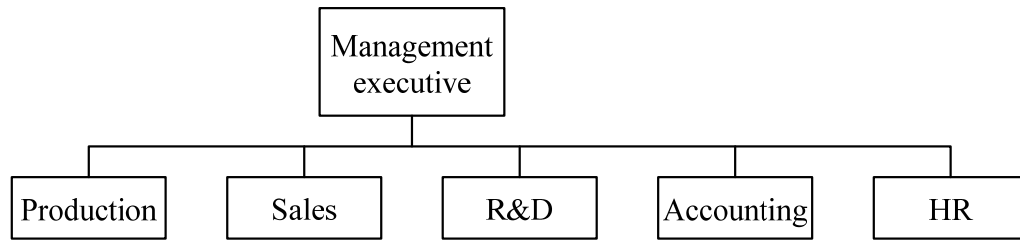
**Q79.** Which of the following is a financial statement that represents the assets, liabilities, and net assets of a company at a certain point in time and indicates the financial condition of the company?

- a) Balance sheet
- b) Cash flow statement
- c) Income statement
- d) Statements of shareholders' equity

**Q80.** When a publisher's lead editor omits a section of an author's manuscript without obtaining the consent of the author, which of the following is infringed according to the international treaty called the Berne Convention for the Protection of Literary and Artistic Works?

- a) Design rights
- b) Moral rights
- c) Patent rights
- d) Trademark rights

**Q74.** Which of the following is a business organization that is divided according to the type of work performed as shown in the chart below?



- a) Divisional organization
- b) Functional organization
- c) Matrix organization
- d) Project organization

**Q75.** Which of the following is an appropriate explanation of accessibility in the context of information technology?

- a) Environment where a working style with time-efficient and stress-free commuting can be chosen by using communications networks effectively
- b) Environment where even those who are handicapped or elderly have an easy access to information equipment and receive information services
- c) Environment where up-to-date information technology, such as mobile computing and home networking, enhances the convenience of computerization
- d) Environment where users can use communications terminals, such as cell phones and smart phones, while they move from location to location



**Q79.** Among various types of license agreements for a software package, which of the following is the most appropriate explanation of a site license?

- a) A software package can be installed on a designated server in a company or an organization, and can also used by a definite number of users.
- b) A software package can be installed on a designated server in a company or an organization, and can also be used by any and all clients to access the server.
- c) A software package can be installed on any and all computers, such as PCs, workstations, and servers, at a given location in a company or an organization.
- d) A software package can be installed anywhere within a company or an organization, even if installation involves multiple locations.

**Q80.** Which of the following is the globally recognized model that is used for measuring the maturity level of software and systems development processes and providing guidance for quality processes across a project, a division, or an entire organization?

- a) CMMI                      b) MBNQA                      c) SLA                      d) SLCP

**Q76.** Which of the following is the organizational structure that is given the authority and responsibility as an intrapreneur who performs a project as a semi-independent business unit and takes full responsibility for the outcome of the project?

- a) Divisional organization
- b) Functional organization
- c) In-house venture organization
- d) Matrix organization

**Q77.** Which of the following is the appropriate rule for “brainstorming” that is a method of resolving problems?

- a) Participants should avoid presenting better ideas based on another participant’s.
- b) Participants should criticize another participant’s ideas without hesitation.
- c) Participants should listen to free-wheeling opinions, including unique ideas.
- d) Participants should select and present only high-quality ideas among their own ideas.

**Q79.** Which of the following is an appropriate explanation of the Delphi method that is a qualitative and exploratory forecasting approach?

- a) It is a method for identifying risks by using a checklist of possible risks that are put together based on the information or knowledge about the past.
- b) It is a random sampling technique that uses probability distributions as process inputs rather than a single or averaged value.
- c) It is a technique of obtaining the most reliable consensus of opinions from a group of experts through a series of questionnaires.
- d) It is a tool used by teams to bring out the ideas of each individual and to present them in an orderly manner without criticizing one another.

**Q80.** Which of the following is an international standard that defines an encoding algorithm used to compress still image data?

- a) GIF                      b) JPEG                      c) MP3                      d) MPEG

**Q76.** Which of the following is an appropriate explanation of a divisional organization?

- a) A share of profit responsibility is assigned to each of the organizational units formed by product, region, and so on.
- b) Business operations are classified by function, and subordinates are given orders and instructions on the individual functions.
- c) The needs for the business environment are met by actively utilizing external management resources through strategic alliance, joint development, and so on.
- d) The organization is formed for a certain limited period of time to solve a problem and dissolved when the problem is solved.

**Q79.** Which of the following is an appropriate case where ABC analysis is applied?

- a) It is applied in the case of identifying detailed sales forecasts in order to avoid running out of stock.
- b) It is applied in the case of identifying hot-selling products from the sales value and gross profit for each product.
- c) It is applied in the case of identifying market needs by conducting questionnaire surveys of the opinion leaders in each region.
- d) It is applied in the case of identifying the combination of purchased products when a customer makes a purchase.

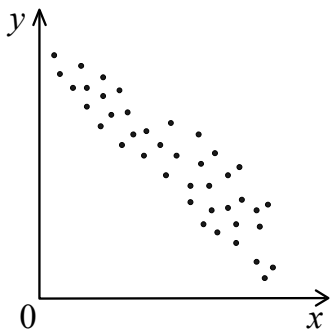


**Q80.** Which of the following explains the characteristic of the break-even point?

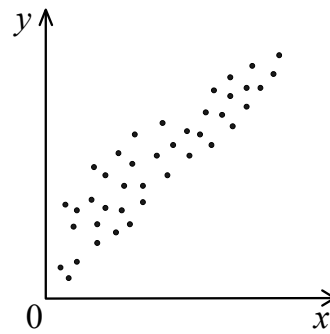
- a) The sales at the break-even point are equal to the sum of the fixed cost and variable cost.
- b) When the fixed cost remains unchanged, the break-even point rises if the ratio of the variable cost lowers.
- c) When the fixed cost remains unchanged, the change in the ratio of the variable cost is directly proportional to the change in the break-even point.
- d) When the ratio of the variable cost remains unchanged, the break-even point rises if the fixed cost is reduced.

**Q74.** When the relationship between the value “ $x$ ” of a certain factor in manufacturing a product and the value “ $y$ ” of a quality characteristic for the product is plotted in a chart, which of the following charts has the positive correlation coefficient between  $x$  and  $y$ ?

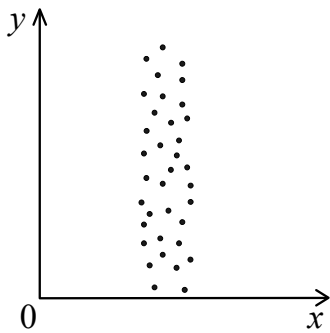
a)



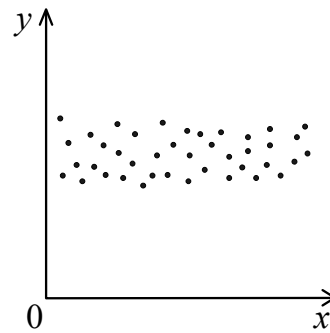
b)



c)



d)



**Q77.** Which of the following is an appropriate description concerning financial indicators?

- a) The current ratio is the ratio of current assets to current liabilities. As the value is smaller, safety and soundness are higher.
- b) The equity to total asset is the ratio of equity capital to fixed assets. As the value is larger, steadiness and soundness are higher.
- c) The fixed ratio is the ratio of fixed assets to fixed liabilities. As the value is smaller, safety and soundness are higher.
- d) The total capital profit ratio is the ratio of profit to gross capital. As the value is larger, profitability is higher.

**Q79.** Which of the following is a law that protects coded expressions of programs rather than ideas or algorithms in programs?

- a) Copyright law
- b) Industrial design law
- c) Patent law
- d) Trademark law

**Q80.** Which of the following sets of standards should be applied for the purpose of developing the new products that are expected to be employed by government agencies of countries who are members of the WTO?

- a) ANSI standards
- b) FCC standards
- c) IEEE standards
- d) ISO standards

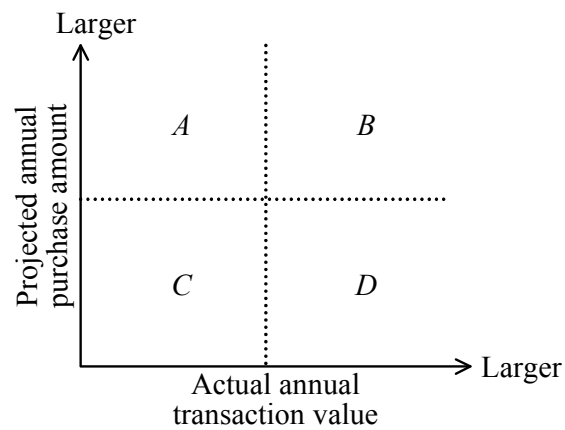
**Q79.** Which of the following appropriately explains “patent right” according to the WTO’s Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)?

- a) It is a right of an author of a literary, scientific, artistic, or musical work to exclusively control this work and to receive benefits from it.
- b) It is a right to exclusively utilize a new invention suitable for industrial use, which is granted upon application to and examination by the competent authority.
- c) It is a right to exclusively utilize an indication which enables a company to distinguish its own products from those of other companies.
- d) It is a right to exclusively utilize an ornamental innovation that is applied to the shape, color, pattern, or layout of a new art, craft, or industrial product.

**Q80.** Which of the following is the appropriate description concerning the CSV data format?

- a) It can contain not only character and numeric value data but also formulas and format information. It uses tabs to separate data.
- b) It can contain not only character data but also images, Java applets, etc. A command called a tag is inserted to separate data.
- c) It only records the information of character data, numeric data, and some control characters such as line feeds. It uses spaces, colons, and semicolons to delimit data.
- d) It separates character and numeric data by a comma and data records by line feeds. Character data may be enclosed in quotation marks.

**Q72.** The projected annual purchase amount and the actual annual transaction value of each client company are plotted on the graph. Which of the following is the appropriate description concerning the future sales policy?



- a) A client in area *A* has the potential of becoming a major customer, so it is better to strengthen sales activities.
- b) A client in area *B* can be regarded as a regular customer, so it is better to minimize an injection of sales force.
- c) A client in area *C* has little potential of becoming a major customer, but is a prospective regular customer, so it is better to strengthen sales activities.
- d) A client in area *D* is expected to increase the amount of transactions, so it is better to strengthen sales activities.



**Q73.** Which of the following financial statements indicates the assets, liabilities, and net assets of a company at a specific time and shows the financial condition of the company?

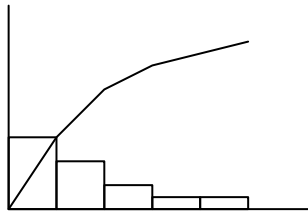
- a) Balance sheet
- b) Cash flow statement
- c) Income statement
- d) Statements of shareholders' equity

**Q75.** Which of the following is the work sampling method?

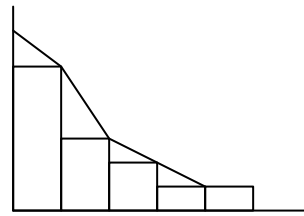
- a) It breaks down the work operations even into fundamental motions, and calculates working hours from the time standard table for fundamental motions by totaling the time for the fundamental motions.
- b) It calculates working hours by tallying questionnaires completed by experienced persons in charge of the actual work operations.
- c) It measures the actual work operations several times with a stopwatch and investigates working hours.
- d) It specifies the number of observations and observation time, and estimates working hours from the ratio of the number of observation points by actual observation based on statistical theory.

**Q77.** A certain factory has recorded the number of defective products in the past on a root cause basis. Which of the following is the graph that indicates the factors that are ranked high for defective products and their rates, based on this record?

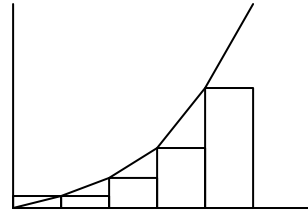
a)



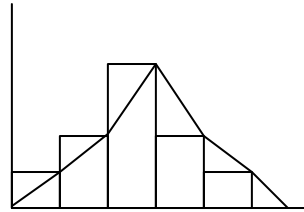
b)



c)



d)



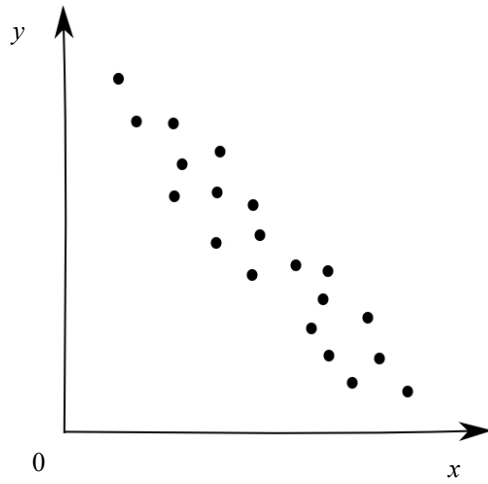
**Q80.** Which of the following explains a volume license agreement?

- a) The agreement limits the location of use. Usage is allowed without a limit in the number if the software is used in specific facilities.
- b) The agreement offers a master to a bulk buyer of the software, such as a company, and determines the maximum installable number of licenses beforehand.
- c) The agreement where standard licensing conditions are defined and, when a certain limited number of packages are opened, the license agreement is considered to be automatically concluded between the rights holder and the purchaser.
- d) The agreement where usage is allowed by agreeing to the details displayed on the screen when the software is downloaded from the Internet.

**Q72.** Which of the following is the purpose of emphasizing the importance of stakeholders in corporate management?

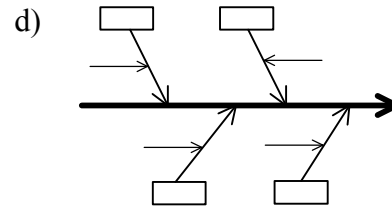
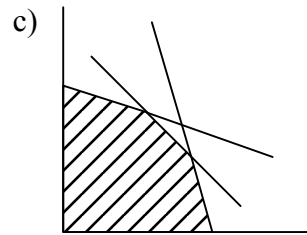
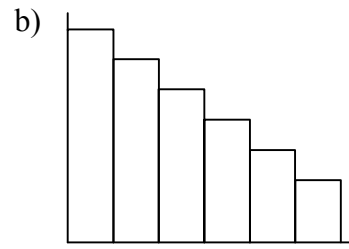
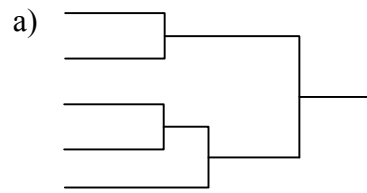
- a) Improving satisfaction of interested parties such as customers, shareholders, and employees; aiming for sustainable growth
- b) Keeping management executives from exercising too much authority; creating a framework for sound management
- c) Preventing scandals involving managers and employees that may jeopardize the company's survival
- d) Retaining business resources that serve to distinguish one's company from competitors and strengthen competitiveness

**Q75.** Which of the following is the appropriate relationship between two variables  $x$  and  $y$  represented by the scatter diagram?

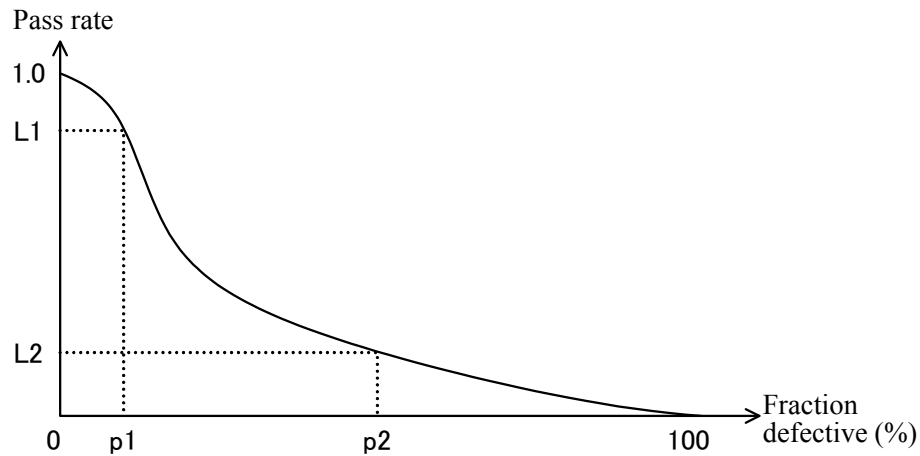


- a) Negative correlation
- b) No correlation
- c) Positive correlation
- d) Weak correlation

**Q76.** Which of the following is the diagram showing results of cluster analysis?



**Q78.** The figure below is the OC curve (Operating Characteristic curve) that shows the result of a sampling inspection of a certain product lot. Which of the following appropriately describes what this figure indicates?



- a) The probability that a lot with a fraction defective greater than  $p_1\%$  passes the inspection is at least  $L_1$ .
- b) The probability that a lot with a fraction defective greater than  $p_2\%$  passes the inspection is at most  $L_2$ .
- c) The probability that a lot with a fraction defective less than  $p_1\%$  fails the inspection is at least " $1.0 - L_1$ ".
- d) The probability that a lot with a fraction defective less than  $p_2\%$  fails the inspection is at most  $L_2$ .



**Q79.** Which of the following is the explanation of a control chart?

- a) Collected data is classified into a few intervals, the number of data for each interval is drawn as a bar graph, and then the variation in quality is observed.
- b) Data is classified into a few items, the items are drawn as a bar graph from the largest to the smallest along the horizontal axis, the cumulative values are drawn as a line graph, and then major problems are grasped.
- c) The relationship between cause and effect is systematically sorted out and shaped like a fish skeleton, clarifying which causes are associated with which results.
- d) Variation of data occurring in time sequence is expressed by a line graph; it is used to find an abnormal behavior, with an upper limit and a lower limit specified.

**Q72.** Which of the following is an appropriate description concerning financial indexes?

- a) Capital ratio signifies the ratio of equity capital to fixed assets. The larger the value of this ratio, the greater the financial soundness.
- b) Current ratio means the ratio of current assets to current liabilities. The smaller the value of this ratio, the higher the financial stability.
- c) Fixed ratio means the ratio of fixed assets to fixed liabilities. The smaller the value of this ratio, the higher the financial stability.
- d) Total capital profit ratio denotes the ratio of profits to gross capital. The larger the value of this ratio, the higher the profitability.

**Q77.** Which is the method of solving a problem of the following type: “How can we distribute a resource subject to constraints that can be expressed by first-degree equations so as to obtain a maximum effect?”

- a) Design of experiments
- b) Factor analysis
- c) Linear programming
- d) Regression analysis

**Q72.** Which of the following is a characteristic of the QR code?

- a) Characters except in binary form can be expressed by the code.
- b) It can contain up to 128 alphanumeric characters or up to 64 double-byte characters.
- c) It is a programming language and is executable on the cell phone.
- d) Using three symbols for detection, the code makes it possible to recognize the rotation angle and the direction of reading.

**Q74.** Which of the following appropriately describes financial statements?

- a) Balance sheet is the statement of the book value of the company's financial condition. It contains two parts, the assets and liabilities. The two sides must be balanced.
- b) Cash flow statement presents the incoming and outgoing money at a period in time. It is used to determine the long-term viability of the company and its capacity to pay dividends to its investors.
- c) Profit and loss statement is also known as the income statement. This presents how revenues are converted to net income by reporting both revenues and expenses of the company for a given period of time.
- d) Statement of retained earnings reports the owner's equity. It requires information from the balance sheet and provides information for the income statement.

**Q75.** Which of the following is the appropriate statement according to the Pareto analysis (also known as the 80-20 rule)?

- a) This is the idea that 20% of tasks can be completed in 80% of the disposable time.  
The remaining 80% of tasks will take up 20% of the time.
- b) This is the idea that 50% of tasks can be completed in 80% of the disposable time.  
The remaining 50% of tasks will take up 20% of the time.
- c) This is the idea that 80% of tasks can be completed in 20% of the disposable time.  
The remaining 20% of tasks will take up 80% of the time.
- d) This is the idea that 80% of tasks can be completed in 50% of the disposable time.  
The remaining 20% of tasks will take up 50% of the time.

**Q76.** The seven traditional, fundamental quality control tools consist of Check sheet, Pareto chart, Stratification, Scatter Diagram, Histogram, and Control Chart. What is the last (or 7th) one?

- a) Affinity diagram
- b) Cause and effect diagram
- c) Relation diagram
- d) Tree diagram

**Q79.** The sales volume of the next month is predicted by the data in the past. The sales volume is changed greatly from month to month, but the annual fluctuation pattern is almost the same every year. Which of the following is the most appropriate formula that can be used for calculating the sales volume of the next month? Here,  $P_{t+1}$  is the sales volume predicted for the next month,  $S_t$  is the sales volume of the current month  $t$ , and the data is retained for three years.

- a)  $P_{t+1} = (S_t + S_{t-1} + S_{t-2}) / 3$
- b)  $P_{t+1} = S_t \times S_t / S_{t-1}$
- c)  $P_{t+1} = (S_t + S_{t-12} + S_{t-24}) / 3$
- d)  $P_{t+1} = (S_{t-11} + S_{t-23} + S_{t-35}) / 3$



**Q80.** There are goods whose unit purchase prices are gradually rising. There was an inventory of these goods at the end of the last accounting period, and the goods were carried into and out of the warehouse several times during the current period. Which of the following valuation methods produces the lowest valuation of the inventory at the end of the current period?

- a) Average cost method
- b) First-in first-out method
- c) Last-in first-out method
- d) Moving average method

**Q73.** Which of the following appropriately explains benchmarking used in business management?

- a) It is to make comparisons with the strongest competitors or advanced companies in order to scope out best practices for setting business goals, and to gain an understanding of products, services, and practical methods qualitatively and quantitatively.
- b) It is to pick out company's own skills and technologies that are profitable and superior to those of other companies.
- c) It is to promote quality control in all departments in an integrated manner for the purpose of quality improvement, to check up the degrees of improvement in the quality of in-house products, and to make comparisons with the quality of competitors' products.
- d) It is to redesign business processes, to make full use of information technologies, and to transform the existing constitution and structures fundamentally.

**Q74.** Which of the following appropriately describes a cause-and-effect diagram?

- a) It classifies the collected data into a few categories, draws the number of data for each category as a bar graph, and captures variance in quality.
- b) It classifies the data into a few categories, sorts the categories from the largest to the smallest as a bar graph along the horizontal axis, draws the cumulative values as a line graph, and sorts out problems.
- c) It expresses variance of time series data as a line graph and achieves an objectively controlled state by using control limit lines.
- d) It systematically arranges the relation between cause and effect in a fishbone format and clarifies which causes are related to particular effects.

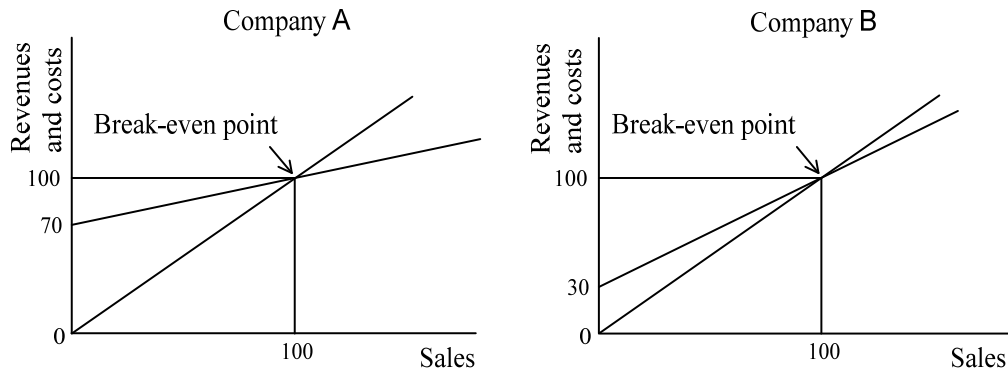
**Q75.** Which of the following is the appropriate statement concerning how to use management science methodology?

- a) PERT is used to perform machine reliability analysis.
- b) The queuing model is used to perform financial analysis.
- c) The simplex method is used for product quality control.
- d) The time-series analysis method is used to forecast product sales in the market.

**Q80.** Which of the following is the appropriate combination of processing modes in banking activities?

	Deposit	Interest calculation	Withdrawal	Posting to account
a)	Batch	Batch	Batch	Online
b)	Batch	Online	Online	Batch
c)	Online	Batch	Online	Batch
d)	Online	Online	Online	Online

**Q75.** The figures show the break-even point for two companies A and B. Which of the following is an appropriate statement with regard to the profit/loss analysis of Companies A and B?

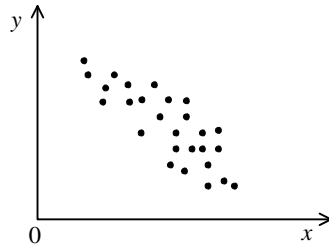


- Both companies have the same break-even point, so their profits and loss are also the same.
- Both companies have the same break-even point, so when both companies are producing the same profit, their sales are also the same.
- Company A has low variable costs per unit of product, so when sales exceed the break-even point, Company A's profits are larger than Company B.
- When sales figures increase for both Company A and Company B, Company B has lower fixed costs, so its profits are larger than Company A.

**Q76.** Which of the following is an appropriate statement concerning a radar chart?

- a) A bar graph and a line graph are combined together to graphically show the ratio of the cumulative total of each item to that of all items, thereby indicating important management items.
- b) Relations between many causes and a specific effect are systematically represented in a fishbone-like form, thereby clarifying what kinds of causes are associated with a single effect.
- c) The degree of attainment of the benchmarking goal is plotted on the radial axis which corresponds to each item. All such plotted points are connected by a line, thereby making a comparison of overall balance.
- d) The schedule and actual achievement record during the execution period are shown, for each job, in a bar graph.

**Q77.** The figure below shows plots of the relationship between values of a certain factor  $x$ , in the product manufacturing process, and values of quality characteristics  $y$ . Which of the following is an appropriate description concerning this figure?



- a) The coefficient of correlation between  $x$  and  $y$  is negative.
- b) The coefficient of correlation between  $x$  and  $y$  is positive.
- c) The regression equation for estimating  $y$  from  $x$  is the same as that for estimating  $x$  from  $y$ .
- d) To estimate  $y$  from  $x$ , it is necessary to calculate second order regression coefficients.



- Q79.** Three products A, B, and C are produced from raw materials at plant X. The production time per unit volume of each product, the required quantity of raw materials, and the profit amounts are shown in the table below. The maximum production hours per month at this plant total 240 hours, and the amount of raw materials that can be fed for production is 150 kg per month.
- Under these conditions, management would like to know how many of A, B, and C should be manufactured so as to yield maximum profits. Which of the following is an appropriate method for solving this problem?

Product	A	B	C
Production time (hours)	2	3	1
Quantity of raw materials required (kg)	2	1	2
Profit (US\$)	80	50	50

- a) Fixed order quantity system
- b) Least squares method
- c) Linear programming method
- d) Moving average method

**Q77.** Products *A*, *B*, *C*, and *D* are to be introduced to the market. The table below shows the expected profit for each product with three (3) sales forecasts (High, Medium, and Low) that are estimated to occur in accordance with the probability in the table. Which of the following is the product that is expected to make the highest profit according to the expected value principle?

Product	High		Medium		Low	
	Profit (\$)	Probability (%)	Profit (\$)	Probability (%)	Profit (\$)	Probability (%)
<i>A</i>	100,000	75	20,000	20	-40,000	5
<i>B</i>	130,000	60	30,000	30	-20,000	10
<i>C</i>	150,000	50	40,000	30	-20,000	20
<i>D</i>	100,000	70	10,000	20	-50,000	10

a) *A*

b) *B*

c) *C*

d) *D*

**Q78.** A company sells two products,  $A$  and  $B$ , and makes a profit of 40 dollars and 30 dollars per unit on them respectively. They are produced through a common production process and are sold in two different markets. The production process has a total capacity of 3,000 person-hours. Product  $A$ 's production time is 3 person-hours that is three times longer than that of product  $B$ . Having surveyed the market, company officials feel that the maximum number of units of product  $A$  that can be sold is 8,000, while for product  $B$  the maximum number of units is 1,200. Subject to these limitations, products can be sold in any combination. When the linear programming model is applied, which of the following is the formulation result that obtains the production amount that maximizes the company's total profit? Here, the number of units of products  $A$  and  $B$  are  $x$  and  $y$ , respectively.

a) Objective function  $40x+30y \rightarrow$  to be maximized

Constraints  $3x+9y \leq 3,000$

$$x \geq 8,000$$

$$y \geq 1,200$$

$$x \geq 0, y \geq 0$$

b) Objective function  $40x+30y \rightarrow$  to be maximized

Constraints  $3x+9y \leq 3,000$

$$x \leq 8,000$$

$$y \leq 1,200$$

$$x \geq 0, y \geq 0$$

c) Objective function  $40x+30y \rightarrow$  to be maximized

Constraints  $3x+y \leq 3,000$

$$x \geq 8,000$$

$$y \geq 1,200$$

$$x \geq 0, y \geq 0$$

d) Objective function  $40x+30y \rightarrow$  to be maximized

Constraints  $3x+y \leq 3,000$

$$x \leq 8,000$$

$$y \leq 1,200$$

$$x \geq 0, y \geq 0$$

**Q79.** Company  $A$  has two media plans. One plan is for a series of 30-second radio advertisements (ads) and the other is for 60-second TV ads. Exposure is rated in points. The company is considering an exposure of at least 60 points in the city and at most 40 points outside the city. The table below shows the cost and exposure of both TV and radio ads. Which of the following is the set of expressions that can determine the number of media ads to minimize the total cost?

	Cost	In the city exposure (points)	Outside the city exposure (points)
TV ads	2000	8	6
Radio ads	800	10	3

- a) Conditions  $8x + 6y \leq 60$ ,  $10x + 3y \leq 40$ ,  $x \geq 0$ ,  $y \geq 0$   
Objective function  $2000x + 800y \rightarrow$  minimize
- b) Conditions  $8x + 6y \geq 60$ ,  $10x + 3y \leq 40$ ,  $x \geq 0$ ,  $y \geq 0$   
Objective function  $2000x + 800y \rightarrow$  minimize
- c) Conditions  $8x + 10y \leq 60$ ,  $6x + 3y \leq 40$ ,  $x \geq 0$ ,  $y \geq 0$   
Objective function  $2000x + 800y \rightarrow$  minimize
- d) Conditions  $8x + 10y \geq 60$ ,  $6x + 3y \leq 40$ ,  $x \geq 0$ ,  $y \geq 0$   
Objective function  $2000x + 800y \rightarrow$  minimize

**Q79.** The break-even point (BEP) is a level where total cost and total revenue are equal. The table below lists the fixed cost, variable cost per unit, price per unit, and BEP in units. Which of the following is a value of the price per unit?

Fixed cost (\$)	100,000
Variable cost per unit (\$)	2
Price per unit (\$)	
BEP in units	10,000

- a) 4                      b) 8                      c) 12                      d) 16

**Q3.** A factory manufactures the same products on two production lines,  $A$  and  $B$ . Line  $A$  manufactures 60% of all products, and  $B$  manufactures the remaining 40%. Defect rates of products manufactured in  $A$  and in  $B$  are 2% and 1%, respectively. When a product was randomly chosen for inspection among the products manufactured in this factory, it was found to be defective. What is the percentage of probability that the product was manufactured in Line  $A$ ?

- a) 40                      b) 50                      c) 60                      d) 75

**Q2.** What is the probability of getting at least two heads when a fair coin is flipped five times?

a) 0.78125

b) 0.8125

c) 0.84375

d) 0.875

**Q78.** Break-even point (BEP) is a point where total costs and total revenue are equal. The table below shows the fixed costs, price per unit, variable costs per unit, and BEP in units for Company *A* and Company *B*.

	Company <i>A</i>	Company <i>B</i>
Fixed costs (\$)	x	y
Price per unit (\$)	120	140
Variable costs per unit (\$)	40	60
BEP in units	500	600

Which of the following is the appropriate combination of the fixed costs of Company *A*, and Company *B*?

	x	y
a)	20,000	36,000
b)	20,000	48,000
c)	40,000	36,000
d)	40,000	48,000



**Q79.** An investor purchased property  $A$  for \$500,000. Two years later, the investor sold the property for \$1,000,000. Which of the following is the ROI of this investment (%)?

- a) 50                      b) 100                      c) 150                      d) 200

**Q3.** A candy box contains four flavors of candies: 6 lemon-flavored, 12 strawberry-flavored, 8 orange-flavored, and 4 grape-flavored. When a candy is randomly chosen from the box, what is the probability that it is either lemon- or orange-flavored?

a)  $\frac{4}{9}$

b)  $\frac{7}{15}$

c)  $\frac{6}{11}$

d)  $\frac{7}{8}$

**Q78.** When a company sells a product at 17 dollars per unit, and the fixed costs and the variable costs are as shown in the tables below (in dollars), how many units does the company have to sell to earn a profit of 42,000 dollars?

Fixed costs:

Administration costs	130,000
R&D costs	10,000

Variable costs per unit:

Raw material costs	4
Administration costs	3

- a) 10,200                      b) 14,200                      c) 16,200                      d) 18,200

**Q78.** Which of the following is a financial statement that represents the assets, liabilities, and net assets of a company at a certain point of time and indicates the financial situation of the company?

- a) Balance sheet
- b) Cash flow statement
- c) Income statement
- d) Statements of shareholders' equity

**Q3.** A factory manufactures the same products in two production lines  $A$  and  $B$ , where 60% of the products are manufactured in  $A$ , and the remaining in  $B$ . Defective rates of the products manufactured in  $A$  and  $B$  are 2% and 1%, respectively. When a product was randomly chosen for inspection, it was found to be defective. What is the percent probability that the product was manufactured in  $A$ ?

- a) 40                      b) 50                      c) 60                      d) 75

- Q79.** Company Z is planning to start a new project of which the initial investment is 100 million dollars. It is expected to generate cash as shown in the following table. What is the payback period of the new project?

Cash flow in million dollars	
Year	Cash Flow
0	(100)
1	20
2	30
3	40
4	50
5	75

- a) 3.0                      b) 3.2                      c) 3.5                      d) 4.0

**Q78.** Company A sets a goal to make a profit of \$36,000 under the conditions shown in the table below. What is the minimum sales revenue for the company to achieve its goal?

Selling Price	\$ 40 per unit
Variable Cost	\$ 28 per unit
Fixed Cost	\$ 42,000 per period

- a) 3,500                      b) 6,500                      c) 140,000                      d) 260,000

**Q2.** When two unbiased coins are tossed and an unbiased six-sided die is rolled at the same time, what is the probability that at least one coin shows heads and the die shows an even number?

a)  $1/4$

b)  $3/8$

c)  $1/2$

d)  $3/4$



**Q8.** There are two boxes; the first box contains two green balls and three red balls; the second box contains three green balls and two red balls. A boy randomly selects a box from the two, and then randomly picks a ball from that box. If the ball is red, what is the probability that he selected the first box?

a)  $\frac{3}{20}$

b)  $\frac{3}{10}$

c)  $\frac{1}{2}$

d)  $\frac{3}{5}$

**Q65.** The purchase of two types of IT devices  $A$  and  $B$  is being examined. The payout period is set in consideration of the useful life of each of the devices. Which of the following is an appropriate description for the minimum amount of annual profit necessary to recover the amount of investment within the set payout period for  $A$  and  $B$ ? Here, the annual profit is made evenly every year, and the interest rate is not considered.

	$A$	$B$
Amount of investment (10,000 yen)	90	300
Payout period (years)	3	5

- a) It is necessary for  $A$  and  $B$  to make the same amount of annual profit.
- b) It is necessary for  $A$  to make twice the annual profit than that of  $B$ .
- c) It is necessary for  $B$  to make 1.5 times the annual profit than that of  $A$ .
- d) It is necessary for  $B$  to make twice the annual profit that of  $A$ .

**Q3.** There are 16 cards numbered from 1 to 16. When four cards are randomly chosen at the same time, what is the probability that all of them are even?

a)  $\frac{1}{26}$

b)  $\frac{1}{24}$

c)  $\frac{1}{20}$

d)  $\frac{1}{16}$

**Q77.** Company A has two media plans. One plan is for a series of 30-second radio advertisements (ads) and the other is for 60-second TV ads. Exposure is rated in points. The company is considering an exposure of at least 60 points in the city and at most 40 points outside the city. The table below shows the cost and exposure of both TV and radio ads. Which of the following is the set of expressions that can determine the number of media ads to minimize the total cost?

	Cost	In the city exposure (points)	Outside the city exposure (points)
TV ads	2000	8	6
Radio ads	800	10	3

- a) Conditions  $8x + 6y \geq 60$ ,  $10x + 3y \leq 40$ ,  $x \geq 0$ ,  $y \geq 0$   
Objective function  $2000x + 800y \rightarrow$  minimize
- b) Conditions  $8x + 10y \geq 60$ ,  $6x + 3y \leq 40$ ,  $x \geq 0$ ,  $y \geq 0$   
Objective function  $2000x + 800y \rightarrow$  minimize
- c) Conditions  $8x + 6y \leq 60$ ,  $10x + 3y \leq 40$ ,  $x \geq 0$ ,  $y \geq 0$   
Objective function  $2000x + 800y \rightarrow$  minimize
- d) Conditions  $8x + 10y \leq 60$ ,  $6x + 3y \leq 40$ ,  $x \geq 0$ ,  $y \geq 0$   
Objective function  $2000x + 800y \rightarrow$  minimize

**Q78.** When the FIFO method is applied to the purchase and selling record shown below, what is the inventory value at the end of March?

			Units	Purchase price per unit	Selling price per unit
March	1	Stock held	400	0.4	
	4	Purchased	600	0.42	
	8	Sold	500		0.6
	10	Purchased	500	0.43	
	15	Purchased	800	0.42	
	20	Sold	1000		0.6
	24	Purchased	200	0.44	
	30	Sold	500		0.6

a) 214

b) 241

c) 300

d) 880

**Q3.** When two unbiased dice are rolled one by one, what is the probability that either the first one is 2 or the sum of the two is less than 5?

a)  $\frac{1}{6}$

b)  $\frac{2}{9}$

c)  $\frac{5}{18}$

d)  $\frac{1}{3}$

**Q3.** Alice and Mary take a math exam. The probability of passing this exam for Alice and Mary is  $\frac{2}{3}$  and  $\frac{3}{5}$ , respectively. What is the probability that at least one of them will pass the exam?

- a)  $\frac{1}{5}$                       b)  $\frac{7}{15}$                       c)  $\frac{3}{5}$                       d)  $\frac{13}{15}$

**Q77.** With the carryover from the previous month and the quantity of inventory transactions for a product shown in the table below, what is the unit price of the product for the succeeding period using the periodic average method?

Date	Transaction	Received Quantity	Shipped Quantity	Unit price
1	Carryover from previous month	200		60
2	Purchase	500		70
5	Sales		600	
10	Purchase	800		60
15	Sales		400	
20	Purchase	500		70
30	Sales		700	
	Carryover for next month	300		?

a) 64.50

b) 65.00

c) 65.40

d) 70.00



**Q78.** The following inventory statement of Build-Up Property Company describes the status of the inventory since the beginning of the year 2014. If this company uses a first-in-first-out (FIFO) method for the inventory asset valuation, what is the inventory value at the end of the year 2014?

Build-Up Property Company Inventory Statement For the year ending December 31, 2014				
		Units	Price	Value
Beginning inventory, January 1, 2014		100	10	1,000
Net Purchases				
	Purchase #1	500	14	7,000
	Purchase #2	400	12	4,800
Cost of goods available for sale				
	Total sold units	400		
Ending inventory, December 31, 2014				?

a) 7,080

b) 7,600

c) 7,800

d) 8,000

**Q79.** A company has planned to provide a product with a fixed cost of \$128,000, a variable cost per unit of \$48, and a selling price per unit of \$80. Which of the following is the point of sales (\$) to become break-even?

- a) 240,000                      b) 320,000                      c) 480,000                      d) 560,000

**Q3.** A spam filter checks each incoming message to be classified as either spam or non-spam, and only messages classified as non-spam are to be delivered to each inbox. On average, however, one percent of messages are incorrectly classified. When 95 percent of incoming messages are spam and this filter is applied, what is the percentage of spam in each inbox?

a) 0.5

b) 1

c) 9.50

d) 16

**Q75.** A company sells two products *A* and *B*, making a profit of 40 dollars and 30 dollars per unit on them respectively. They are produced in a common production process and are sold in two different markets. The production process has a total capacity of 3000 person-hours. The production time of product *A* is 3 person-hours which is three times longer than that of product *B*. The market has been surveyed and company officials feel that the maximum number of units of product *A* that can be sold is 8000 and that of product *B* is 1200. Subject to these limitations, products can be sold in any combination. Which of the following is a formulation result of a linear programming model for the question which obtains the production amount that maximizes the total profit of the company? Here, assume the number of units produced of product *A* and that of product *B* as  $x$  and  $y$ , respectively.

a) Objective function  $40x+30y \rightarrow$  to be maximized

Constraints  $3x+9y \leq 3000$

$x \geq 8000$

$y \geq 1200$

$x \geq 0, y \geq 0$

b) Objective function  $40x+30y \rightarrow$  to be maximized

Constraints  $3x+9y \leq 3000$

$x \leq 8000$

$y \leq 1200$

$x \geq 0, y \geq 0$

c) Objective function  $40x+30y \rightarrow$  to be maximized

Constraints  $3x+y \leq 3000$

$x \geq 8000$

$y \geq 1200$

$x \geq 0, y \geq 0$

d) Objective function  $40x+30y \rightarrow$  to be maximized

Constraints  $3x+y \leq 3000$

$x \leq 8000$

$y \leq 1200$

$x \geq 0, y \geq 0$

**Q76.** Peter plans to open his own coffee shop. He uses break-even analysis to evaluate the feasibility. He needs to rent a coffee making machine at 20 dollars per day. The average cost of coffee ingredients is 0.40 dollars per cup and the cost of a plastic cup is 0.10 dollars. He sets a price at 1.50 dollars per cup. What is the sales revenue a day at the break-even point?

- a) 10                      b) 25                      c) 30                      d) 75

**Q77.** There is an enterprise whose current liabilities valued 2,400 dollars and the current assets valued 5,000 dollars including inventory assets valued 200 dollars. What is an acid test ratio (in percentage) of the enterprise?

- a) 108                      b) 148                      c) 200                      d) 220

**Q78.** Break-even point of the new product is 12,000 units a month. Fixed cost is 800,000 dollars a month and variable cost is 20 dollars per unit. Based on the information above, which of the following is a selling price of the new product?

- a) 46.67                      b) 66.67                      c) 86.67                      d) 89.23

**Q79.** A cost schedule showing total costs of the production is given below. Which of the following is an appropriate combination of the average cost of producing 2 units, and the marginal cost of producing the 5<sup>th</sup> unit?

Number of Output	Total Cost
0	40
1	50
2	60
3	70
4	80
5	90
6	100

	Average cost of producing 2 units	Marginal cost of producing 5 <sup>th</sup> unit
a)	10	5
b)	10	10
c)	30	10
d)	30	20



**Q3.** When three apples are removed at random from a box that contains four green apples and eight red apples, what is the probability that the first two apples are green and the third (or last) apple is red? Here, once an apple is removed, it is not put back into the box.

a)  $\frac{1}{18}$

b)  $\frac{8}{121}$

c)  $\frac{4}{55}$

d)  $\frac{2}{27}$

**Q77.** As shown in the table below, a factory manufactures the three types of products: X, Y, and Z. How much is the maximum possible profit in dollars? Here, there is an upper limit of the monthly demand for each product. Also, the factory can be used up to 200 hours per month for product assembly, but multiple products cannot be assembled in parallel.

	Product X	Product Y	Product Z
Profit per unit (dollars)	18	25	30
Assembly time required per unit (minutes)	6	10	15
Limit of monthly demand (units)	1,000	900	500

- a) 6,250                      b) 30,000                      c) 31,500                      d) 33,000

- Q2.** As shown in the table below, 100 out of 100,000 patients have a cancer. When a cancer screening test has an accuracy of 99% for patients with a cancer and an accuracy of 96% for patients without a cancer, the equations below hold for  $A$ ,  $B$ ,  $C$ , and  $D$ .

$$\frac{A}{A+B} \times 100 = 99 \quad \frac{D}{C+D} \times 100 = 96$$

Which of the following is the probability (in percentage) that a patient with a positive test result has a cancer?

	Number of patients with a positive test result	Number of patients with a negative test result	Total
Patients with a cancer	$A$	$B$	100
Patients without a cancer	$C$	$D$	99,900
Total	$A + C$	$B + D$	100,000

- a) 0.001                      b) 2.418                      c) 97.582                      d) 99.999

**Q79.** When the carry-over from the previous month and the quantity of inventory transactions for a product are as shown in the table below, what is the cost of sales (in dollars) calculated for the current month by using the first-in first-out method?

Date	Type of transaction	Transaction quantity		Unit price (dollars)
		Receiving quantity	Shipping quantity	
1st	Carry-over from the previous month	100		200
5th	Purchase	50		215
15th	Sales		70	
20th	Purchase	100		223
25th	Sales		60	
30th	Carry-over to the next month		120	

- a) 26,290                      b) 26,450                      c) 27,250                      d) 27,586

**Q2.** What is the approximate probability (in percentage) that at least 2 people in a group of 6 randomly-selected people have a birthday on the same day of the week?

a) 65.0

b) 85.0

c) 95.7

d) 99.4

**Q76.** A restaurant is to be opened for business under the conditions shown below. In order to make the monthly profit of 50,000 dollars, how many customers are necessary for each seat per business day?

[Conditions]

Average sales for each customer per month:	100 dollars
Variable cost per customer per month:	20 dollars
Fixed cost per business day:	400 dollars
Number of business days per month:	25 days
Number of seats:	10 seats

- a) 2                      b) 3                      c) 4                      d) 5

**Q78.** As shown in the table below, there are four tours provided by a tour company. The table also shows the expected profit for each tour with accidents or without accidents. Which of the following is the tour that is expected to make the highest profit according to the expected value principle?

Tour options	Without accidents		With accidents	
	Profit (\$)	Probability (%)	Profit (\$)	Probability (%)
Mountain biking	400	95	200	5
River rafting	600	90	−400	10
Bungee jumping	300	97	250	3
Scuba diving	900	80	−1,000	20

- a) Bungee jumping
- b) Mountain biking
- c) River rafting
- d) Scuba diving

**Q3.** The distribution of days that are required to complete a certain activity can be approximated by a standard normal distribution with a mean of 500 days and a standard deviation of 12 days. What is the approximate 95% confidence interval in days for the activity?

- a) Between 464 and 536
- b) Between 476 and 524
- c) Between 488 and 512
- d) Between 494 and 506



**Q79.** The table below shows the transaction records for a certain fiscal period. When the average cost is calculated based on the periodic average method, how much is the “cost of sales” in dollars at the end of the period?

Transaction	Quantity	Unit cost (dollars)
Beginning inventory	10	12
Purchased	40	13
Sold	40	17
Purchased	50	14
Sold	30	18

a) 402

b) 938

c) 1220

d) 1340

- Q7.** When characters *A* through *E* are encoded, their bit patterns and probabilities of occurrence are shown in the table below. What is the average number of bits per character?

Character	Bit pattern	Probability of occurrence (%)
<i>A</i>	0	50
<i>B</i>	10	30
<i>C</i>	110	10
<i>D</i>	1110	5
<i>E</i>	1111	5

- a) 1.6                      b) 1.8                      c) 2.5                      d) 2.8

**Q74.** When production is planned based on the calculation formula and table shown below, what is the value for production plan *C*? Here, the carry-over inventory on April 1 is equal to 400 pieces of the actual inventory on March 31.

[Calculation formula]

Production plan = Sales plan + Inventory plan – Carry-over inventory

Unit: pcs			
	Production plan	Sales plan	Inventory plan
April 1	<i>A</i>	5,000	300
April 2	<i>B</i>	4,500	250
April 3	<i>C</i>	4,800	300
April 4	<i>D</i>	4,600	250

- a) 4,450                      b) 4,550                      c) 4,850                      d) 4,900

**Q76.** A trucking company has two types of trucks, A-type and B-type, as shown in the table below, and the company has a contract to deliver 900 boxes at a time by using the company's own trucks. However, because of the limited availability of truck drivers, only a total of 10 trucks can be dispatched at a time. Which of the following is the set of expressions that can determine the number of trucks so as to minimize the delivery cost? Here,  $x$  and  $y$  are the number of A-type trucks and the number of B-type trucks, respectively.

	A-type truck	B-type truck
Maximum loading capacity	90 boxes	70 boxes
Number of company's own trucks	8	6
Cost per delivery	\$400	\$300

- a) Conditions  $90x + 70y \leq 900$   
 $x + y \leq 10$   
 $0 \leq x \leq 8, \quad 0 \leq y \leq 6$   
Objective function  $400x + 300y \rightarrow \text{Minimize}$
- b) Conditions  $90x + 70y \leq 900$   
 $x + y \geq 10$   
 $0 \leq x \leq 8, \quad 0 \leq y \leq 6$   
Objective function  $400x + 300y \rightarrow \text{Minimize}$
- c) Conditions  $90x + 70y \geq 900$   
 $x + y \leq 10$   
 $0 \leq x \leq 8, \quad 0 \leq y \leq 6$   
Objective function  $400x + 300y \rightarrow \text{Minimize}$
- d) Conditions  $90x + 70y \geq 900$   
 $x + y \geq 10$   
 $0 \leq x \leq 8, \quad 0 \leq y \leq 6$   
Objective function  $400x + 300y \rightarrow \text{Minimize}$

**Q78.** The table below shows the income statement for a certain company. Which of the following is the amount of sales (in million dollars) at the break-even point?

Unit: million dollars

Account	Sub-account	Amount
Sales		700
Cost of sales	Variable cost 100	
	Fixed cost 200	300
Gross profit		400
Selling, general, and administrative expenses	Variable cost 40	
	Fixed cost 300	340
Profit before tax		60

- a) 250                      b) 490                      c) 500                      d) 625

**Q1.** According to a survey of 100 students, there are 40 students studying English, 30 studying French, and 25 studying Spanish. In addition, 8 students are studying English and French, 6 are studying English and Spanish, 5 are studying French and Spanish, and 22 are not studying any of the three languages. Which of the following is the number of students studying all three languages?

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

**Q4.** What is the probability of getting a sum of 8 or 9 on a pair of dice, each of which is a regular hexahedron with faces numbered 1 through 6?

a)  $\frac{1}{18}$

b)  $\frac{5}{36}$

c)  $\frac{1}{4}$

d)  $\frac{1}{3}$

**Q77.** A factory produces three products shown in the table below. How much is the maximum possible profit in dollars? Here, there is an upper limit of monthly demand for each product, and up to 200 hours/month of factory time can be used for the assembly process.

	Product $X$	Product $Y$	Product $Z$
Profit per unit (dollar)	18	25	30
Time to assemble a unit (minute)	6	10	15
Maximum monthly demand (unit)	1,000	900	500

- a) 26,250                      b) 30,000                      c) 31,500                      d) 33,000



**Q75.** When ABC analysis is used to categorize product items in the table below, which of the following is the combination of the product numbers for the items that are categorized into the group “A”?

Product number	Annual sales quantity	Unit price	Annual sales amount
1	110	2	220
2	60	40	2,400
3	10	4	40
4	130	1	130
5	50	12	600
6	1	25	25
7	10	2	20
8	150	2	300
9	20	2	40
10	50	1	50
Total	591		3,825

a) 1 and 2

b) 2 and 5

c) 2 and 6

d) 4 and 8

**Q78.** The table below shows records of purchase and withdrawal for a component. When the first-in first-out method is applied, which of the following is the unit price of the withdrawal on April 10?

Transaction date	Transaction type	Quantity	Unit price (dollars)	Amount (dollars)
April 1	Carry-forward from the previous month	2,000	100	200,000
April 5	Purchase	3,000	130	390,000
April 10	Withdrawal	3,000		

- a) 100                      b) 110                      c) 115                      d) 118

**Q7.** When three cards are randomly selected at a time from a standard deck of 52 playing cards, what is the probability that all of these three cards are in the same suit (heart, diamond, spade, or club)?

a)  $\frac{11}{850}$

b)  $\frac{11}{425}$

c)  $\frac{22}{425}$

d)  $\frac{44}{425}$

**Q77.** When the fixed order quantity model can be used for controlling inventory under the following conditions, what is the Economic Order Quantity (EOQ)? Here, EOQ is the optimal order quantity that theoretically minimizes the total of the cost of ordering and holding inventory. The demand is constant, and does not vary over time.

[Conditions]

Annual demand: 10,000 units

Ordering cost per order: \$10

Annual holding cost per unit: \$0.2

- a) 250                      b) 500                      c) 1,000                      d) 2,000

- Q5.** The student scores in a certain examination are shown in the table below. What is the standard deviation of these student scores? Here, the standard deviation  $\delta$  can be defined as follows:

$$\delta^2 = \frac{1}{n} \sum_{i=0}^n (x_i - \bar{x})^2$$

“ $\delta$ ” is a positive number, and “ $n$ ” is the number of sample values. “ $x_i$ ” is each sample value, and “ $\bar{x}$ ” is an arithmetic average of the sample values.

Student name	Score
Mr. Brown	30
Ms. Rose	50
Mr. White	60
Ms. Green	70
Mr. Black	90

- a) 10                      b) 20                      c) 30                      d) 60

- Q6.** There are three different sizes of white balls and three different sizes of green balls. When these six balls are laid out in a line so that the three white balls can be placed in adjacent positions, how many arrangements of all the balls can be made?
- a) 10                      b) 144                      c) 576                      d) 720

- Q74.** The table shows the sales, cost, and profit for a certain product in the current period. When the sales unit price of this product is 5 dollars, at least how many should be sold to earn twice or more in profit during the next period?

Unit: dollar

Sales	10,000
Cost	
Fixed cost	2,000
Variable cost	6,000
Profit	2,000

- a) 2,400                      b) 2,500                      c) 3,000                      d) 4,000

**Q78.** You want to invest in one of the stocks  $A$  through  $D$ , all of which are 100 dollars at the current price. The table shows the predicted price increase of each stock when the growth of the economy is high, medium, or low. When the “maximin” principle is applied, which of the following stocks should be invested in?

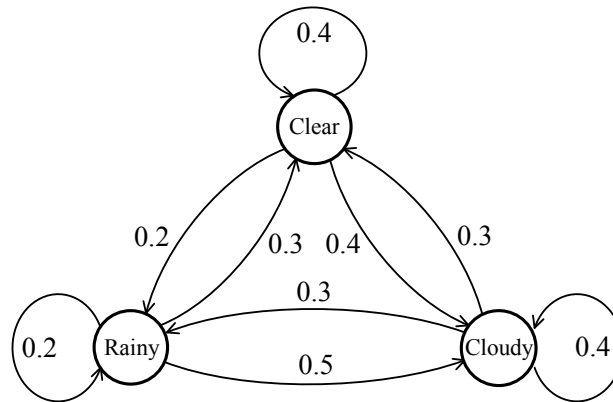
Unit: dollar

Stock \ Economic growth	High	Medium	Low
$A$	20	10	15
$B$	25	5	20
$C$	30	20	5
$D$	40	10	-10

- a)  $A$                       b)  $B$                       c)  $C$                       d)  $D$



- Q6.** The figure below shows daily changes in the weather for a given district, and each value represents the probability of changes in the following day's weather. When the weather is rainy on a given day, what is the probability that the weather is clear two days later?



- a) 0.15      b) 0.27      c) 0.3      d) 0.33

**Q8.** In a certain company, there are a total of 400 employees including 100 smokers. The number of male employees is 250, including 75 male smokers. What is the probability that an employee selected at random is a female nonsmoker?

a)  $\frac{3}{4}$

b)  $\frac{3}{8}$

c)  $\frac{5}{6}$

d)  $\frac{5}{16}$

**Q73.** When the average cost method is used for the inventory control in the transaction record table shown below, what is the inventory value (in dollars) at the end of March?

[Transaction record]

Date (yyyy-mm-dd)	Transaction	Quantity	Unit cost (\$)
2009-03-01	Beginning inventory	100	30
2009-03-06	Purchased	50	50
2009-03-10	Sold	50	
2009-03-17	Purchased	50	40
2009-03-25	Sold	100	
2009-03-31	Ending inventory	50	

- a) 1,500                      b) 1,800                      c) 1,875                      d) 2,000

**Q74.** As shown below, a shop purchases and sells a certain type of product.

Purchasing price : \$10 per unit

Selling price : \$15 per unit

Fixed cost : \$1,000

How many units are sold at a “break even” point, where there is neither a profit nor a loss?

a) 100

b) 150

c) 200

d) 250

**Q77.** When ABC analysis is done on the products shown in the table below, which of the following is a set of the product numbers that should be handled as management items of Group A?

Product Number	Annual Sales	Unit Price	Annual Revenue
1	110	2	220
2	60	40	2,400
3	10	4	40
4	130	1	130
5	50	12	600
6	1	25	25
7	10	2	20
8	150	2	300
9	20	2	40
10	50	1	50
Total	591		3,825

- a) 1 and 2                      b) 2 and 5                      c) 2 and 6                      d) 4 and 8

**Q7.** There are 3 white balls and 3 red balls in a box. What is the probability that the two balls taken out at random from the box are one white ball and one red ball?

a)  $1/5$

b)  $1/3$

c)  $1/2$

d)  $3/5$

**Q73.** A certain company is producing and selling its product  $X$ . The variable cost of the product  $X$  is 60% of its selling price, and the fixed cost of the company is \$50,000 per month. When the company's target profit for the forthcoming month is \$20,000, how much sales volume (in dollars) is required to meet it?

- a) 100,000      b) 125,000      c) 150,000      d) 175,000

**Q74.** A certain manufacturer plans to produce products in the two periods 1 and 2 as shown in the table below. How much is the fixed cost (in dollars) to produce the planned products during a single period? Here, the fixed cost remains unchanged for each period.

Period	Number of products to be produced	Manufacturing cost (\$)
1	1,000	5,000
2	1,500	6,000

- a) 1,000                      b) 2,500                      c) 3,000                      d) 5,000



**Q75.** A certain retailer purchases watches from a wholesaler and sells them to customers. As shown in the transaction record table below, the retailer purchased a total of 150 watches and sold 120 watches in January. In addition, the retailer had a stock of 30 watches at the beginning of January. What is the total purchase cost (in dollars) of watches that were sold on an FIFO (First In First Out) basis in January?

[Transaction record]

Date (yyyy-mm-dd)	Transaction	Quantity	Unit cost (\$)
2008-01-01	Beginning inventory	30	20
2008-01-10	Purchased	60	21
2008-01-16	Purchased	40	22
2008-01-25	Purchased	50	23
2008-01	Sold	120	

- a) 2,500                      b) 2,520                      c) 2,550                      d) 2,670

**Q76.** Company *A* and Company *B* can expect profits as shown in the table below when each of them implements two different strategies. Which of the following is the profit of Company *A* when both companies carry out the maximin strategy? In each cell of the table, the left value indicates the profit of *A*, and the right value indicates the profit of *B*.

		Company <i>B</i>	
		Strategy b1	Strategy b2
Company <i>A</i>	Strategy a1	−15, 15,	20, −20
	Strategy a2	5, −5	0 0

a) −15

b) 0

c) 5

d) 20

**Q78.** A certain company has installed an online computer for the purpose of improving its inventory control system. When the company anticipates sales of 15,000 units per year, ordering cost of \$60 per order, and annual holding cost of \$20 per unit, what is the optimal order quantity (in units) per order? Here, the fixed order quantity model can be applied.

- a) 300                      b) 500                      c) 1,500                      d) 3,000

- Q9.** There are five different sizes of white balls and five different sizes of green balls. When these ten balls are laid out in a line so that adjacent balls can have different colors, how many arrangements of the balls can be made?
- a) 7,200                      b) 14,400                      c) 28,800                      d) 57,600

**Q10.** A coin is tossed three times. What is the probability that it lands on heads exactly one time?

a) 0.125

b) 0.25

c) 0.333

d) 0.375

**Q78.** A server runs a regional web application. It services the requests coming in from all regional offices. Each request is completed in 80 milliseconds on average. A total of 10 requests per second arrive at the server on average. If the M/M/1 queuing model can be applied, how many requests are waiting for the service on average?

- a) 3.20                      b) 4.00                      c) 4.66                      d) 5.00

**Q8.** Two players, X and Y play a dice game. A pair of dice is tossed. If the sum of the dice is 2, 4, or 6, X wins the game. Otherwise, Y wins. What is the probability that Y wins the game?

a)  $1/4$

b)  $1/3$

c)  $1/2$

d)  $3/4$

**Q9.** There are a total of 1,900 students in a school, 553 of whom are taking a course in computer science, 667 of whom are in mathematics, and 290 of whom are in both computer science and mathematics. How many students are not taking a course in either computer science or in mathematics?

a) 680

b) 930

c) 970

d) 1260



**Q76.** The selling price per unit of product Z is set to \$250, and sales for the coming year are expected to be 500 units. If the company requires a return of 15% in the coming year on its investment of \$250,000 in product Z, what is the target variable cost per unit for the coming year? Here, the fixed cost is \$10,000 per annum.

- a) \$145                      b) \$155                      c) \$165                      d) \$175

**Q77.** When the moving average method is applied to the receipt/shipment ledger shown below, how much in dollars is the closing inventory value of August?

[Receipt/shipment ledger]

Date	Transaction	Quantity	Unit price (\$)
August 1	Beginning inventory	100	10
August 5	Purchased	100	12
August 15	Sold	50	
August 18	Sold	100	
August 20	Purchased	50	15
August 31	Ending inventory	100	

a) 1,180

b) 1,250

c) 1,300

d) 1,350

**Q78.** In a production process of 1,000 units of product X, “material cost” incurred is \$10,000, and “direct labor cost” is \$20,000. “Production overhead” is 100% of direct labor cost. “Selling and distribution cost” is \$10,000. How much in dollars is the unit cost of product X?

a) 10

b) 30

c) 50

d) 60

**Q7.** When you flip a coin four times, what is the probability that it will come up heads exactly twice?

a) 0.2

b) 0.375

c) 0.5

d) 0.625