



October 2011

IT Passport Examination

Questions must be answered in accordance with the following:

Question Nos.	Q1 – Q100
Question Selection	All questions are compulsory.
Examination Time	9:30 – 12:15 (165 minutes)

Instructions:

1. Use a pencil. If you need to change an answer, erase your previous answer completely and neatly. Wipe away any eraser debris.
2. Mark your examinee information and your answers in accordance with the instructions below. Your answer will not be graded if you do not mark properly. Do not mark nor write on the answer sheet outside of the prescribed places.
 - (1) **Examinee Number**
Write your examinee number in the space provided, and mark the appropriate space below each digit.
 - (2) **Date of Birth**
Write your date of birth (in numbers) exactly as it is printed on your examination admission card, and mark the appropriate space below each digit.
 - (3) **Answers**
Select one answer (a through d) for each question.
Mark your answers as shown in the following sample question.

[Sample Question]

Q1. In which month is the autumn IT Passport Examination conducted?

- a) September b) October c) November d) December

Since the correct answer is “b)” (October), mark your answer sheet as follows:

[Sample Answer]

Q1	<input type="radio"/> A	<input checked="" type="radio"/>	<input type="radio"/> C	<input type="radio"/> D
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**Do not open the exam booklet until instructed to do so.
Inquiries about the exam questions will not be answered.**

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Answer questions Q1 through Q36 concerning technology.
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Q1. Which of the following is an appropriate description concerning the Java language?

- a) It is a markup language used for describing Web pages.
- b) It is a language developed for scientific and engineering calculations.
- c) It is an object-oriented language that provides platform-independent portability.
- d) It is a language developed for business-oriented calculations.

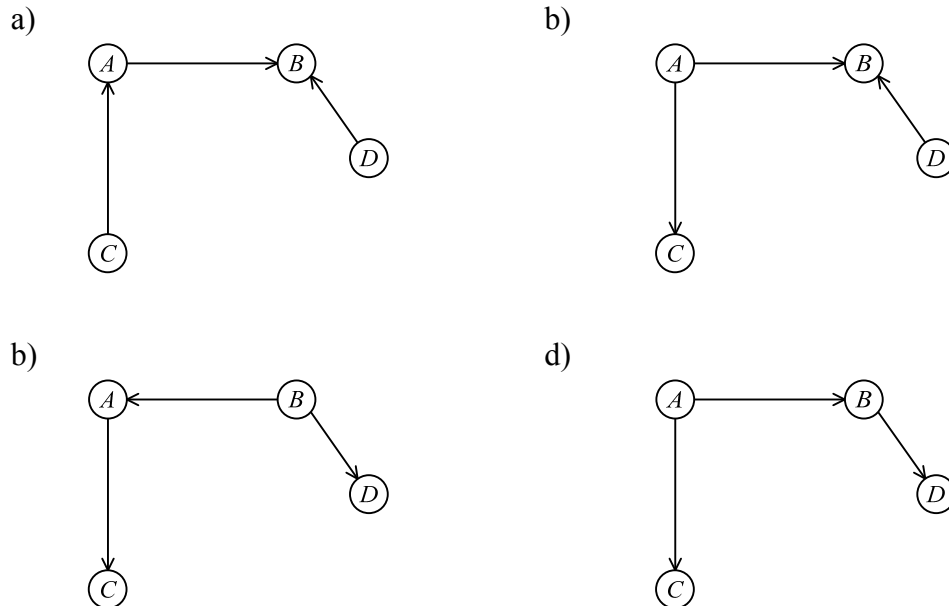
Q2. Which of the following is an appropriate description concerning the usage of HTML (Hyper Text Markup Language) tags?

- a) <LABEL> is used to define the title of a Web page.
- b) <BODY> is used to describe the text of a Web page.
- c) <BIG> is used to specify the size and style applied to each character in a Web page.
- d) <FORM> is used to divide a Web page into multiple frames.

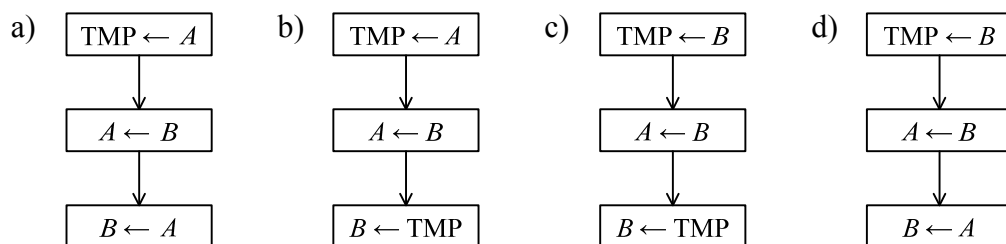
Q3. Which of the following is an appropriate description concerning XML (eXtensible Markup Language)?

- a) It is an object-oriented language based on C++, but simplified to eliminate language features that cause common programming errors.
- b) It is an interpreter language for text processing and also a standard language for CGI (Common Gateway Interface) programs that run on a Web server.
- c) It is a page description language used in the electronic and desktop publishing areas for defining the contents and layout of a printed page.
- d) It is a language that enables users to create their own tags in order to describe the structure and content of a document.

Q4. When a relation between objects is abstracted, the relation from X to Y (called an order relation) is represented as (X, Y) and illustrated as $(X) \longrightarrow (Y)$. Which of the following is the diagram that illustrates three sets of order relations “ (A, B) , (A, C) , (B, D) ”?



Q5. The data is exchanged between variable A and variable B . When variable TMP is used to temporarily store data, which of the following is the procedure for exchanging data correctly? Here, “ $x \leftarrow y$ ” indicates that the content of “ x ” is replaced with the data of “ y ”.

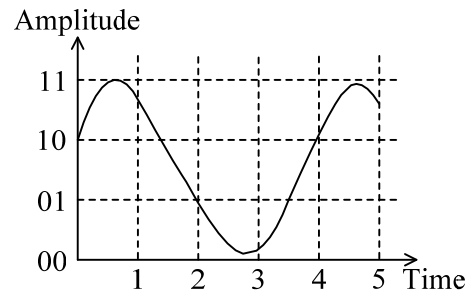


- Q6.** When the reward for an improvement proposal concerning business operations is determined based on the decision table below, how much is the reward for an improvement proposal that results in an improvement of \$20,000 and a turnaround time reduction of three days? Here, “Y” in the table means that each condition holds “true”, and “N” means “not true”. In addition, “√” indicates the reward that applies to a specific combination of these conditions.

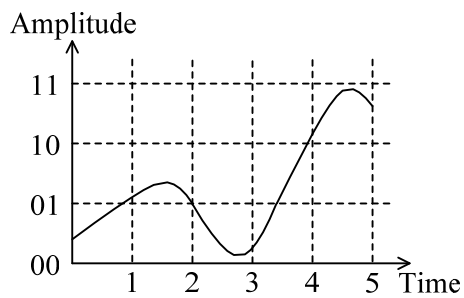
Condition	Improvement of less than \$10,000	Y	Y	N	N
	Turnaround time reduction of less than one week	Y	N	Y	N
Reward	\$50	√			
	\$100			√	
	\$150		√		
	\$300				√

- a) \$50 b) \$100 c) \$150 d) \$300
- Q7.** When a sound is recorded in a computer file, it is to be stored as a series of 8-bit encoded data. When the same sound source is sampled at the same sampling frequency and then encoded as a series of 16-bit data in lieu of 8-bit data, which of the following is an appropriate explanation concerning this encoding?
- a) The amplitude of the sound can be recorded more finely.
b) When the recording time is the same, the amount of data becomes smaller.
c) The CPU load required to process the recorded data decreases.
d) The upper limit of the frequency that can be recorded becomes higher.

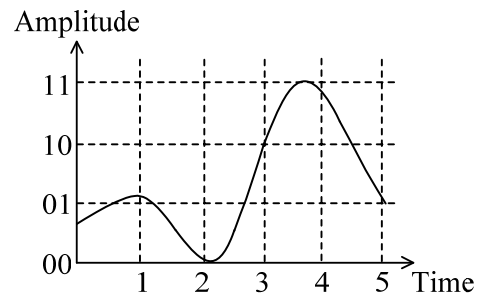
- Q8.** A sound signal is digitized. Sampling is performed at Time 1 through Time 5 in the figure below, and four-level quantization is performed; in other words, the levels closest to the sampling point are selected. After that, two-bit encoding is performed. The result is “11 01 00 10 11”. When digitization is performed in the same way, which of the following figures represents the sound signal that results in “01 00 10 11 01”?



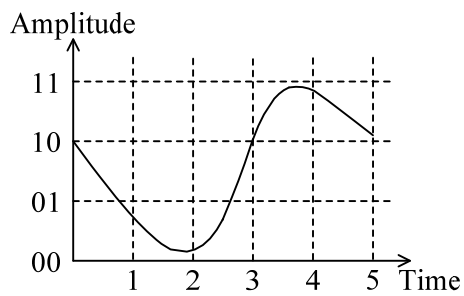
a)



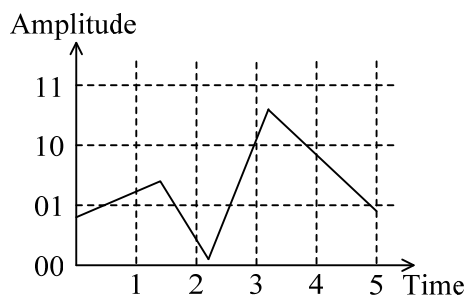
b)



c)



d)



Q9. Which of the following is an appropriate description concerning the clock frequency of the CPU in a PC?

- a) The instruction execution timing of the CPU changes depending on the clock frequency. As the clock frequency becomes higher, the instruction execution speed of the PC increases.
- b) The communication speed of the LAN changes depending on the clock frequency. As the clock frequency becomes higher, the communication speed of the LAN increases.
- c) The rotation speed of the hard disk changes depending on the clock frequency. As the clock frequency becomes higher, the rotation speed becomes faster and the data transfer rate of the hard disk increases.
- d) The clock frequency serves as the reference for the internal clock of the PC. When the clock frequency doubles, the interrupt interval becomes half and the speed of real-time processing increases.

Q10. Which of the following is an appropriate explanation concerning the cache memory of a PC?

- a) It is placed between the CPU core and main memory, and is used to read and write data at high speed.
- b) It is used to store the same data in two locations at the same time in order to improve reliability.
- c) It is equipped with a mechanism that can run even a program whose size exceeds the main memory capacity.
- d) It enables simultaneous access to main memory blocks by dividing main memory into multiple blocks.

Q11. Which of the following is an appropriate description concerning flash memory?

- a) It is used as read-only storage once data is written.
- b) No power supply is required to retain stored data.
- c) It is not used for digital cameras because of the difficulty of downsizing.
- d) Data is read or written using laser light.

Q12. Which of the following is an appropriate description concerning CD-R?

- a) It is suitable for making a backup copy of data, because the saved data cannot be erased or overwritten.
- b) It is suitable as storage for frequently updated large master files, because it has a large storage capacity.
- c) It is capable of high-speed writing by shrinking the recording area of the disc surface.
- d) A specially-designed CD-R drive is necessary for reading data, because the data is recorded in a special format.

Q13. Which of the following is the most appropriate explanation of TCO (Total Cost of Ownership) that represents the cost of a system?

- a) The total cost of a company's initial investment in an information system
- b) The total cost incurred in system development
- c) The total cost including system installation, operation, maintenance, and education
- d) The total cost of system installation

Q14. In the new system environment of Company X, three systems including a customer management system, an ordering management system, and a call center system are run individually at separate locations and connected via a network so that they can complement one another in the event of a failure. Also, the system operations are managed at their respective locations. Which of the following is the greatest merit of this new system?

- a) The integration of operations helps reduce the number of operating staff.
- b) Risks of disasters and other problems can be diversified.
- c) The versions of software can be controlled easily.
- d) Backup files can be managed in a consolidated manner.

Q15. Which of the following is the technical term that represents the work volume processed by a computer per unit time?

- a) Throughput
- b) Turnaround time
- c) Time slice
- d) Response time

Q16. Which of the following is an appropriate description concerning OSs used for PCs?

- a) Since the interface between an OS and application programs is standardized, the application programs can be developed without regard to the type of OS.
- b) An OS allocates the computer resources, such as the CPU, memory, and auxiliary storage device, to application programs.
- c) Since an OS has the function of automatically converting character sets in a file, application programs can access the file without regard to the type of character set.
- d) The source code of an OS should be disclosed so that application programs can be free to use the various functions of the OS.

Q17. Which of the following is the most appropriate method for displaying the content of database to a limited extent in accordance with the level of confidentiality for each user's business operations?

- a) Setting up access rights based on the combination of data and user
- b) Distributing a copy of the database limited to each user
- c) Setting up a set of data items (columns) dedicated to each user
- d) Setting up a password for each record in order to protect data

Q18. When a newly installed application program is concurrently executed on a PC that is equipped with a virtual memory function, the swapping of pages between main and secondary storage occurs frequently and the processing efficiency of the running application programs drops sharply. Which of the following is the most appropriate solution to this situation?

- a) Installing more hard disks
- b) Installing more main memory
- c) Switching to a faster CPU
- d) Switching to faster main memory

Q19. Which of the following is an appropriate description concerning file systems that manage files with directories and that are used for a wide variety of OSs on PCs?

- a) The current directory is created first as the top directory of a hierarchical structure.
- b) The file system should be created on a hard disk for directory management.
- c) The directory path is used to identify a specific file stored on an auxiliary storage.
- d) Files and directories cannot be registered in the same directory.

Q20. Which of the following is an appropriate explanation of an interpreter?

- a) It is a program that translates source programs written in assembler language to machine language programs.
- b) It is a program that reads high-level source programs line-by-line, alternately translating lines and executing appropriate operations.
- c) It is a program that translates source programs written in high-level language to machine language programs, and then generates load modules.
- d) It is a program that automatically generates purpose-specific programs based on the specified parameters.

Q21. Which of the following is software that can be used free of charge on a trial basis but requires a usage fee if it continues to be used after the trial period?

- a) Open source software
- b) Shareware
- c) Public domain software
- d) Freeware

Q22. Which of the following is an explanation of defragmentation?

- a) It reassigns defective clusters to other clusters.
- b) It relocates free or unused clusters.
- c) It removes failed or defective clusters.
- d) It relocates physically distributed files into continuous areas.

Q23. Which of the following is an appropriate concept of universal design?

- a) Ensuring that, once a product is designed, the design remains usable without being changed for a long period of time
- b) Ensuring that products keep the same levels of performance and quality regardless of where they are manufactured in the world
- c) Making the design as simple and easy as possible in order to reduce the manufacturing cost
- d) Making products available to many people regardless of differences in age, culture, and ability as well as whether disability is present

Q24. Which of the following is an appropriate explanation of MP3 that is used as a multimedia file format?

- a) File compression format for G4 facsimile communication data
- b) File compression format for audio data
- c) File compression format for color image data
- d) File compression format for digital video data

Q25. Which of the following is an appropriate explanation of a commercial database service?

- a) Publishing information collected only from the commercial field free of charge in the form of a database
- b) Providing professional advice on various issues that occur when a database is being designed and built
- c) Providing information for profit by creating a database of information collected in specific fields
- d) Managing user-built databases on behalf of users, in order to release information to the public

Q26. There is an order entry system that is used to enter and manage orders from customers. A numbering printer is used to print sequential order numbers on order forms in order of arrival unless the forms have mistakes such as missing information. When the order data shown below is entered in this order entry system, which of the following is the item that should be checked so as not to enter the duplicate order data?

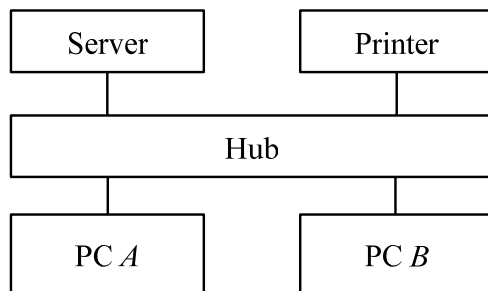
Order data

Order number	Order date	Product code	Quantity	Customer code
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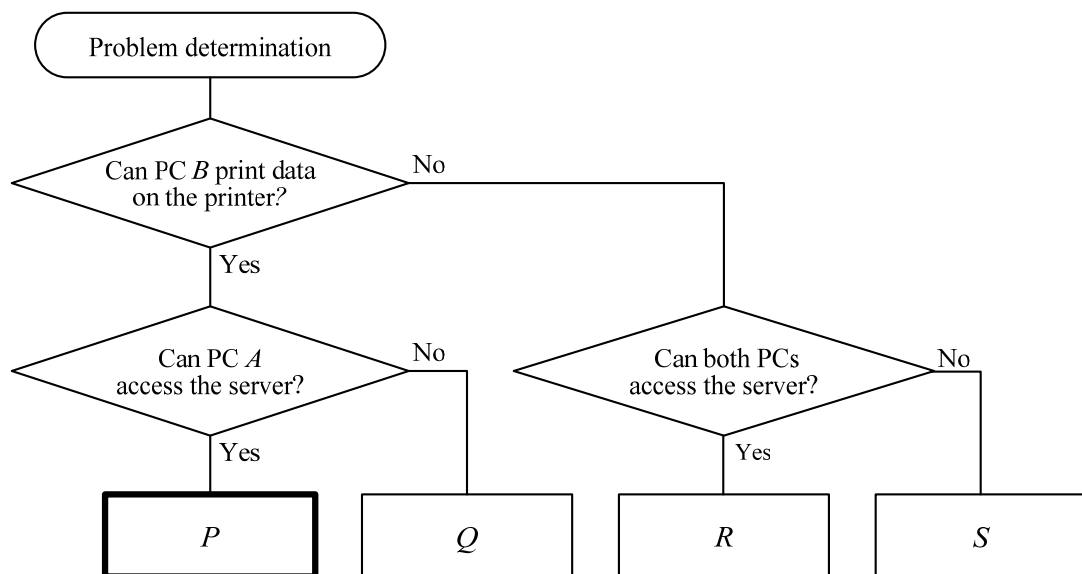
- a) Customer code
- b) Product code
- c) Order number
- d) Order date

Q27. As shown in the figure below, a LAN system comprises two PCs, one server, and one printer. When PC A cannot print any output data on the printer, which of the following should be applied to blank *P* in the problem determination flowchart? Here, both PCs can send output data directly to the printer without using the server.

[LAN System]



[Flowchart]



- a) PC A is not connected to the LAN system.
- b) PC A has something wrong with output settings such as the print queue.
- c) The LAN system does not work because of a failure in the hub.
- d) The printer does not work because of a hardware failure.

Q28. Which of the following is an appropriate explanation of a router that allows messages to be sent between two or more networks?

- a) It performs connection at the data link layer, and provides the traffic isolation function.
- b) It converts protocols including protocols above the transport layer, and interconnects networks with different types of network architecture.
- c) It performs connection at the network layer, and is used for connecting LANs via wide-area networks.
- d) It performs connection at the physical layer, and is used for extending the connection distance.

Q29. In order to implement communication between applications via a network, a number of protocols are used in a hierarchical structure. Which of the following is the appropriate combination of the protocol names to be inserted into blanks *A* and *B* in the description below?

When a Web page is viewed via the Internet, the browser and the Web server use a protocol called A. Communication over this A uses a protocol of a lower layer called B and a protocol of a further lower layer called IP (Internet Protocol).

	<i>A</i>	<i>B</i>
a)	FTP (File Transfer Protocol)	Ethernet
b)	HTTP (Hyper Text Transfer Protocol)	TCP (Transmission Control Protocol)
c)	SMTP (Simple Mail Transfer Protocol)	POP3 (Post Office Protocol version 3)
d)	WWW (World Wide Web)	HTML (Hyper Text Markup Language)

Q30. Which of the following is an appropriate explanation concerning URL?

- a) It is a communications protocol between a Web page and a browser.
- b) It is a message about the update history of a Web page.
- c) It is grammar for describing the content (body) of a Web page.
- d) It is a notation for representing the location of a Web page.

Q31. When an e-mail message titled “Returned mail: Host unknown” is returned in response to an e-mail over the Internet, which of the following is a probable cause of this message?

- a) The recipient’s mail server remains stopped.
- b) In the recipient’s address, the domain name after the @ symbol is incorrect.
- c) The transmitted data is too large, so it exceeds the mail server’s storage capacity.
- d) The encoder used for the attached file is incompatible with the recipient’s decoder.

Q32. A cookie is a small data file that a web site can transfer to a browser to maintain records of the visit to the web site. Among descriptions *A* through *C* concerning such a cookie, which of the following is a list of only the appropriate descriptions?

- A:* Since the cookie always inherits the ID and password entered during the last visit to a Web site, it is not necessary to enter them again when the Web site is viewed using another PC.
- B:* After a Web site is viewed from a temporarily PC rented at an Internet cafe or other places, the cookie should be deleted.
- C:* When personal information is stored in the cookie, such information may be stolen using cross site scripting or some other means.

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

Q33. Which of the following is an appropriate guideline for users concerning protection against computer viruses?

- a) When software is installed, the “read-me” file or other instructions should be read and followed prior to running a virus check.
- b) The autostart function should be enabled as a preventive measure against virus infection via removable disc media.
- c) The auto preview function should be disabled as a preventive measure against virus infection via e-mail.
- d) File extension names should be hidden to prevent application software from being started automatically by identifying the type of file.

Q34. Which of the following is an appropriate description concerning a method used for phishing?

- a) If data entered in a Web page is displayed as is, a malicious script embedded in the page causes damage to users and servers.
- b) Computers infected with a virus are controlled from outside via a network such as the Internet.
- c) Computer user’s personal information, such as IP address or Web browsing history, is secretly collected and sent outside.
- d) E-mails, which pretend to be from an existing business or organization, are sent to lead recipients to a bogus Web site and to steal their personal information.

Q35. When portable computers are used for remote access to data on an office server, which of the following is an effective security measure?

- a) The login screen of portable computers should be set up so that the previously entered user ID and password can be reused.
- b) As much of the required data as possible should be copied onto the portable computers in order to keep network use to a minimum.
- c) User IDs should be shared among multiple users so that unauthorized access can be detected easily.
- d) One-time passwords should be used to allow access to the office server from a remote location.

Q36. Among information security measures *A* through *D* implemented in the workplace to maintain the “confidentiality” and “integrity” of information, which of the following is a list of only the appropriate measures?

A: PCs should remain unlocked to keep them ready for operation from the start to the end of the business day.

B: Documents and electronic storage media, such as CD-R containing important information, should be stored in locked cabinets except when they are used.

C: Documents sent or received by facsimile should be picked up immediately without leaving them unattended on the tray.

D: Messages or information written on the whiteboard should be erased immediately after use.

a) *A, B*

b) *A, B, D*

c) *B, D*

d) *B, C, D*

Answer questions Q37 through Q56 concerning management.

Q37. In system analysis and design, which of the following is described using DFD?

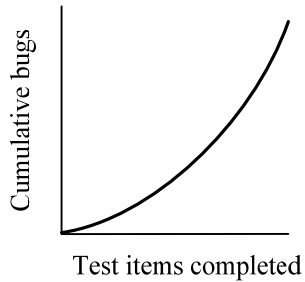
- a) Layout of items on a data entry screen
- b) Flow of data
- c) Physical structure of a database
- d) Procedure of a program

Q38. The upper bound of accounts receivable for each customer and the total value of the receivables up to now are recorded in the customer master file. Which of the following is the process that checks whether or not a new order should be received in consideration of the upper bound of accounts receivable?

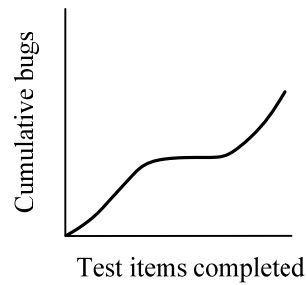
- | | |
|-------------------|----------------------|
| a) Sequence check | b) Duplication check |
| c) Format check | d) Limit check |

Q39. One of the criteria for judging quality during the test phase is the relation between the number of test items completed and the cumulative number of bugs detected. Which of the following graphs indicates that the quality is going into a steady or stable state?

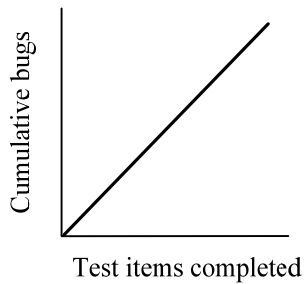
a)



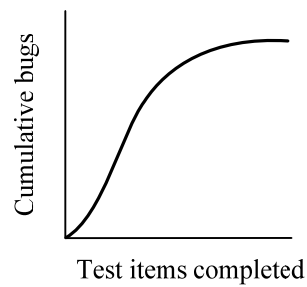
b)



c)



d)



Q40. Which of the following is the test method that determines whether or not the output based on the system specifications is obtained for any given input with the focus on input and output only, and thereby verifies the functions that can be seen from the outside of the system regardless of its internal structure?

a) Operational test

b) Integration test

c) Black box test

d) White box test

Q41. Among software development process models, which of the following is the model that aims to reach a high degree of completion of a system by iterating the development cycle in consideration of minimizing the risk in each cycle?

- a) Incremental model
- b) Waterfall model
- c) Spiral model
- d) Evolution model

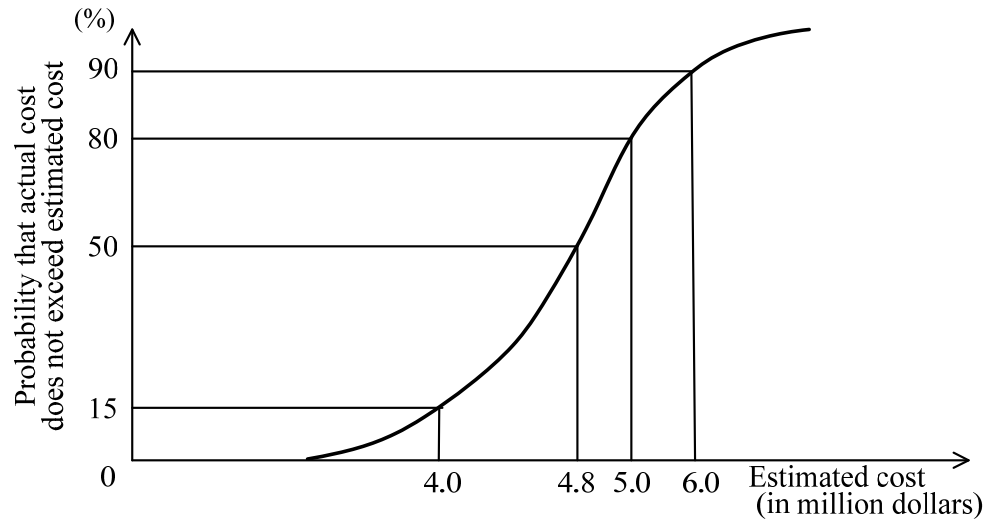
Q42. Which of the following is an appropriate characteristic of a prototyping model?

- a) Development is promoted by evaluating and finalizing the specifications through creating trial models at an early stage of system development and then clarifying the user requirements.
- b) Development is promoted by designing data processing and system operation through taking them into consideration as the extraction of targets as well as their attributes and procedures, rather than as the flow of procedures.
- c) Development is promoted by starting with the development of partial functions, and then repeating the expansion and improvement of functions to satisfy user requirements.
- d) Development is promoted by clearly distinguishing between development phases from requirements analysis through to testing, and then sequentially reviewing and verifying each phase from upstream to downstream.

Q43. Which of the following is the most effective example of an arrow diagram?

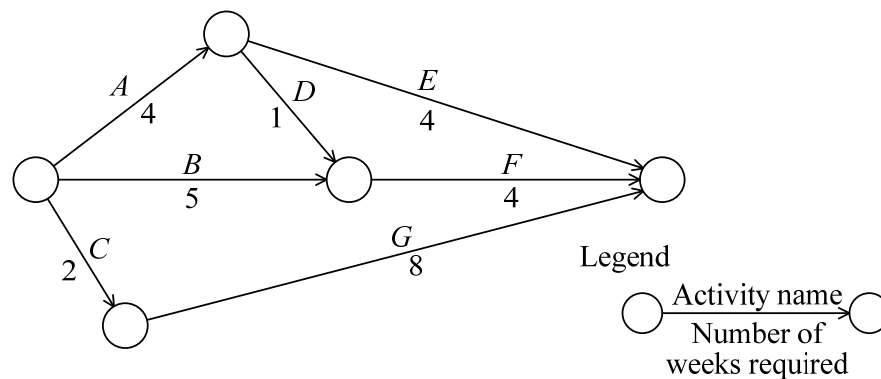
- a) A launch event for a new product is planned so that the preparation of the venue, communication to interested parties, and other activities can make smooth progress.
- b) When a building is designed and constructed, control is exerted over how to proceed with several activities so as not to delay the process.
- c) When a theme is selected, problems are narrowed down to identify the significant problems or concerns to be solved.
- d) Before a negotiation for the revision of transaction prices, several alternative plans are prepared in anticipation of the other party's attitude.

Q44. In the graph below, the probability that the actual project cost does not exceed the estimated cost is shown based on risk simulation. A total of 4.0 million dollars are reserved as project budget. In order to increase the probability that the actual cost does not exceeds the estimate up to 80%, how much money (in million dollars) should be additionally reserved?



- a) 1.0 b) 2.0 c) 5.0 d) 9.0

Q45. Five weeks have passed since the start of a project whose schedule is shown by the arrow diagram below. At this time, the percentage of completion of each activity is as shown in the table below. For example, 80% of activity *B* is completed. In other words, it takes one more week (20% of 5 weeks) to complete activity *B*. When all the activities are evaluated based on the table, which of the following is the activity that causes a delay in the completion of the project? Here, the remaining activities make progress as initially planned.



Activity name	A	B	C	D	E	F	G
Percentage of completion (%)	100	80	100	100	25	0	25

- a) *B* b) *E* c) *F* d) *G*

Q46. At the request of a user department, the development department launches a project of system development. Which of the following is the most appropriate role of the project manager?

- a) Presenting the requirements of the system to the user department
 b) Monitoring the progress to take preventive measures against problems
 c) Preparing a proposal for the project on behalf of the user department
 d) Raising funds to carry out the project on behalf of both departments

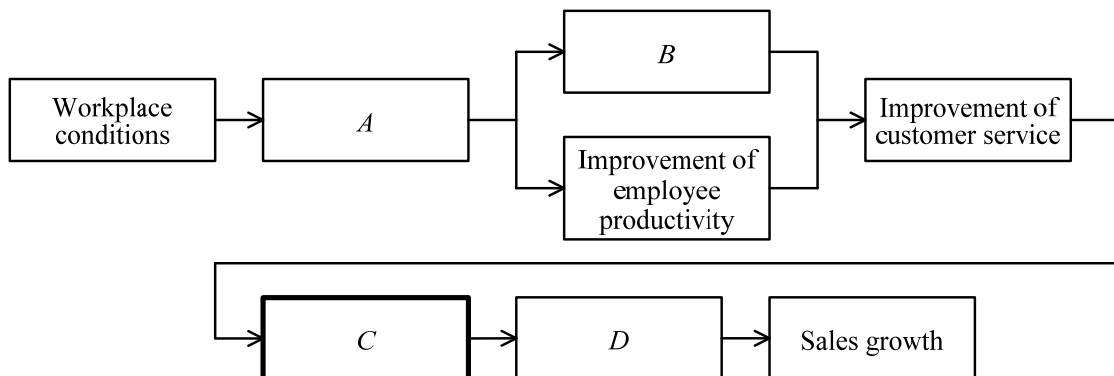
Q47. Which of the following is an appropriate index or indicator that is used to evaluate the quality of deliverables in a system development project?

- a) External procurement ratio
- b) Test coverage
- c) Total number of staff assigned
- d) Number of days spent on the project

Q48. Which of the following is the most appropriate item to be included in an SLA that is a contract defining expectations between an organization and the service vendor to provide an agreed upon level of support?

- a) Server performance
- b) Opening hours for services
- c) System operation cost
- d) Procedures to add new services

Q49. The figure below shows the “service profit chain” developed by James L. Heskett. Among the items to be inserted into blanks *A* through *D* in the figure, which of the following should be inserted into blank *C*?



- a) Improvement of customer satisfaction
- b) Improvement of customer loyalty
- c) Improvement of employee retention rate
- d) Improvement of employee satisfaction

Q50. Which of the following is a technology that is used to link computers to equipment such as PBX, in order to automatically respond to phone and FAX or to route them to their appropriate destinations?

- a) PAX (Private Automatic eXchange)
- b) VoIP (Voice over Internet Protocol)
- c) ISDN (Integrated Services Digital Network)
- d) CTI (Computer Telephony Integration)

Q51. Which of the following is the most appropriate method for computer system maintenance?

- a) Even if there is no system failure observed, a long-term maintenance plan should be made and carried out on a regular basis, in consideration of ensuring stable system operation.
- b) Even if a failure occurs just before scheduled maintenance, the regular maintenance cycle should be kept by taking measures to continue system operation without stopping the system.
- c) At the time of making a maintenance agreement with a service provider, it is advisable to consult and follow the provider's experienced specialist about details, such as maintenance methods and schedule.
- d) It is important to perform maintenance work under the observation of users at the location where the system is installed, and on-site maintenance rather than remote maintenance should be conducted even in the distributed system.

Q52. Which of the following is the most appropriate description concerning the activity of changing an application system by the system operations department?

- a) Since it takes time to determine the priority for change requests, the change activity should be done in order of arrival.
- b) Since it is difficult to predict the extent of impact of the change activity, all the employees should always be informed of the change.
- c) Since the content of the change activity is important for identifying the cause of a failure, it should always be recorded.
- d) The change activity should always be done late at night so as not to have an impact on users.

Q53. The private power generator is installed to protect a business server against electric power failure, but it takes one minute to provide a stable power supply after the power failure is detected. Which of the following devices is necessary to supply temporary power to the server during that one-minute period?

- a) A/D converter
- b) RAID
- c) UPS
- d) Firewall

Q54. When the operational status of an information system is audited, who is in an appropriate position to act as an auditor?

- a) A person who is independent of the system to be audited
- b) An operations manager of the system to be audited
- c) A staff member in charge of the operations of the system to be audited
- d) A consultant who advises on the operations of the system to be audited

Q55. In the flow of a system audit, which of the following is carried out by the auditee (i.e. the organization or person to be audited)?

- a) Verification of improvement
- b) Preparation of an audit plan
- c) Creation of an audit report
- d) Improvement of business operations

Q56. A company monitors and manages business operations by establishing standards and operational procedures to prevent unlawful or unjustifiable acts, mistakes, errors, and other problems, and to ensure that the organization is run healthy, effectively, and efficiently. Which of the following is the most appropriate term that represents this policy or mechanism?

- | | |
|-----------------------|-----------------------|
| a) Information ethics | b) Internal design |
| c) Internal control | d) Privacy protection |

Answer questions Q57 through Q88 concerning strategy.

Q57. Which of the following is the most appropriate explanation of CSR that is becoming increasingly important for the competitiveness and sustainable success in every size of enterprises?

- a) A technique that a company uses to analyze the management styles and business processes of competitors and to learn and adopt their advantages
- b) A concept that a company can enhance its value by taking responsibility for the social and environmental impact of business activities
- c) A system for checking the management of a company to ensure that the power and authority of a management executive is exercised properly
- d) A core competence of a company, such as technology or skill, which provides the company's unique value that cannot be imitated by competitors

Q58. Which of the following is the appropriate rule for “brainstorming” that is a method of resolving problems?

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

Q59. Which of the following indicates a characteristic of management accounting?

- a) It is always necessary to verify every piece of accounting information based on evidence such as a written contract.
- b) The calculation of profit and loss, as well as financial calculation, is done by department, by product, or by project, according to management needs.
- c) Quantification of accounting information is limited to measurement on a monetary basis.
- d) It is necessary to do calculations based on relevant laws such as the commercial law and tax law, not on economics or statistics.

Q60. Company *A* manufactures and sells product *B*. Which of the following is the appropriate expression for calculating the total cost of product *B*? Here, the total cost refers to all the costs incurred until product *B* is sold.

- a) Sales of product *B* – Operating expense of product *B*
- b) Sales of product *B* – Manufacturing cost of product *B*
- c) Manufacturing cost of product *B* + Operating expense of product *B*
- d) Manufacturing cost of product *B* + Operating profit of product *B*

Q61. Which of the following is the right that belongs to a purchaser of a PC software package provided by CD-ROM?

- a) Right to use the program stored in the CD-ROM
- b) Copyright of the program stored in the CD-ROM
- c) Design right of the CD-ROM storing the program
- d) Copyright of the CD-ROM storing the program

Q62. Which of the following is the most appropriate example of e-mail transmission from the viewpoint of consideration for recipients?

- a) A questionnaire on member satisfaction is sent by e-mail to all the addresses of 100 selected members entered in the “To” (destination) field.
- b) A large-size document presenting a company’s products is sent to a customer as an e-mail attachment without being compressed.
- c) A reply to an e-mail query about a product is sent to those customers who should know about the details, by entering their addresses in the “Cc” (carbon copy) field.
- d) An e-mail is sent to the limited customers specified in the “Bcc” (blind carbon copy) field in order to inform them of the URL of a specially planned homepage.

Q63. In the case of placing an order for a product on an Internet shopping site, at which point is the sales contract concluded?

- a) At the point in time when the consumer's purchase message reaches the shop
- b) At the point in time when the shop sends out an acceptance notice to the consumer
- c) At the point in time when the shop's acceptance notice reaches the consumer
- d) At the point in time when the ordered product reaches the consumer

Q64. Which of the following is an appropriate description concerning the two-dimensional code symbol?

- a) Information is read in the horizontal direction only, in the same way as the one-dimensional bar code.
- b) Errors can be detected in both horizontal and vertical directions, but cannot be corrected.
- c) When the area is equivalent in size to the one-dimensional bar code, more information can be recorded.
- d) Since a matrix code has information in both horizontal and vertical directions, its adjustable reading angle is narrow.

Q65. Which of the following is the most appropriate explanation of "digital divide" in relation to information technologies and services?

- a) It refers to the economic or social gap between those who take full advantage of information equipment and those who do not.
- b) It refers to an environment where all people including handicapped people and senior citizens have access to the Internet by using information equipment.
- c) It refers to the level of availability of information equipment and services for all people including handicapped people and senior citizens.
- d) It refers to the people who cannot obtain information because of their lack of knowledge or skills about information equipment such as a PC.

Q66. Which of the following is an activity of quality management based on ISO 9001: 2008?

- a) Preventive actions for potential problems should be implemented at the field staff level and are therefore not reported to the management level.
- b) Since an audit is performed by a third party on a regular schedule, no internal audit is performed.
- c) Records related to quality are stored in a server in order to share the information among the interested parties.
- d) Although a project consists of the company's employees and the partner company's employees, only the company's employees are informed of the quality policy.

Q67. Although a data warehouse is put into operation, it is seldom used. As a result of user interviews, it is concluded that the user's skill level is lower than expected. Which of the following is an appropriate plan to promote the utilization of the data warehouse?

- a) Sending a notification of usage promotion to users through their managers
- b) Preparing standard templates for data extraction and analysis patterns
- c) Providing data more promptly in real-time to improve data precision
- d) Adding more information that users are likely to need

Q68. When two or more companies work together under an alliance agreement, which of the following is the most appropriate risk that is expected to be reduced?

- a) Business investment risk
- b) Information leakage risk
- c) Brain drain risk
- d) Fraud risk

Q69. Which of the following is the most appropriate explanation of “benchmarking” used in business management?

- a) It is a tool to radically transform management practices and structures by redesigning business processes and making full use of information technology.
- b) It is a tool to compare business processes and performance metrics with those of the strongest competitor or a leading company as a reference of best practices.
- c) It is a tool to promote quality control across all departments, by reviewing the degree of product quality improvement in comparison with competitors.
- d) It is a tool to identify a company’s own original skills and technology that are highly profitable and superior to other companies.

Q70. Company A is evaluating the business strategy that was implemented last fiscal year. When the conditions are as shown in the table below, what is the score of the overall evaluation?

Classification	Strategic item	Target	Actual record	Evaluation method and criteria	Score weighting
Quantitative items	Rate of increase in sales	2.5%	2.4%	<ul style="list-style-type: none"> - When the actual rate of increase in sales is 2% or higher, 110 points are given. - When the actual rate is over 1% and below 2%, 100 points are given. - When the actual rate is over 0% and below 1%, 90 points are given. - In cases other than the above, 0 points are given. 	0.5
	Number of newly developed products	2	1	<ul style="list-style-type: none"> - When the actual number of newly developed products is 2 or more, 110 points are given. - When the actual number is 1, 100 points are given. - In cases other than the above, 0 points are given. 	0.3
Qualitative item	Customer satisfaction	4	4	<ul style="list-style-type: none"> - When the actual customer satisfaction is one or more ranks higher than the target, 100 points are given. - In cases other than the above, 0 points are given. 	0.2

[Method of the overall evaluation]

- (1) A score is calculated by using the evaluation method and criteria set for each strategic item.
- (2) Each score calculated in (1) is multiplied by the specified weight, and then all weighted scores are added to obtain the total weighted score of the overall evaluation.

- a) 75 b) 82 c) 85 d) 105

Q71. A chain store with a distribution system is connected to the manufacturer via a computer network, in order to use it to determine optimal production volumes. Among the information collected by the chain store, which of the following is an appropriate combination of information required for the manufacturer?

- a) Inventory information and point-of-sale information
- b) Shelf allocation information and inventory information
- c) Shelf allocation information and inbound inventory information
- d) Inbound inventory information and point-of-sale information

Q72. Which of the following is the type of retailing where the headquarters provides the business right, the right to use the trademark, and know-how about opening and running stores, based on contracts with member stores, and collects royalties in return?

- a) Outlet store
- b) Antenna shop
- c) Franchise chain
- d) Voluntary chain

Q73. Which of the following is an appropriate explanation of MOT (Management of Technology)?

- a) It is the business activity of a company gaining control of all or part of another company through merger or acquisition for the purpose of expanding the scale of operation.
- b) It is the concept of management under which a company doing industrial business invests in scientific methods and materials to promote innovation and to grow business continuously.
- c) It is the business activity of the management of a company raising funds from financial institutions and buying the stock to acquire the controlling interest of the company.
- d) It is the material management technique for calculating the quantities of the components and materials necessary to produce a product and reflecting the results on the production plan.

Q74. An ERP (Enterprise Resource Planning) package is a suite of fully integrated software applications that are used to perform administrative business processes such as financial management, procurement, personnel, and payroll administration. Which of the following is the most appropriate description concerning such an ERP package?

- a) An ERP package can be installed with relative ease because the business processes of a company do not need to be analyzed.
- b) An ERP package should be maintained by individual user departments after its installation.
- c) An ERP package should be installed after business processes are verified and standardized.
- d) An ERP package is system software integrated and designed especially for the business processes of domestic companies.

Q75. Which of the following is the system that records sales information when a product is sold at the store and that collects, accumulates, and analyzes product sales information for each product?

- a) CAD
- b) CIM
- c) EOS
- d) POS

Q76. Which of the following is a technology that is defined by some international standards and used for contactless IC cards such as train or bus passes?

- a) IrDA
- b) RFID
- c) Bar code
- d) Wireless LAN

Q77. A factory is engaged in assembly production of product *P* that consists of components *A* and *B*. The processing of component *A* requires component *C*, and the processing period is one week. The delivery lead times of purchased components *B* and *C* are two weeks and three weeks, respectively. Product *P* can be assembled in one week only after components *A* and *B* are both delivered. What is the minimum number of weeks required to produce one unit of product *P*, including the delivery periods of the components? Here, there is no stock of any of the components.

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

Q78. As shown below, data in CSV format is entered using spreadsheet software and then calculation formulas are entered in cells D1, D2, and D3. Which of the following numeric values is displayed in cell D3? Here, data in CSV format is entered sequentially from the leftmost cell in the first row, and a carriage return code (^C_R) causes the active cell to move to the leftmost cell in the next row. When a numeric value is entered in a cell, values in other cells are re-calculated immediately.

Data in CSV format: 2 , 2 , 4 ^C_R 1 , 3 , 4 ^C_R 2 , 1 , 1 ^C_R
 Calculation formula of cell D1: A1 + C3
 Calculation formula of cell D2: B1 + B3
 Calculation formula of cell D3: D1 + D2

	A	B	C	D
1				
2				
3				

- a) 6 b) 7 c) 8 d) 9

Q79. Which of the following is categorized as “embedded software” that is generally written for special-purpose microchips, not for general-purpose CPUs?

- a) Software that is used for designing, drawing, and other tasks for industrial products
- b) Software that controls the amount of fuel supplied to the engine of an automobile
- c) Software that is used on a PC to edit images taken by a digital camera
- d) Software that performs macro calculation as a function of spreadsheet software

Q80. Which of the following is an explanation of “contact management” that is a basic function of SFA (Sales Force Automation)?

- a) Sales efficiency is enhanced by taking prompt action on every inquiry from salespersons.
- b) The order receiving rate is increased by having the entire sales organization respond to a customer, rather than having only a single salesperson respond to the customer.
- c) A set of records including customer visiting days and sales results is managed, in order to perform effective sales activities for prospective and existing customers.
- d) Sales techniques accumulated on an individual basis are identified and shared, in order to improve the performance level of the entire sales department.

Q81. Which of the following is the chief position that has direct responsibility for developing and implementing information systems strategy based on business strategy?

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

Q82. Which of the following is used for accumulating and consolidating a large amount of data acquired through various business activities and thereby providing the helpful and meaningful data as a management tool such as a decision-making support system?

- a) Data mapping b) Data warehouse
- c) Data dictionary d) Data modeling

Q83. Company A, which manufactures and sells house building materials, identifies a problem with its logistics operation and develops an improvement plan to resolve the problem. Which of the following is the most appropriate mechanism or function to be computerized to implement the improvement plan?

[Problem]

Since it takes several days to deliver the product ordered by a sales office, each sales office has in stock all of the products dealt with by the company in fear of being out of stock. As a result, an enormous inventory cost is incurred by Company A as a whole.

[Improvement plan]

A logistics warehouse is built in the major territory of the sales area, and delivery trucks are allocated so that any product can be delivered on the day the order from the sales office is received.

- a) A mechanism that enables sales offices to inquire the number of new housing starts in their sales territories
- b) A mechanism that enables sales offices to immediately inform the logistics warehouse about the order details
- c) A mechanism that enables the manager of each sales office to understand the current inventory cost
- d) An analysis function that enables management to compare and review the sales performance of individual sales offices

Q84. When system development is outsourced for the purpose of constructing a system, which of the following is an appropriate item to be considered?

- a) Placing an order with a reliable outsourcee in order to complete the acceptance test in a simple and easy way
- b) Monitoring the progress of development on the outsourcer side in order to find and resolve problems early
- c) Entrusting all tasks, including the determination of the specifications of business operations, to an outsourcee who is familiar with the business operations
- d) Giving detailed instructions on outsourced tasks down to each staff member, even if the outsourcee is reliable

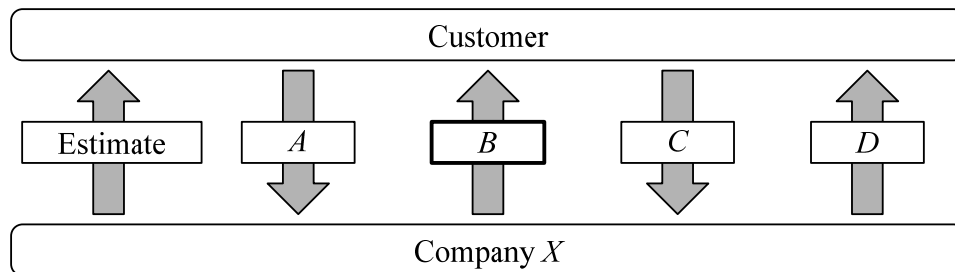
Q85. When computerization of an information system is planned, which of the following is the most appropriate item to be considered?

- a) Promoting a study of developing the system as much as possible by a company's own staff, in consideration of system operations
- b) Installing an equivalent system used by other companies in the same industry in order to avoid failures
- c) Describing specifically the initiative of computerization, the operation manuals, and the measures against system failures
- d) Clarifying the effectiveness of the information system as well as the return on investment

Q86. When an error message displayed by an application program is designed, which of the following is an appropriate item to be considered?

- a) Only the fact and details of the error, rather than the way of handling the error, should be displayed.
- b) Only the information that system developers need to identify the cause of the error should be displayed.
- c) Since it is desirable that the error message be as short as possible, the abbreviation and error code should be displayed as they are.
- d) Action to be taken by the user should be displayed briefly and precisely with the error message.

Q87. In the figure below, blanks *A* through *D* represent the transaction process that is used when Company *X* exchanges the forms or documents with the customer. When time progresses from left to right, which of the following should be inserted into blank *B*? Here, each of blanks *A* through *D* corresponds to one of the options “a)” through “d)”.



- | | |
|--------------------------|-------------------|
| a) Acceptance inspection | b) Debit note |
| c) Confirmation of order | d) Purchase order |

Q88. Which of the following is an explanation of “acceptance inspection” performed for a vendor?

- Checking the estimate submitted by the vendor prior to placing an order based on that estimate
- Checking whether the deliverables provided by the vendor conform to the requirements specifications
- Requesting the vendor to study and submit the proposal for the construction of a new system
- Requesting the vendor to provide information for the purpose of collecting information

Answer questions A through C, each of which has four questions.

Question A Read the following description concerning a software test, and then answer **Q89** through **Q92**.

Mr. *M* is asked by Mr. *N* of the general affairs department to create a charge calculation program (hereinafter called the program) used in home-delivery operation. Based on the charge calculation method told by Mr. *N*, Mr. *M* summarizes the requirements as described below and creates the program.

- (1) The charge is calculated from Table 1 according to the size category and the shipping area. The three-side size (total of the depth, width, and height in units of centimeters) of the package is compared with the weight (in units of kilograms), and whichever category having the larger value is used as the size category.
A package with three-side size over 140 cm or with weight over 20 kg is not accepted.
- (2) When the three-side size, weight, and shipping area (*A* through *D*) of the package are entered, the charge is displayed.

Table 1 Charge table

Unit: dollar

Size category			Shipping area			
Category	Three-side size (cm)	Weight (kg)	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
1	Up to 80	Up to 5	13	10	12	18
2	Up to 100	Up to 10	16	12	14	24
3	Up to 140	Up to 20	20	16	18	34

Mr. *M* intends to conduct a test before providing the program to Mr. *N*. Before conducting the test, Mr. *M* creates the output result table shown in Table 2 and prepares test data based on this table. In Table 2, the “Expected output” field contains the correct output that is displayed when the values of the input data correspond to the combination of the values for which “Yes” is shown in the column.

Table 2 Output result table

		1	2	3	4	5	6	...	36
Shipping area	<i>A</i>	Yes	Yes	Yes	Yes	Yes	Yes	...	
	<i>B</i>							...	
	<i>C</i>							...	
	<i>D</i>							...	Yes
Three-side size (cm)	Up to 80	Yes	Yes	Yes				...	
	Up to 100				Yes	Yes	Yes	...	
	Up to 140							...	Yes
Weight (kg)	Up to 5	Yes			Yes			...	
	Up to 10		Yes			Yes		...	
	Up to 20			Yes			Yes	...	Yes
Expected output (dollar)				X				...	

Note: The shaded areas are not shown.

↑ ↑
Y Z

[Management]

Q89. Which of the following is an appropriate reason why Mr. *M* creates the output result table shown in Table 2 in order to prepare the data used to test the program?

- To prepare test data covering all the possible cases identified based on the requirements and then perform those test cases
- To prepare test data used to trace the execution order of the program instructions and then conduct a test to check whether they are executed in the designed order
- To prepare test data for the cases that occur frequently based on the specifications and then conduct a test efficiently with a small number of test cases
- To prepare test data for the cases likely to cause processing errors and then conduct a reliability test on the program

[Strategy]

Q90. Which of the following is the expected output to be inserted into blank *X* shown in Table 2?

- a) 13 b) 16 c) 20 d) 34

[Management]

Q91. The table below shows part of the results of the actual test conducted using test data (shipping area, three-side size, and weight). Which of the following is the appropriate judgment about these results?

Test data			Output result (dollar)
Shipping area	Three-side size (cm)	Weight (kg)	
<i>C</i>	60	5	14
<i>C</i>	101	8	18
<i>D</i>	60	5	24
<i>D</i>	101	8	34

- a) The output results with a three-side size of 60 cm and a weight of 5 kg are wrong.
b) The output results with a size category of category 3 are wrong.
c) No output result is wrong.
d) Only the output results for shipping area *C* are wrong.

[Management]

Q92. Which of the following is the appropriate combination of test data (shipping area, three-side size, and weight) displayed in columns *Y* and *Z* of the output result table shown in Table 2?

	Test data for column <i>Y</i>	Test data for column <i>Z</i>
a)	A, 80, 10	A, 80, 20
b)	A, 90, 10	A, 90, 11
c)	A, 90, 11	A, 90, 21
d)	A, 100, 5	A, 100, 10

Question B Read the following description concerning room entry control for facilities, and then answer **Q93** through **Q96**.

Sales branch *T* of Company *S* has a plan to install a room entry control system that uses ID cards. The types of facilities of sales branch *T* and the categories of people subject to control (hereinafter called target categories) are classified as shown in the table below, and the categories indicating whether or not room entry is permitted are set (hereinafter called permission categories). Here, a target category for which entry into the facility is permitted is indicated by “√” and one for which entry is not permitted is indicated by “–” in the table below.

Table Setting of the permission categories

Facility \ Target category	Visitor	Sales department staff
Office	–	√
Reception room	√	√

In order to set permission categories for facilities and target categories, the permission categories are entered in the setting formats shown below from the administrative PC of the room entry control system.

[Setting formats]

Format 1	Policy	Permission category	
Format 2	Facility	Permission category	Target category

Note: The third field of format 1 is not used.

- (1) In order to set permission categories, format 1 is described on the first line and format 2 is described on as many lines as necessary starting with the second line.
- (2) For the permission category, “ACCEPT” is described when entry into the facility is permitted, and “DENY” is described when entry is not permitted.
- (3) Format 1 is intended for describing a policy, and the word “Policy” is described in the first field. The description of a policy specifies the permission category to be applied to the combinations of both a facility and a target category that do not correspond to any of the combinations described on the second and subsequent lines.

- (4) Format 2 is intended for describing the combinations of a facility and a target category as well as the permission categories for those combinations. Multiple target categories having the same permission category for a facility can be described by separating each of them with a comma.
- (5) To determine whether entry into the facility is permitted or not, the second and subsequent lines are checked in the order they are listed. When the line containing the specified combination of both a facility and a target category is found, the permission category described on that line is applied and the subsequent lines are not checked.

[Technology]

Q93. Regarding the setting of the permission categories in the table, when the permission category for Policy is set to “ACCEPT”, the description of the setting is as shown in the figure below. Regarding the setting in the table, when the permission category for “Policy” is set to “DENY”, which of the following is the appropriate description of the setting?

Policy	ACCEPT	
Office	DENY	Visitor

- a)

Policy	DENY	
Office	ACCEPT	Sales department staff
- b)

Policy	DENY	
Reception room	ACCEPT	Visitor, Sales department staff
- c)

Policy	DENY	
Office	DENY	Visitor
Reception room	ACCEPT	Visitor, Sales department staff
- d)

Policy	DENY	
Office	ACCEPT	Sales department staff
Reception room	ACCEPT	Visitor, Sales department staff

[Technology]

Q94. Regarding the setting of the permission categories shown in the table below, when the permission category for “Policy” in format 1 is set to “DENY”, what is the minimum number of lines required for describing of the setting, including the line describing format 1?

Facility \ Target category	Visitor	Sales department staff	Engineering department staff
Conference room	–	√	√
Office 1	–	√	–
Office 2	–	–	√
Reception room	√	√	√

a) 4

b) 5

c) 6

d) 7

[Technology]

Q95. Regarding the setting of the permission categories shown in the table below, when the permission category for “Policy” is set to “ACCEPT”, the description of the setting is as shown in Fig. 1. As entry into the special conference room is permitted for managers, a new target category “Manager” is created and the description of the setting shown in Fig. 2 is inserted. Among (1) through (4) shown in Fig. 1, which is the appropriate position where the setting shown in Fig. 2 is inserted?

Here, the manager of the sales department and the manager of the engineering department belong to the target category of “Manager”, and both managers also belong to the target categories of the staff of their respective departments. In the case where a person to be controlled belongs to two target categories, when the line matching the combination of a facility and one of the target categories is found during checking of the description of the setting, the permission category of that line is applied.

Facility \ Target category	Visitor	Sales department staff	Engineering department staff
Special conference room	–	–	–
Conference room	–	√	√
Office 1	–	√	–
Office 2	–	–	√
Reception room	√	√	√

(1) →	Policy	ACCEPT	
(2) →	Special conference room	DENY	Visitor, Sales department staff, Engineering department staff
(3) →	Conference room	DENY	Visitor
	Office 1	DENY	Visitor, Engineering department staff
(4) →	Office 2	DENY	Visitor, Sales department staff

**Fig. 1 Description of the setting
when the permission category for Policy is set to ACCEPT**

Special conference room	ACCEPT	Manager
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Fig. 2 Description of the additional setting

a) (1)

b) (2)

c) (3)

d) (4)

[Technology]

Q96. In preparation for a lack of format 2 when a new facility or target category is inserted, which of the following is the appropriate method for setting the permission category for “Policy” from the viewpoint of security?

- a) “ACCEPT” is set so that entry is not allowed if any setting is missing.
- b) “DENY” is set so that entry is not allowed if any setting is missing.
- c) “ACCEPT” is set so that entry is allowed even if any setting is missing.
- d) “DENY” is set so that entry is allowed even if any setting is missing.

Question C Read the following description concerning an activity plan, and then answer **Q97** through **Q100**.

The information systems department of Company *E* is planning to install a new sales management system. Mr. *F*, a newly hired employee of the information systems department, is assigned to estimate the activity time required to switch from the existing sales management system to the new one, under the guidance of his superior. The list of the activity plan is as shown in the table below.

Table List of the activity plan

Activity number	Activity	Planned activity time (hours)	Preceding activity number
1	Shutdown of system services	0.5	None
2	Backup of the system	2.0	1
3	Extraction of migration data	1.0	1
4	Installation of software	3.0	2, 3
5	Setup of the system	2.0	4
6	Input of migration data	3.0	4
7	Preparation of an operation check list	1.5	4
8	Operation check	2.0	5, 6, 7

[Strategy]

Q97. Mr. *F* organizes the contents of the table in order to calculate the total activity time. From the series of activities, he extracts those that can be performed concurrently. Which of the following is a list of all the combinations of activities that can be performed concurrently? Here, the activities that can be performed concurrently are shown within brackets.

- a) [2, 3]
- b) [2, 3] and [4, 5, 6]
- c) [2, 3] and [5, 6, 7]
- d) [5, 6, 7]

[Strategy]

Q98. In consideration of the total activity time, Mr. *F* reviews the sequence of the activities listed in the table and the required time. Which of the following represents the sequence of the activities on the critical path? Here, the arrows are used to represent the sequence of the activities.

- a) $1 \rightarrow 2 \rightarrow 4 \rightarrow 5 \rightarrow 8$
- b) $1 \rightarrow 2 \rightarrow 4 \rightarrow 6 \rightarrow 8$
- c) $1 \rightarrow 3 \rightarrow 4 \rightarrow 6 \rightarrow 8$
- d) $1 \rightarrow 3 \rightarrow 4 \rightarrow 7 \rightarrow 8$

[Management]

Q99. Mr. *F* calculates the minimum time required to complete all the activities listed in the table. How many hours is that time?

- a) 10.0
- b) 10.5
- c) 11.0
- d) 11.5

[Management]

Q100. Mr. *F* calculates the total activity time, but the calculated time is longer than initially expected. His superior therefore instructs him to consider a method for reducing the time. Which of the following is the appropriate method that most reduces the total activity time listed in the table? Here, the activities that can be performed concurrently are all performed in parallel and simultaneously.

- a) Reducing the time of activity 2 by 1.5 hours
- b) Reducing the time of activity 4 by 1.5 hours
- c) Reducing the time of activity 5 by 1.5 hours
- d) Reducing the time of activity 6 by 2.0 hours

Spreadsheet Software Functions and Terminology

The following defines the basic functions and terminologies of spreadsheet software.

1. Worksheets

Worksheet is the work area within spreadsheet software. A worksheet has 256 columns (columns A through Z, followed by AA through AZ, then BA through BZ, up to column IV) and 10,000 rows (row 1 through row 10,000).

2. Cells

- (1) An intersection of a column (vertical) and a row (horizontal) on a worksheet is called a cell. The cell at Column A and Row 1 is represented as A1.
- (2) A group of cells that form a rectangular shape can be selected as a range. A range is represented, for example, as "A1:B3".
- (3) A name can be assigned to any range. A name is assigned to a range by using [] (square brackets), for example, "the range of cells 'A1:B3' is named [Price]."
- (4) A cell that contains no data is called a blank cell.

3. Cell data entry

- (1) Numeric values, character strings, and expressions can be entered to a cell.
- (2) Cells can be protected to prevent data entry. When cell protection is turned off, data entry is allowed again.
- (3) The entry of a numeric value 5 into cell A1 is represented as "Enter 5 into cell A1."
- (4) The entry of a character string ABC into cell B2 is represented as "Enter 'ABC' into cell B2."
- (5) The entry of an expression for the sum of cell A1 and cell B2 into cell C3 is represented as "Enter the expression 'A1+B2' into cell C3."

4. Cell display format

- (1) A numeric value in a cell is displayed right justified.
- (2) A character string in a cell is displayed left justified.
- (3) An expression in a cell is displayed left justified if the result is numeric, and right justified if the result is a character string.
- (4) The display format for each cell can be changed to left justified, centered, or right justified.

5. Calculating formula

- (1) Mathematical expressions can be used in calculating formula.
- (2) Arithmetic operators available for use in a calculating formula include "+" (addition), "-" (subtraction), "*" (multiplication), "/" (division), and "^" (exponentiation).
- (3) The arithmetic operators are processed according to the standard order of mathematical precedence.

6. Recalculation

- (1) When a calculating formula is entered into a cell, the calculation result is displayed immediately.

- (2) When the value of a cell changes, values of other cells that refer to that cell will be automatically recalculated. This recalculation is performed only once, in the sequence A1, A2, A3, ..., B1, B2, B3, ..., and so on.

7. Functions

- (1) The functions defined in the table below are available for use in a calculating formula.

Function name and example	Description
SUM (A1:A5)	Calculates the sum of the values in cells A1 through A5.
AVERAGE (B2:F2)	Calculates the average of the values in cells B2 through F2.
SQUAREROOT (I6)	Calculates the positive square root of the value in cell I6 (which must be a positive value).
STANDARDDEVATION (D5:D19)	Calculates the standard deviation of the values in cells D5 through D19.
MAX (C3:E7)	Returns the largest value from the values in cells C3 through E7.
MIN ([Score])	Returns the smallest value from the values within the range called [Score].
IF (B3>A4, 'Chicago', 'Washington')	Returns the second argument if the logical expression specified in the first argument is TRUE (valid), or the third argument if FALSE (invalid). In the example on the left, if the value in cell B3 is greater than the value in cell A4, the character string 'Chicago' is returned. Otherwise, 'Washington' is returned. In logical expressions, comparison operators =, ≠, >, <, ≤, ≥ can be used. "IF" functions can be specified as the second or the third arguments to construct a nested "IF" function.
COUNT (G1:G5)	Counts the number of non-blank cells in cells G1 through G5.
COUNTIF (H5:H9, '>25')	Counts the number of cells within the range specified in the first argument that meet the condition specified in the second argument. In the example on the left, in cells H5 through H9, the number of cells that contain a value greater than 25 is returned.
INTEGER (A3)	Calculates the maximum integer that does not exceed the number in cell A3 (must be a numeric number). Example: INTEGER (3.9) = 3 INTEGER (-3.9) = -4

MODULO (C4, D4)	Calculates the remainder after the value in cell C4 (dividend) is divided by the value in cell D4 (divisor). The result will always have the same sign as the divisor. MODULO and INTEGER functions satisfy the following relationship: $\text{MODULO}(x, y) = x - y * \text{INTEGER}(x/y)$
AND (Logical expression 1, Logical expression 2, ...)	Returns TRUE if all the logical expressions specified as arguments evaluate to TRUE. Returns FALSE if any one arguments is FALSE. Any number of logical expressions can be specified as arguments.
OR (Logical expression 1, Logical expression 2, ...)	Returns FALSE if all logical expressions specified as arguments evaluate to FALSE. Returns TRUE if any one of the logical expressions is TRUE. Any number of logical expressions can be specified as arguments.
NOT (Logical expression)	Returns TRUE if the logical expression specified as the argument evaluates to FALSE, and returns FALSE if the argument evaluates to TRUE.
Note: SUM, AVERAGE, STANDARDDEVIATION, MAX, and MIN functions ignore cells that are within the specified range but do not contain a numeric value.	

- (2) An argument of a function can be specified using a calculation formula that uses cells, a range, a range name, or a logical expression.

8. Copying of cells

- (1) A numeric value, character string, or expression entered into a cell can be copied into other cells.
- (2) If an expression referring to another cell is copied, the copied expression will be changed automatically based on relative reference. For example, when the function SUM (A1:A5) in cell A6 is copied to cell B7, cell B7 will contain the expression SUM (B2:B6).

9. Absolute references

- (1) A reference that is not changed even when an expression is copied into another cell is called absolute reference, and is represented using the \$ (dollar) symbol, as in \$A\$1. For example, when an expression \$A\$1+5 in cell B1 is copied into cell C4, the expression in cell C4 will remain as \$A\$1+5.
- (2) A mixed reference is also possible, where either the column or the row is an absolute reference, as in \$A1 and A\$1. For example, when the expression \$C1-3 in cell D2 is copied into cell E3, cell E3 contains the expression \$C2-3. Likewise, when the expression F\$2-3 in cell G3 is copied into cell H4, cell H4 contains the expression G\$2-3.

10. Macros

- (1) Macros can be stored within a spreadsheet. Macros are represented as Macro *P*, Macro *Q*, and so on.

- (2) Some examples of instructions concerning macros are as follows: “Run Macro *P* to save the spreadsheet,” “Register the procedure for sorting cells A1 through A10 in ascending order as Macro *Q*,” “Macro *R*: enter numeric values,” and “Extract records for which the data in Column C is less than the specified value.”

11. Others

The spreadsheet software shall be equipped with the same functions as most commercially-available spreadsheet software, including the grid line and graph/chart functions in addition to “Save”, “Read”, and “Print”.