



**April 2012**

## **IT Passport Examination**

**Questions must be answered in accordance with the following:**

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

### **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 spring IT Passport Examination conducted in 2012?

- a) March                      b) April                      c) May                      d) June

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

[Sample Answer]

<b>Q1</b>	<input type="radio"/> A	<input checked="" type="radio"/> B	<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.**

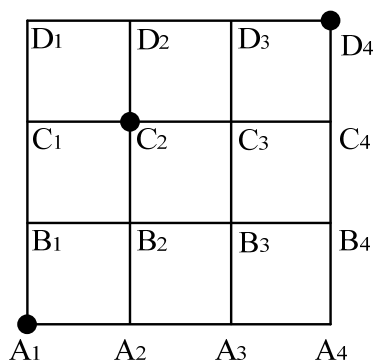
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Answer questions Q1 through Q34 concerning technology.

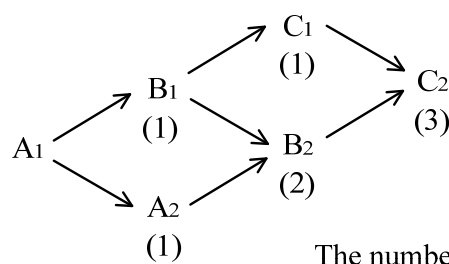
- Q1.** In the worksheet of spreadsheet software shown below, rows 1 through 4 are sorted in ascending order by using the last (or low order) two digits of each numeric value in column A. When the numeric values of column B that are calculated from those of column A are used as sort keys, which of the following is the appropriate calculation result to be entered into column B?

	A	B
1	123411	
2	156711	
3	119813	
4	123815	

- a) The quotient obtained when the numeric value in column A is divided by 10  
b) The remainder obtained when the numeric value in column A is divided by 10  
c) The quotient obtained when the numeric value in column A is divided by 100  
d) The remainder obtained when the numeric value in column A is divided by 100
- Q2.** When a path goes from node  $A_1$  to node  $C_2$  in Fig. 1 and the passing nodes are counted as shown in Fig. 2, it is found that there are three shortest paths with the minimum number of passing nodes. How many shortest paths are there available to go from node  $A_1$  to node  $D_4$  via node  $C_2$ ?



**Fig. 1**



The number in parentheses below a node represents the number of shortest paths from  $A_1$  to that node.

**Fig. 2**

- a) 6                      b) 9                      c) 12                      d) 20

**Q3.** Which of the following is an appropriate purpose of appending a check digit to a customer code?

- a) To check the customer code for input errors
- b) To arrange customers in order of acquisition when a list of customers is created
- c) To enable customers to be inferred easily and quickly
- d) To enable the grouping of customers by geographical area or other attributes

**Q4.** Which of the following is an appropriate description concerning the characteristics of EUC (End User Computing)?

- a) EUC enables users to directly access, reference, and manipulate data that they need for business operations.
- b) EUC gives priority to system operation and maintenance, so it causes backlogs to increase in the information systems department.
- c) EUC requires more development staff members in the information systems department, so it often leads to an increase in the operating costs of the department.
- d) EUC allows the information systems department to take a leadership role in application development, so it can reduce the workload of users.

**Q5.** The procedure described below is sequentially performed for two variables  $x$  and  $y$ , starting with step (1). When the procedure is completed, what is the resulting value of  $x$ ?

[Procedure]

- (1) Assign 2 to  $x$  and 3 to  $y$ .
- (2) Subtract 1 from the value of  $y$ , and assign the resulting value to  $y$ .
- (3) Add the values of  $x$  and  $y$ , and assign the resulting value to  $x$ .
- (4) If the value of  $y$  is 1, complete the procedure. Otherwise, return to step (2).

- a) 4
- b) 5
- c) 7
- d) 8

**Q6.** Which of the following refers to an XML-based document format that is used for efficient information collection and distribution on Web sites such as a blog, a news site, or an electronic bulletin board, and is also used for describing metadata such as page header, abstract, and update time in a structured form?

- a) CSS (Cascading Style Sheets)
- b) DTD (Document Type Definition)
- c) RSS (RDF(Resource Description Framework) Site Summary)
- d) XSL (Extensible Stylesheet Language)

**Q7.** Which of the following is an appropriate description concerning a CPU?


- a) The cache memory that is integrated into a CPU is used to virtually extend the capacity of the main memory.
- b) A CPU is equipped with the arithmetic and logical unit that should serve as part of control functions.
- c) A CPU is categorized as a 16-bit, 32-bit, or 64-bit CPU depending on the data volume processed at a time, but the width in bits is not related to the performance.
- d) For CPUs that have the same architecture, the higher the clock frequency, the faster the response time.

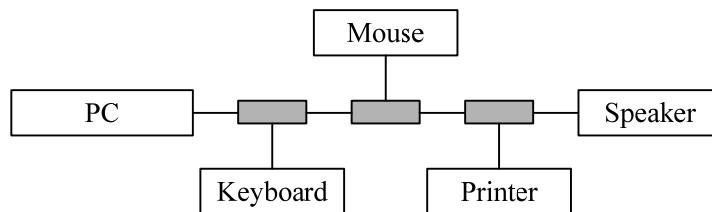
**Q8.** Which of the following is an appropriate description concerning USB?

- a) Some peripheral devices with low power consumption can receive power through a USB cable without any additional power supply.
- b) All peripheral devices connected to the USB port of a PC must be turned on before the PC is powered on.
- c) The data is transmitted in parallel over multiple data lines, in order to achieve high speed data transfer.
- d) The USB interface is suitable for a low speed peripheral device, such as a keyboard or a mouse, rather than a high speed device like a hard disk.


**Q9.** Which of the following is used for image sensors in digital cameras?

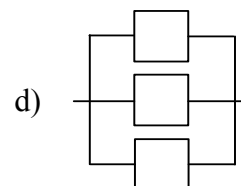
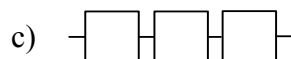
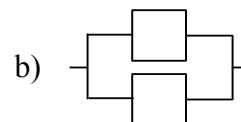
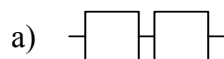
- a) CCD                      b) PDP                      c) STN                      d) TFT

**Q10.** Which of the following is the interface that enables a PC and its peripheral devices to be connected in the configuration shown in the diagram below? Here,  represents a hub.



- a) SATA                      b) IrDA                      c) SCSI                      d) USB

**Q11.** Among the system configurations shown below, which of the following has the lowest probability of causing the entire system to stop at the occurrence of a failure? Here,  represents an identical device. When the devices are connected in parallel, only one device must be running, and when the devices are connected in serial, all devices must be running.



**Q12.** When a computer is installed under the conditions below, which of the following is an appropriate graph to represent the relationship between the number of years of use (horizontal axis) and the monthly costs (vertical axis)?

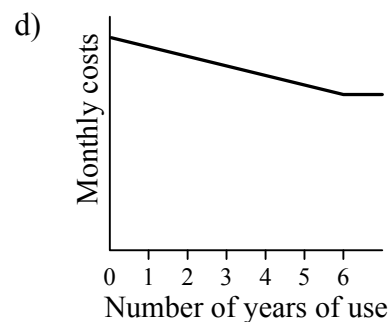
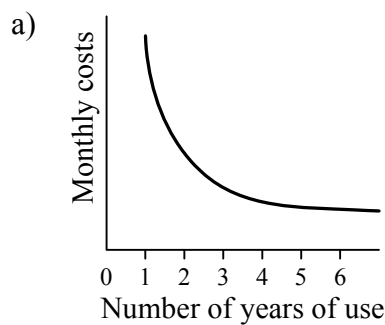
[Conditions]

(1) Computer costs

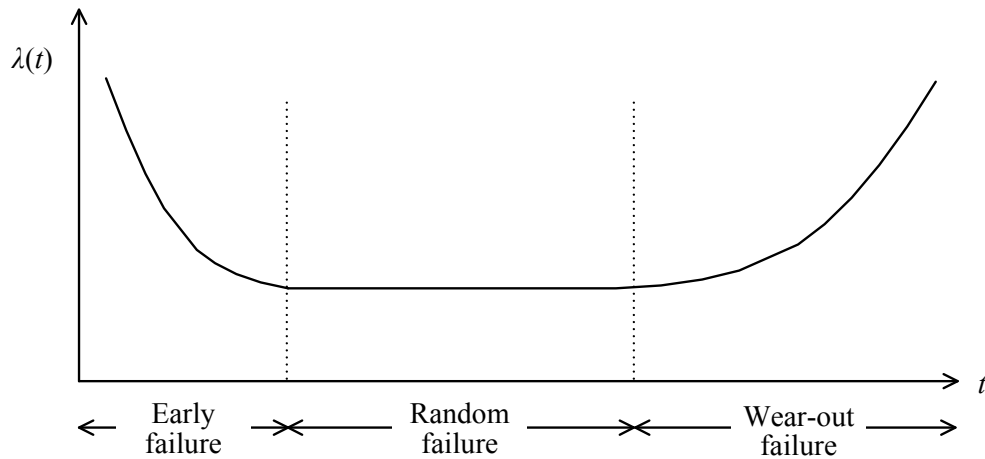
- For the initial five years, an amount that is calculated from a lease rate based on the cost of purchasing the computer is paid in fixed monthly installments.
- From the sixth year on, an amount that is calculated from a lease rate based on one tenth ( $1/10$ ) of the cost of purchasing the computer is paid in fixed monthly installments.

(2) Maintenance costs

- From initial installation, the maintenance fee is paid to a maintenance service provider in fixed monthly installments.



**Q13.** The graph below shows the relationship between the failure rate “ $\lambda(t)$ ” of the devices comprising the system and the time “ $t$ ” elapsed since the start of use. Which of the following is a device that is expected to show the greatest increase in the failure rate during the wear-out failure period?



- |                    |              |
|--------------------|--------------|
| a) CPU             | b) Hard disk |
| c) Network adapter | d) Memory    |

**Q14.** When a PC is powered on, which of the following is first activated to access a hard disk or other bootable media before the OS is started?

- |         |                |
|---------|----------------|
| a) BIOS | b) POST        |
| c) MBR  | d) Disk driver |



**Q15.** When print processing is executed using an application program such as word processing software or spreadsheet software, there is a method that allows data for printing to be stored temporarily on the hard disk without direct output to the printer, and allows actual printer output to be performed by a dedicated program. Which of the following is the advantage of separating actual printer output from application execution in this way?

- a) The time from the start of application execution until the end of printing can be reduced.
- b) The modification of a document that contains a large number of images becomes possible.
- c) The processing volume per unit time increases.
- d) The font can be changed easily at the time of printer output.

**Q16.** In the description below concerning a file system, which of the following is an appropriate combination of terms to be inserted into blanks *A* through *C*?

When files and directories on a PC are managed hierarchically, the directory at the highest level is called the *A* directory, and the directory that a user is now manipulating is called the *B* directory. A notation format that uses the *B* directory as its starting point and shows the location of a file or a directory is called a(n) *C* path.

	<i>A</i>	<i>B</i>	<i>C</i>
a)	current	root	absolute
b)	current	root	relative
c)	root	current	absolute
d)	root	current	relative

**Q17.** When the log file of a Web server is analyzed as a part of daily system administration, which of the following can be found?

- a) Web pages accessed by Web site visitors
- b) The model name of a computer used by each visitor
- c) The speed of a Web browser on each visitor's computer
- d) Personal information about individual Web site visitors



**Q20.** Candidates for operating a new business are selected from all of the employees based on the conditions below. When a decision table is used to represent the selection process, which of the following is the appropriate “conditions table” to be inserted into the decision table?

[Conditions for candidates]

- (1) The employee has selected “I am interested in IT” in the questionnaire.
- (2) The employee has a score of 85 or higher on the IT aptitude test.
- (3) An employee with a test score lower than 85 can become a substitute candidate if the employee has worked for five or more years in the current workplace.

Selected “I am interested in IT” in the questionnaire	<b>Conditions table</b>			
Scored 85 or higher on the IT aptitude test				
Has five or more years of working experience in the current workplace				
Candidate	X	–	–	–
Substitute	–	X	–	–
Not applicable	–	–	X	X

a)

N	N	Y	Y
Y	N	N	Y
–	Y	N	–

b)

N	Y	N	Y
Y	N	N	–
–	Y	N	–

c)

Y	N	N	Y
Y	Y	N	N
–	–	N	Y

d)

Y	Y	Y	N
Y	N	N	–
–	Y	N	–

**Q21.** In a company which has its offices dispersed in several buildings, it is decided to construct a relational database to manage the locations where PCs are installed. “Asset” table, “Room” table, and “Building” table are created, and these tables are linked. When new data is entered, data in the table to be referenced should exist beforehand. Which of the following is the appropriate sequence of entering data into each table? Note that the underlined items in each table indicate the primary keys or the foreign keys.

Asset

<u>PCNo</u>	<u>BuildingNo</u>	<u>RoomNo</u>	ModelName
-------------	-------------------	---------------	-----------

Room

<u>BuildingNo</u>	<u>RoomNo</u>	RoomName
-------------------	---------------	----------

Building

<u>BuildingNo</u>	BuildingName
-------------------	--------------

- a) “Asset” table → “Building” table → “Room” table
- b) “Building” table → “Room” table → “Asset” table
- c) “Room” table → “Asset” table → “Building” table
- d) “Room” table → “Building” table → “Asset” table

**Q22.** Which of the following is an appropriate explanation of the table obtained when the SELECT statement shown below is executed?

```
SELECT Products.Product_code, SUM(Units_price*Sales_volume)
FROM Products, Sales
WHERE Products.Product_code = Sales.Product_code
GROUP BY Products.Product_code
ORDER BY SUM(Units_price*Sales_volume)
```

Products

Product_code	Product_name	Unit_price
A5023	Shampoo	500
A5025	Rinse	400
A5027	Soap	100

Sales

Customer	Product_code	Sales_volume
Company K	A5023	100
Store S	A5023	150
Company K	A5025	120
Company K	A5027	100
Store S	A5027	160

- a) A table with 3 rows and 2 columns containing total sales grouped by product code is obtained.
- b) A table with 1 row and 1 column containing total sales for all products is obtained.
- c) A table with 2 rows and 2 columns containing total sales for each customer is obtained.
- d) A table with 15 rows and 2 columns containing a list of sales grouped by customer and by product code is obtained.

**Q23.** When a database is used, the execution of a function that can update information during search may cause data inconsistencies in the database. Which of the following is an appropriate function to prevent this situation?

- a) Commitment control
- b) Deadlock avoidance
- c) Exclusive control
- d) Shared access

**Q24.** Which of the following is an appropriate description of VoIP?

- a) It is a method that enables PC users to access data or applications available on the Internet.
- b) It is a technology that converts voice data into packets and transmits them in real-time over an IP network.
- c) It is a technology that ensures the security of communication by using authentication, encryption, and decryption between network nodes.
- d) It is a system that defines and manages a correspondence between a host name and an IP address for a network-connected computer.

**Q25.** Which of the following prevents unauthorized external access by using packet filtering at the connection point between a company's internal network and the Internet?

- a) DNS
- b) NAT
- c) Gateway
- d) Firewall

**Q26.** Which of the following is an appropriate explanation concerning the function of a router?

- a) It optically reads data such as picture and text and then converts it into digital data.
- b) It converts analog signals to digital signals and vice versa.
- c) It controls the communication path of data and relays data across networks.
- d) It archives and provides data of Web pages by using networks.

**Q27.** Which of the following is an appropriate description concerning a cookie used in the Web?

- a) It is a standard that can be used for formatting the layout of an HTML document in detail.
- b) It is the HTTP protocol to which an encryption function is added for private communications over the Internet.
- c) It is a mechanism where a Web server interacts with external programs to create Web pages dynamically.
- d) It is a mechanism where information from a Web server is temporarily saved in a browser that accesses the Web server.

**Q28.** Which of the following is a system configuration that introduces Internet technology into a company's information and telecommunication system and is used for information sharing and business support?

- a) EDI
- b) VAN
- c) Intranet
- d) Extranet

**Q29.** A PC was checked for computer viruses, and a certain number of infected files were discovered. Which of the following is an appropriate course of action that should be taken by the person who found the infected files?

- a) Contacting the recipients to whom the files infected by an unknown virus were forwarded, after identifying the virus so that they can take corrective action
- b) Forwarding the infected files to the system administrator by e-mail so that the administrator can promptly take measures
- c) Disconnecting the infected PC immediately from the network in order to prevent other PCs from being infected
- d) Enabling the write protection of removable media that were used for a day-old backup in order to prevent other files from being infected

**Q30.** There exists a model of communication from  $A$  to  $B$  based on public key cryptography as shown below. Which of the following is an appropriate description concerning this model?

The message sent by  $A$  is used to generate a message authentication code. This authentication code is encrypted using  $A$ 's private key to generate a bit string that is sent to  $B$  by e-mail along with the original message.

$B$  obtains  $A$ 's public key from a trusted organization, and in addition to decrypting the received bit string,  $B$  generates the message authentication code from the received message to verify that both codes are the same before the message is used.

- a)  $A$  can confirm that the message is delivered to  $B$ .
- b)  $A$  can guarantee to  $B$  that the message is not wiretapped.
- c)  $B$  is guaranteed to receive the message from  $A$ .
- d)  $B$  can confirm that the message is from  $A$  and is not falsified.

**Q31.** Which of the following is an appropriate description concerning the information security policy?

- a) The security policy of a company is intended to define what should be set for each security system, so its contents vary depending on the security-related product to be installed.
- b) The security policy of a company provides guidelines on the action and judgment to be followed and does not cover the stance and direction on security measures.
- c) It is desirable for top management of a company to disclose the vulnerability of the information system that forces the company to create the security policy.
- d) It is necessary to clarify the vision about the action and judgment to be followed to achieve the target security level.



**Q32.** Which of the following is the term that refers to the act of setting up a bogus Web page imitating a bank, a credit card company, or other organization, and tricking a user with an e-mail disguised as an official message from the financial organization or a public organization in order to guide a user to the bogus Web page and steal personal information such as the personal identification number and credit card number?

- a) Cracking
- b) Buffer overflow
- c) Phishing
- d) Bot

**Q33.** Which of the following is an appropriate description concerning a macro virus?

- a) It is a new virus that is created by combining multiple viruses into one.
- b) It moves across computers connected via a network while replicating itself.
- c) It is an executable file that is sent as an attachment to an e-mail message.
- d) It infects data files used by word processing software or spreadsheet software.

**Q34.** Which of the following is a method that may cause a mail server to go down by sending a large number of unsolicited e-mails to a lot of e-mail users in a short period of time with the aim of advertising or selling goods or services?

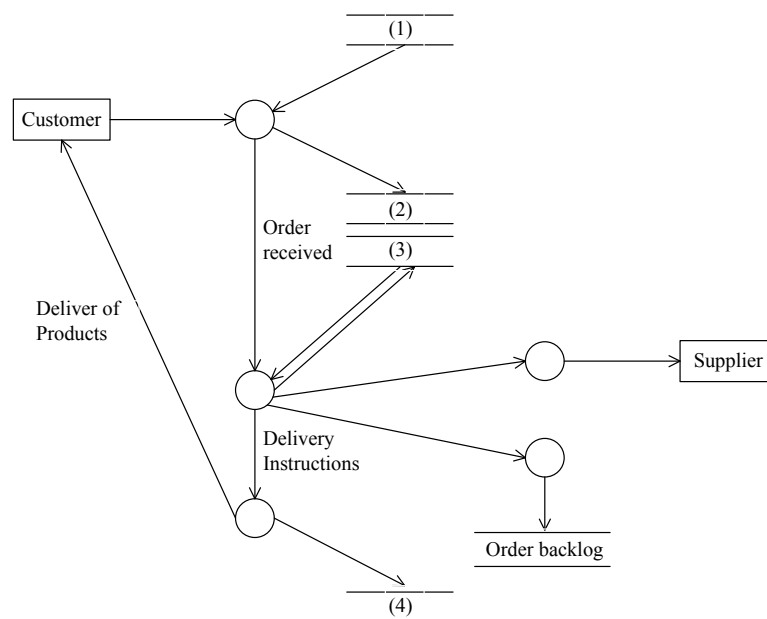
- a) Spam mail
- b) Chain mail
- c) E-mail bomb
- d) Multi-posting

Answer questions Q35 through Q56 concerning management.

**Q35.** Which of the following is an appropriate description concerning system maintenance?

- a) In order to perform system maintenance in contrast to system design and development, it is important to follow the manual without relying on knowledge of the system.
- b) When system maintenance is performed, it is important to respond appropriately to improvement requests from users and to system failures, and also important to record accurate response logs.
- c) In order to efficiently perform system maintenance, it is preferable for the system department to take the central role and execute the plan, and to avoid participation of the user department as much as possible.
- d) In order to handle system improvement requests from the user department efficiently with the limited staff members of the system department, it is best to deal with simple and easy-to-implement requests first.

**Q36.** In a DFD of sales management, which of the following is the data store that represents “product inventory”? Here, each process corresponds to one of “inventory allocation”, “order receipt”, “order backlog”, “shipment”, and “order placement”.



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

**Q37.** When system administrators participate in a system test in cooperation with the information systems department, which of the following is test data that should be prepared in advance?

- a) Data handled as an exception and also used in actual business operations
- b) Data to execute all instructions in the program one or more times
- c) Data to detect errors related to interfaces between modules
- d) Data to detect logical errors in program modules

**Q38.** When word processing software, spreadsheet software or other application software is installed on multiple PCs, which of the following is an appropriate point to be considered by the system administrator?

- a) In consideration of data compatibility and license cost, the standardized software should be installed.
- b) If the software has an online help function, support from the vendor does not need to be considered.
- c) Users have their own preference on which software to use, so they should be allowed to select the software to be installed.
- d) Users should be allowed to install free software at their own discretion if it is downloadable from the Internet.

**Q39.** Before migration, a newly developed online ordering management system is operated in parallel with the existing system for two months. During that period, data is entered into both systems, and output is checked. After parallel operation is started, processing is initially smooth. However, just before migration to the new system, it is discovered that response time increases if a large amount of data is entered into the new system at a time. Which of the following is the test that is considered to be insufficient as a cause of delay in discovering this problem?

- a) Function test
- b) Fault recovery test
- c) Regression test
- d) Load test

**Q40.** Which of the following is an appropriate description concerning the characteristic of prototyping that is a software development method?

- a) The phases of basic planning, external design, internal design, program design, programming, and testing are conducted sequentially, so the entire project can be overviewed and it is easy to make the schedule and allocate resources.
- b) A trial model is created at an early stage of system development, so perception gaps and ambiguities between the user department and the development department can be eliminated early.
- c) Software is divided into two groups with and without the possibility of specification changes, and then the processes of programming, review, and change are repeated for the group with the possibility of changes. .
- d) A large-scale application is divided into highly independent parts, and the phases of design, programming, and testing are repeated part by part while the development scope is expanded gradually.

**Q41.** Which of the following is the most appropriate description concerning the role of the user department in large-scale system development?

- a) Without considering the effect of investment in the installed systems, user department managers make efforts to have the development department accept requests for additional features from the user department.
- b) The user department is in the position of using systems developed by the development department, so it is better to leave the development entirely to the development department than to take part in it.
- c) The user department checks the deliverables of system development from the viewpoint of business operations, but details of program design are entrusted to the development department.
- d) The user department needs to actively participate in system development and to provide advice, so its staff members who are unfamiliar with business processes but knowledgeable about computers should participate in it at a higher priority.

**Q42.** There exist 50 work items, each having an equivalent workload, and a plan is made to complete them in 10 days. However, at the end of the 5th day, only 20 items are completed. If the delay in progress is to be represented as the difference between the originally planned completion date and actual completion date for the work items that are currently completed, how many days is the delay?

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

**Q43.** Company *A* in the manufacturing industry uses an NC machine tool to perform four tasks *A* through *D*. The setup time between each task is as shown in the table below. When the four tasks are performed so that the total setup time can be minimized, how long is the total setup time in hours? Here, the tasks can be carried out in any order, and the setup time between FROM and TO can be used for evaluation; for example, the setup time from task *A* to task *B* is 2 hours.

Unit: hour

TO FROM	Task <i>A</i>	Task <i>B</i>	Task <i>C</i>	Task <i>D</i>
Task <i>A</i>	–	2	1	2
Task <i>B</i>	1	–	1	2
Task <i>C</i>	3	2	–	2
Task <i>D</i>	4	3	2	–

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

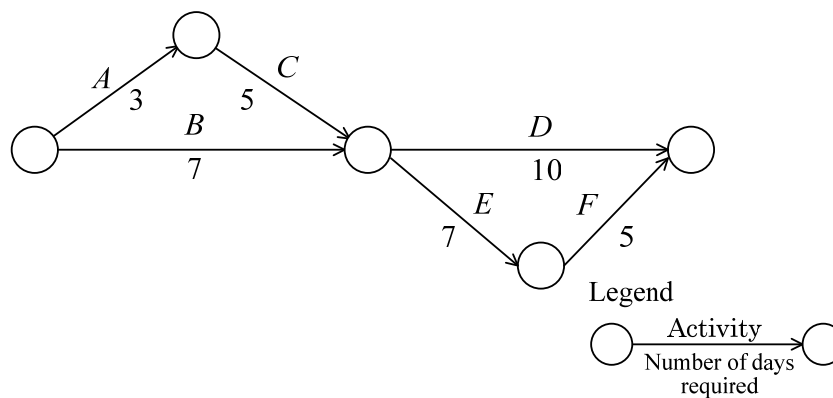
**Q44.** Which of the following is an appropriate description concerning the component breakdown of the WBS (Work Breakdown Structure) in project management?

- a) The deepest level of detail of the component breakdown is the level that enables more accurate project planning and cost estimation.
- b) The deepest level of detail of the component breakdown is always the same level regardless of the project scale.
- c) The depth of the component breakdown is always the same depth for all component deliverables.
- d) The deeper the level of the component breakdown is, the higher the level of the work efficiency becomes.

**Q45.** Five staff members with the same productivity are assigned to an activity that takes 20 days. Immediately before the start of the activity, three members have influenza and are replaced by new members. When the new members' productivity is 60% of the original members', what is the minimum number of new staff members that is needed to complete the activity in 20 days or less?

- a) 4                      b) 5                      c) 7                      d) 9

**Q46.** In the arrow diagram shown below, Activity *B* is completed three days behind schedule. In order to reduce the end-to-end delay to only one day, which activity should be reduced by how many days?



- a) Activity *C* should be reduced by one day.  
b) Activity *D* should be reduced by two days.  
c) Activity *E* should be reduced by one day.  
d) Activity *F* should be reduced by two days.

**Q47.** Which of the following is the most appropriate description concerning the development budget of a project?

- a) A development plan is based on the total development budget, so the plan should not be made by adding up the estimated costs of individual tasks.
- b) The difference between the development budget and the actual cost should be monitored, and then the plan should be reviewed and changed as necessary.
- c) The development budget relates to the procurement of direct materials, so it should not include the labor cost for the staff members who participate in the project.
- d) A detailed estimate should be made using the FP (Function Point) method, regardless of whether or not there is a similar project.

**Q48.** Which of the following is an appropriate description concerning the critical path in a system development project?

- a) When additional staff members are assigned in order to recover from a delay in development, priority is given to activities on non-critical paths.
- b) If an activity on the critical path is completed three days ahead of schedule, the project is also completed three days earlier than expected.
- c) If an activity on the critical path is delayed, completion of the project is also delayed.
- d) There exists only one critical path irrespective of the size, duration, or complexity of the project.

**Q49.** Which of the following is the most appropriate description concerning system operations?

- a) There are many cases where problems and failures relating to system operations cannot be realized until they actually occur, so it is better to take measures after occurrence than to take proactive measures.
- b) In order to perform system operations smoothly, it is preferable to strengthen the authority of an operator and entrust the operator with a proper judgment relating to the handling of a failure.
- c) In order to perform system operations efficiently and effectively, it is better to perform operational tests within the operations department than to request participation from the development department and the user department.
- d) Changes may occur after the system is put into full operation, so it is preferable to define the standard of change management beforehand in order to ensure that all changes are made in a controlled manner.



**Q50.** Mr. *M* was asked to prepare a management list of hardware, so he proposed a management method using the table shown below.

ID number	Product	Serial number	Purchase date	Purchase price

- When a PC is purchased, a single entry including both the PC and its peripheral devices is recorded in the list.
- When peripheral devices are purchased individually, an entry is recorded for each device.
- A unique ID number sticker is attached to every device to be managed.

This method has a possibility that not all devices, including peripheral devices, can be checked against the list. Which of the following is appropriate advice or guidance for Mr. *M*?

- a) There is no way to determine if someone maliciously switches the stickers on two devices, so the stickers should indicate not only the ID number but also all information from the list.
- b) There is no way to distinguish devices purchased on the same day and to record them in the list, so a record format with the “purchase date” column should be used to distinguish those devices.
- c) When PCs bundled with peripheral devices are purchased, it becomes impossible to check whether or not there are peripheral devices. Therefore, ID numbers should be assigned to all peripheral devices so that they can be managed individually.
- d) When additional devices with the same product name are purchased, there is no way to distinguish them. Therefore, an additional column for location should be inserted to distinguish them.

**Q51.** Which of the following is an appropriate description concerning a benefit of introducing and operating a service desk for a company.

- a) Reducing the time before the release of a new version of software
- b) Eliminating the use of software that is not approved
- c) Reducing the out-of-service state caused by the failure of a system change
- d) Responding to an inquiry as promptly as possible

**Q52.** Which of the following is the appropriate use of a security cable (or security wire)?

- a) Preventing critical equipment from being destroyed in a fire
- b) Preventing notebook PCs placed in the office from being stolen
- c) Preventing the screens of mobile PCs used outside the office from being peeped at
- d) Supplying alternative power to the system in the event of a power failure

**Q53.** Which of the following is the device that can cope well with a momentary loss of electric power and can also supply alternative electric power for the period of time required to shut down the system in the event of a power failure?

- a) AVR
- b) CVCF
- c) UPS
- d) Private power generator

**Q54.** As a result of the system audit on personal information protection, the sales department is notified that a list of customers which is generated by an information system is not handled properly in accordance with company-wide rules. Who is responsible for making an improvement plan based on this notification?

- a) The person in charge of the sales department
- b) The person in charge of the audit department
- c) The person in charge of the management planning department
- d) The person in charge of the information systems department

**Q55.** When a function for internal control is established, which of the following means that the distribution of roles and the authority of management are clarified?

- a) Segregation of duties
- b) Internal audit
- c) Activity-based management
- d) Risk control matrix

**Q56.** Which of the following is an appropriate description of internal control?

- a) A process that is performed by all persons within a company in order to ensure the effectiveness and efficiency of business operations, reliability of financial reporting, compliance, and safeguarding of assets
- b) A process where a manager who is entrusted with business management raises funds from a financial institution and buys shares from the shareholders of a parent company in order to obtain a controlling interest
- c) An approach to both work and personal life outside of work where an attempt is made to sacrifice neither work nor personal life and to keep a good balance between both of them in a fulfilling way
- d) A measure taken by an organization in order to achieve the target of organizational activities, and a method that aims for the optimization of business activities and systems

Answer questions Q57 through Q88 concerning strategy.

**Q57.** Which of the following is the term that refers to the description below?

Establish and take a course of action, investigate the result, and if the expected result is not obtained, reflect upon the cause and utilize the conclusion in the next task.

- a) AIDMA
- b) PDCA
- c) SWOT
- d) Brainstorming

**Q58.** Company *A*, in the manufacturing and sales industry, sells 30 products. Based on an ABC analysis, products are to be narrowed down and then sales promotion is to be performed for those products with high total sales. The table below shows total sales by product. How many products are contained in “A group” that is subject to the sales promotion? Here, “A group” represents approximately 70% of the company’s total sales.

Unit: \$1,000

Product 1	Product 2	Product 3	Product 4	Product 5	Product 6	Product 7	Product 8	Product 9	Product 10	Other	Total
182	136	120	120	98	91	83	80	65	35	290	1,300

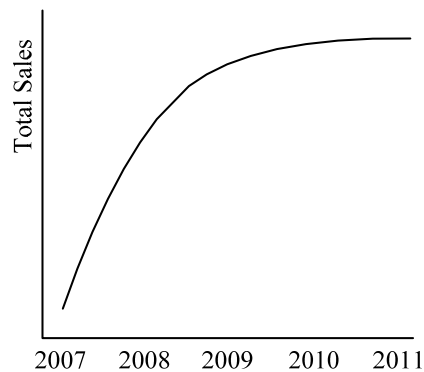
(Other breakdowns)

Unit: \$1,000

Product 11	Product 12	Product 13	Product 14	Product 15	Product 16	Product 17	Product 18	Product 19	Product 20
30	28	25	22	20	18	17	16	15	14
Product 21	Product 22	Product 23	Product 24	Product 25	Product 26	Product 27	Product 28	Product 29	Product 30
13	13	11	10	9	8	7	6	5	3

- a) 7
- b) 8
- c) 9
- d) 10

**Q59.** The graph below shows the total sales transition over the past five years for a product that was released by Company *A* five years ago. Which of the following is an appropriate description concerning the analysis of the total sales?



- a) Sales are expected to increase in the future, because the product is continuously improved and brought to the market.
- b) The product was released too early, so it was not initially well received by the market. However, sales are expected to increase in the future.
- c) Sales increased rapidly during the initial phase after the release, and after that, sales grow at a sluggish pace.
- d) Sales did not increase during the initial phase after the release, but then increased rapidly for a while. After that, sales grow at a sluggish pace.

**Q60.** In order to evaluate groupware installed, an information systems department sends a questionnaire to employees once every six months. The questionnaire has eight evaluation items including the transmission speed, level of sharing, and recentness of information. Employees evaluate each item on a scale of one to ten. Which of the following is an appropriate chart or diagram for representing this evaluation result?

- a) Bar chart
- b) Scatter diagram
- c) Distribution chart
- d) Radar chart

**Q61.** The table below shows the monthly sales of a particular product at a retailer that sells approximately 200 types of products. The product is replenished during the beginning of each month according to the inventory quantity checked at the end of the previous month. Which of the following is the appropriate order placement method for this product? Here, the sales ranking is determined as the ranking of the product when all the products are ranked by the amount of sales.

Month	Quantity replenished this month	Month-end inventory quantity	Amount of sales (dollars)	Sales ranking
January	50	45	100	150
February	0	25	400	90
March	10	0	700	45
April	50	0	1,000	23
May	100	5	1,900	8
June	200	20	3,700	3

- The product shows stable sales, so a fixed quantity of the product should be ordered at regular intervals.
- The product shows a large fluctuation in sales, so a fixed quantity of the product should be ordered only when the inventory becomes low.
- The product is becoming a main product, so the quantity to be ordered should be adjusted based on sales forecast with caution to avoid excessive inventory.
- The product shows stable sales over a long term, so the quantity based on a six-month sales forecast should be ordered at regular intervals.

**Q62.** A sales company records customer complaints in a complaint log. Which of the following is an appropriate analysis material that is first created to reduce the number of complaints?

- a) Complaints are categorized, and the number of complaints is counted for each category item. A Pareto chart is created using the category items and the number of complaints as the axes.
- b) The number of complaints is counted for each day of the week when a complaint is received. A scatter diagram is created using the days of the week and the number of complaints as the axes.
- c) Regions of customers are categorized, and the number of complaints is counted for each region. A histogram is created using the region categories and the number of complaints as the axes.
- d) Complaints that took long to respond are extracted into a list. Complaint items are entered in the list so that the corresponding pages of the original complaint log can be identified.

**Q63.** In cost accounting, which of the following is handled as a cost element?

- a) Donation
- b) Material cost
- c) Bond interest
- d) Extraordinary loss

**Q64.** Among actions concerning the creation of a computer program, which of the following is a copyright violation?

- a) Creating another Web page by using the source of HTML that was downloaded from the Internet
- b) Creating a program based on an idea that was discussed on a bulletin board on the Internet
- c) Creating a program to increase a company's operational efficiency by using a program that was created during one's school days
- d) Creating a program based on a flowchart that was shown in a purchased book

**Q65.** Which of the following is an international book code?

- a) EAN                      b) ISBN                      c) ITF                      d) UPC

**Q66.** According to ISO 9000:2005 Quality management systems — Fundamentals and vocabulary, quality is defined as the “degree to which a set of inherent characteristics fulfills requirements.” When product evaluation is based on this definition, which of the following is the most appropriate as a good quality product?

- a) A product having few customer complaints and a high level of customer satisfaction
- b) A product that a company produces without outsourcing manufacturing
- c) A product designed and manufactured using CAD and CAM
- d) A product utilizing materials and components of high quality

**Q67.** Which of the following is an appropriate description concerning the operations of a quality management system in accordance with ISO 9001:2008?

- a) Even if some different activities are performed by each department within an organization, it is effective to define common quality objectives to achieve quality assurance.
- b) Even if there are many cases where the quality manual is not actually followed, the manual should be continuously used during a certain period of time.
- c) The quality management system is established in accordance with international standards, so the operations of the currently existing quality management system should be continued regardless of the implementation status of processes.
- d) Even if a carefully designed quality management system is used, it should be modified according to a formal procedure on occasions when a problem is identified in the operational phase.



**Q68.** Product portfolio management is a method for analyzing the positioning of a product within the market and reviewing the resource allocation. It uses a matrix chart divided into four quadrants, with the market growth rate on the vertical axis, and the market share on the horizontal axis. Which of the following refers to a product that is categorized into the quadrant for low market growth rate and high market share?

- a) Cash cow
- b) Star
- c) Dog
- d) Question mark (problem child)

**Q69.** Which of the following is an explanation of affiliate that is one of the advertisement methods on the Internet?

- a) It is a method for sending advertisements of categories that recipients are interested in, by e-mail with prior permission from them.
- b) It is a method for displaying a company's advertisement and Web link on a personal home page, and for paying rewards based on the number of visitors attracted.
- c) It is a method for making a company's Web site visible near the top of the search engine results.
- d) It is a method for attracting users to a company's Web site by placing a graphical image on a large scale portal site as an entrance to the Web site.

**Q70.** Which of the following is an explanation of the maturity stage in the product life cycle?

- a) It is a stage where there is a sudden increase in sales. Competition intensifies as newcomers enter the market.
- b) It is a stage where sales and profits suddenly drop. In this stage, withdrawal from the market should be considered.
- c) It is a stage where demand growth slows down. Measures such as product quality improvement and style change are taken to maintain market share and secure profits.
- d) It is a stage where the product is marketed to early adopters. Strategies to enhance brand recognition are planned and implemented.

**Q71.** Which of the following is a method for analyzing the behavior of a visitor based on information such as the number of accesses to a Web site and the browsing history within the Web site?

- a) Regression analysis
- b) Cluster analysis
- c) Access log analysis
- d) Value chain analysis

**Q72.** There are two types of performance indexes: one to evaluate the achievement level of a goal and the other to evaluate the method for achieving a goal. When the goal is to “improve the English ability of employees,” which of the following is an appropriate index to represent the achievement level of this goal?

- a) The ratio of employees’ awareness of a message from the company president concerning the importance of learning English is 80% or more.
- b) The ratio of employees who get a mark of 650 or higher in an English test is 60% or more.
- c) The ratio of employees who participate in an English test is 90% or more.
- d) The ratio at which a company’s monthly English training course is held as planned is 90% or more.

**Q73.** Which of the following is an appropriate purpose of CRM?

- a) To increase the level of customer satisfaction
- b) To understand the purchasing trend of consumers
- c) To gain the loyalty of new customers
- d) To increase or retain market share

**Q74.** Which of the following is an appropriate description concerning a technology roadmap?

- a) It organizes the transition of past technology and does not show future trends.
- b) It is created for the technology strategy of a company or an industry and is not created by a government or an administration.
- c) It represents milestones in technology development, and no review based on market trends is carried out.
- d) It shows a technology development strategy based on an enterprise strategy, and is intended to be understood not only by engineers but also by other people.

**Q75.** Which of the following is an appropriate explanation of the POS terminal (or POS cash register) in a supermarket and other such places?

- a) It is a terminal of the system used for collecting and managing information such as the product code and price at the time of a sales transaction (at the “Point of Sale”).
- b) It is a terminal of the “Purchase Order System”, and is mainly used to automate purchase orders for the replenishment of products.
- c) It is a terminal of the strategic product management system developed for monitoring the “Probability of Survival” of such products.
- d) It is a terminal of the inventory management system first manufactured in “Port of Spain”, and it holds an overwhelming market share.

**Q76.** Which of the following is the most appropriate explanation of ERP (Enterprise Resource Planning)?

- a) It is the technique and concept to improve management efficiency by planning the company-wide management resources in an effective and integrated way.
- b) It is the technique and concept to perform commercial transactions for consumers and between companies by using electronic networks, such as the Internet.
- c) It is the technique and concept to introduce IT into business activities with the aim of improving not only efficiency and quality but also customer satisfaction.
- d) It is the technique and concept where wholesalers and manufacturers support the business activities of retail stores for increased turnover.

**Q77.** Among e-commerce categories, which of the following corresponds to the concept of “B to C” transactions?

- |                      |                  |
|----------------------|------------------|
| a) CALS              | b) Web-EDI       |
| c) Virtual companies | d) Virtual malls |

**Q78.** Which of the following is supported by a CAD system?

- |                   |                        |
|-------------------|------------------------|
| a) Process design | b) Production planning |
| c) Product design | d) Delivery planning   |

**Q79.** Which of the following is the situation where an improvement can be expected by installing an MRP (Material Requirements Planning) system?

- a) Drawing information is managed using electronic files and hard copies, so the design change history cannot be accurately known.
- b) Information concerning materials necessary for manufacturing and their required quantities is insufficient or incorrect, so production is being adversely affected.
- c) There are too many design change requests, so production efficiency does not improve.
- d) High-mix, low-volume production is adopted, so the cost of installing production equipment is increasing.

**Q80.** When the spreadsheet shown below is converted into CSV format, which of the following is an appropriate list of data that is generated by spreadsheet software? Here, records are separated by the carriage return code “ $C_R$ ”. The expression in a cell is automatically recalculated, and the resulting value is written back into that cell. Although the entered expressions are shown in row 3 and column C below, the resulting values are actually displayed on the screen.

	A	B	C
1	2	7	A1+B2
2	6	4	A2+B1
3	A1+A2	B1+B2	C2+B3

- a) 2 , 6 , 8  $C_R$  7 , 4 , 11  $C_R$  6 , 13 , 24  $C_R$
- b) 2 , 6 , 8  $C_R$  7 , 4 , 11  $C_R$  9 , 10 , 19  $C_R$
- c) 2 , 7 , 6  $C_R$  6 , 4 , 13  $C_R$  8 , 11 , 24  $C_R$
- d) 2 , 7 , 9  $C_R$  6 , 4 , 10  $C_R$  8 , 11 , 19  $C_R$

**Q81.** Which of the following is an appropriate explanation of a banner advertisement that is one of the Internet advertisements?

- a) When a Web site is being browsed, an advertisement from an advertiser is automatically displayed in another new window.
- b) When a Web page is accessed from another page, a page with an advertisement is briefly shown before the accessed page is displayed.
- c) When an advertisement image that is placed on part of a Web page is clicked, a page created by an advertiser is displayed.
- d) When keywords are entered into a search service site, an advertisement related to the keywords is displayed on the page showing the search results.

**Q82.** When computerization is promoted, which of the following is an appropriate point to be noted?

- a) In order to understand the current status of business operations, the opinions of third parties rather than staff members involved in the operations should be considered.
- b) In order to make a computerization plan, more attention should be paid to “how to do it” rather than “what to do”.
- c) After the final decision on the hardware configuration of an information system, the methodology of computerization should be investigated.
- d) In order to evaluate a computerization plan, not only the occurrence of new problems but also investment effect and feasibility should be considered.

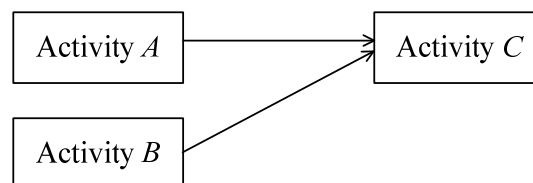
**Q83.** Which of the following is an appropriate description concerning groupware?

- a) It is software that has an animation or sound function and is helpful in effective presentations by incorporating the output of spreadsheet software or database software.
- b) It is software that has functions, such as a format setting function used to define the print layout and a function to change and edit text, and enters data to create a document.
- c) It is software that has functions, such as communication via e-mail and electronic bulletin boards, data sharing, and schedule management, and supports collaborative work.
- d) It is software that is used to enter data into cells of a worksheet, create tables, and tabulate data.

**Q84.** During business system development, it is effective to collect the meaning and usage of language (such as words, terms, and phrases) used in the target business operations and to create a glossary for smooth communication between users and developers, and between developers themselves. Which of the following is an appropriate description concerning the handling of this glossary?

- a) The glossary should be created and updated from an early stage of development.
- b) The manual writer should create the glossary in the final stage of development.
- c) The glossary is not necessary for small scale systems.
- d) Only technical terms related to the target business operations should be collected.

**Q85.** As shown in the figure below, there exists a business process consisting of activities *A*, *B*, and *C*. When an information system is installed to achieve improvement, what is the percentage of reduction in the person-hours required for manufacturing a product in comparison with before the improvement? Here, the arrows in the figure indicate the sequence of the activities, and the person-hours are calculated by multiplying the number of staff members by the working hours.



[Before the improvement]

- The number of staff members required for each activity is 10.
- The working hours required per product are 3 hours for activity *A*, 3 hours for activity *B*, and 4 hours for activity *C*.

[After the improvement]

- The number of staff members required for activity *A* is reduced by half.
- The working hours required per product in activity *C* are reduced by half.

- a) 15                      b) 20                      c) 30                      d) 35

**Q86.** When the software lifecycle is divided into four processes consisting of planning, requirements definition, development, and operation, which of the following is an appropriate result of the planning process?

- a) The requirements of the software to be developed are defined and reviewed.
- b) The requirements and constraints of the system are defined and agreed.
- c) A development project to implement the system is scheduled and approved.
- d) The database is designed at the highest level and is reviewed.

**Q87.** Which of the following is an appropriate description concerning risk analysis?

- a) It takes too much time and cost to implement countermeasures against all possible risks, so priority should be given based on the estimated amount of loss and probability of occurrence.
- b) For risks that are assessed with risk analysis, risk analysis should not be repeated until all measures are completely implemented.
- c) The purpose of risk analysis is to prevent loss in the future, so data that was accumulated in similar projects in the past should not be referenced.
- d) The purpose of risk analysis is to know the amount of loss caused by the occurrence of a risk, and the cost of measures should be decided based on this amount of loss.

**Q88.** In the case of constructing a new system by either developing a new system or adopting an existing package, when the initial investment amount, effect amount, operational cost, and maintenance cost are as shown in the table below, which of the following is the method for recovering the initial investment amount in the minimum number of years?

	System construction method	Initial investment amount (dollars)	Effect amount (dollars/year)	Operational cost (dollars/year)	Maintenance cost (dollars/year)
a)	Developing a new system	120,000	72,000	24,000	18,000
b)	Developing a new system	90,000	55,000	16,000	9,000
c)	Adopting an existing package	80,000	44,000	12,000	16,000
d)	Adopting an existing package	60,000	30,000	8,000	12,000



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

**Question A** Read the following description concerning a contract for system development, and then answer questions **Q89** through **Q92**.

Company *W* manufactures everyday sundries and has a plan to construct a system for managing sales (hereinafter referred to as sales management system) for business expansion. Mr. *G*, a member of the system construction team, created an RFP under the guidance of a supervisor and received a proposal from Company *X*. The overview of the RFP and the proposal from Company *X* are as shown below.

In order to handle Company *W*'s important customer information, the necessary measures are to be taken at the time of the conclusion of a contract.

[Overview of RFP]

System purpose:	To manage an order from a customer for a manufactured product from receipt of the order until shipment of the product
System requirements:	The number of products to be managed is initially 2,000 with a maximum of 5,000. The number of customers managed is initially 500 with a maximum of 2,000. The maximum number of orders placed per day is 200. An appropriate software package suitable for the scale of Company <i>W</i> 's activities is assumed to be used.
Delivery date:	Within 6 months of order placement

[Proposal from Company *X*]

Implementation cost:	70,000 dollars
Preconditions:	A software package for sales management from Company <i>Y</i> and database software from Company <i>Z</i> are used, and any functions that are lacking are developed. Two servers are installed, and each has one CPU. One server is a production server, and the other is a cold standby server that is used if a fault occurs on the production server.
Contract conditions:	The turnkey contract is applied to the system development project including all phases from requirements definition to system test. Company <i>X</i> provides 6-month warranty against defects in deliverables after the receiving inspection.
Implementation period:	4 months
Maintenance:	By concluding a maintenance contract, Company <i>X</i> deals with inquiries and fault isolation of the implemented system.

[Strategy]

**Q89.** There is an insufficiency or omission in the overview of the RFP created by Company *W*. Which of the following should be added to the RFP?

- a) Company *W*'s business results achieved in the previous year
- b) The number of products and the number of customers to be handled by the system
- c) Requirements for the performance to be achieved by the system
- d) Information about machines that are used to manufacture the products

[Strategy]

**Q90.** The license for the database software is determined by the number of CPUs on the servers that are running, and the license for a software package of sales management is determined by a combination of the maximum number of products handled and the maximum number of customers. Which of the following is an appropriate combination of licenses that Company *W* should purchase?

	Database software	Software package of sales management	
	Number of CPUs	Number of products (maximum)	Number of customers (maximum)
a)	1	2,000	500
b)	2	2,000	500
c)	1	5,000	2,000
d)	2	5,000	2,000

[Strategy]

**Q91.** In order to allow Company *X* to use customer information directly during development of the sales management system, which of the following should Company *W* do in advance?

- a) Company *W* should conclude a turnkey contract for development with Company *X* at once so that Company *X* can handle customer information at an early date.
- b) Company *W* should hand over detailed customer information to Company *X* prior to the conclusion of a formal contract so that development can be performed smoothly.
- c) Company *W* should sign a nondisclosure agreement with Company *X* so that customer information is not leaked or mishandled by Company *X*.
- d) Company *W* should sign a license agreement based on the number of customers for the software package of sales management with Company *Y*.

[Management]

**Q92.** Company *W* concludes a maintenance contract just after performing a receiving inspection of the system delivered by Company *X*. If a failure occurs in the sales management system in the next month, which of the following should Company *W* do?

- a) Company *W* should investigate the cause of the problem and fix the problem without any help from Company *X* even if the cause is a bug in the system developed by Company *X*.
- b) Company *W* should investigate the cause of the problem, and request that Company *X* fix the problem for a fee if the cause is a bug in the system developed by Company *X*.
- c) Company *W* should request that Company *X* investigate the cause of the problem, and have the problem fixed free of charge if the cause is a bug in the system developed by Company *X*.
- d) Company *W* should request that Company *X* investigate the cause of the problem, and have the problem fixed for a fee if the cause is a bug in the system developed by Company *X*.

**Question B** Read the following description concerning programming and testing, and then answer questions **Q93** through **Q96**.

Mr. *R* of Company *Q* is attempting to perform the programming and testing of a function that is used for the development of a ticket sales system. This function calculates a total amount based on the desired number of adult tickets and child tickets. An adult ticket costs 30 dollars, and a child ticket costs 10 dollars. A maximum of 20 adult tickets and 20 child tickets can be purchased at one time, and the function checks if these conditions of purchase are fulfilled. Furthermore, if a total of 20 tickets or more are purchased, discount is given. The specifications and processing details for the function are as shown below.

[Specifications of the function]

Arguments passed to the function

*J*: the desired number of adult tickets

*K*: the desired number of child tickets

(*J* and *K* are integers of 0 or greater)

Value returned from the function

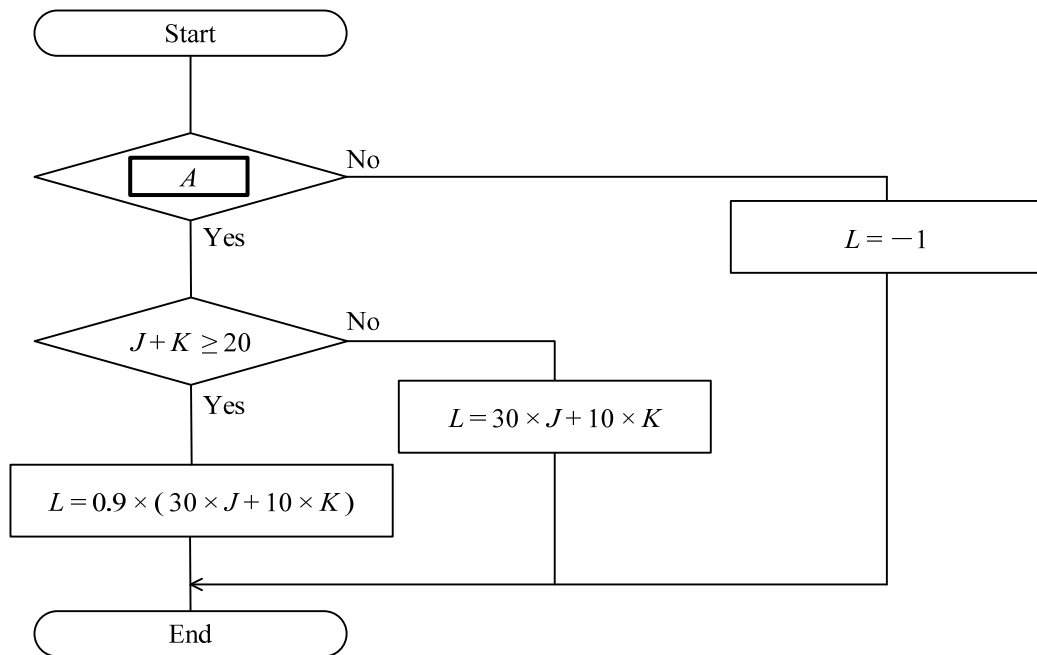
*L*: total amount (*L* is an integer)

[Processing details]

- (1) Based on the desired number of tickets, determine if the conditions of purchase are fulfilled. If the conditions of purchase are not fulfilled, set the total amount to “-1”.
- (2) If the conditions of purchase are fulfilled, the total amount is calculated as shown below based on the arguments that are passed.  
$$\text{Total} = \text{the desired number of adult tickets} \times 30$$
$$+ \text{the desired number of child tickets} \times 10$$
- (3) If a total of 20 or more tickets are purchased, subtract a 10% discount from the total amount.

[Technology]

**Q93.** The flow of processing for the function is shown in Fig. 1. Which of the following is an appropriate conditional statement to be inserted into blank *A* in Fig. 1?



**Fig. 1** Flowchart of processing for the function

- a)  $0 \leq J \leq 20$  and  $0 \leq K \leq 20$
- b)  $0 \leq J \leq 20$  or  $0 \leq K \leq 20$
- c)  $0 \leq J + K \leq 20$
- d)  $J > 20$  and  $K > 20$

[Management]

**Q94.** Table 1 below shows all combinations of conditions and their processing that are organized in order to test the function. Which of the following is an appropriate combination of symbols to be inserted into blanks *B* and *C* in Table 1?

**Table 1 All combinations of conditions and their processing**

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Condition	$0 \leq J \leq 20$	Y	Y	N	N	Y	Y	N	N
	$0 \leq K \leq 20$	Y	Y	Y	Y	N	N	N	N
	$J + K < 20$	Y	N	Y	N	Y	N	Y	N
Process	Calculate total amount	X	X						
	Deduct 10% discount from total amount	—	<i>B</i>						
	Set total to – 1	—	—		<i>C</i>				

Notes: 1. Values in the shaded area are not shown.

2. “Y” means that the condition is met, and “N” means that the condition is not met. “X” indicates that the process is executed, and “—” indicates that the process is not executed. For example, in the case of (1), this shows that when the result of the three conditions is “Y, Y, Y”, the process to calculate the total amount is executed.

	<i>B</i>	<i>C</i>
a)	X	X
b)	X	—
c)	—	X
d)	—	—

[Management]

**Q95.** Table 2 below shows part of the test data that is prepared in order to test the function and expected results. Which of the following is the combination of values to be inserted into blanks *D* and *E* in Table 2?

**Table 2 Part of the test data and expected results**

Test number	<i>J</i>	<i>K</i>	<i>L</i>
1	3	2	110
2	15	15	<i>D</i>
3	20	0	
4	10	30	<i>E</i>
⋮	⋮	⋮	⋮

Note: No value is shown in the shaded area.

	<i>D</i>	<i>E</i>
a)	540	540
b)	540	−1
c)	600	540
d)	600	−1

[Technology]

**Q96.** In order to make it possible to calculate the total amount for different types of tickets such a one-day or two-day ticket, (2) of “Processing details” and “Specifications of the function” are changed, and the argument  $M$  is added to represent the number of days of a ticket. The number of days for which a ticket is valid is entered into  $M$ . The array that defines the ticket prices by type is  $TP(M, N)$ .  $N$  is set to 1 for an adult and 2 for a child. The value of each array element is shown below. Which of the following is the total amount in dollars when the arguments are  $J=10$ ,  $K=20$ , and  $M=2$ ? Here, the function references this array based on the arguments and determines the ticket price.

[Values of array elements]

$$TP(1, 1) = 30, \quad TP(1, 2) = 10,$$

$$TP(2, 1) = 40, \quad TP(2, 2) = 15,$$

$$TP(3, 1) = 50, \quad TP(3, 2) = 20$$

- a) 450                      b) 500                      c) 630                      d) 700





[Main instructions concerning creation]

- (1) Creating the gift page in an HTML format file called “ank01.html”, and transferring it to a specified directory on the Web server
- (2) Using a relative path to specify a file
- (3) Making the file size of each photograph that is used 200 KB or less

[Technology]

**Q97.** Mr. *D* considered the advice from Mr. *E* and decided to improve the design of the proposal for the gift page shown in Fig. 1. Which of the following is an appropriate improvement?

- a) Placing the “Submit” button at the very top of the page so that the user does not forget to press it
- b) Using a check box so that the user can choose the “desired gift” with a click of a mouse
- c) Using a radio button for “Sex” so that the user can choose either “Male” or “Female”
- d) Placing questionnaire items on the assumption that the user responds to questions sequentially from the top-right of the screen

[Technology]



**Q98.** Mr. *D* received permission from the manufacturer of the gifts, and decided to scan photographs of the gifts from the manufacturer’s product catalog and then place these images on the gift page. The photographs are scanned in a bitmap format at a size of 2 inches high  $\times$  3 inches wide and in 24-bit color. The images are then edited with photo-retouching software.

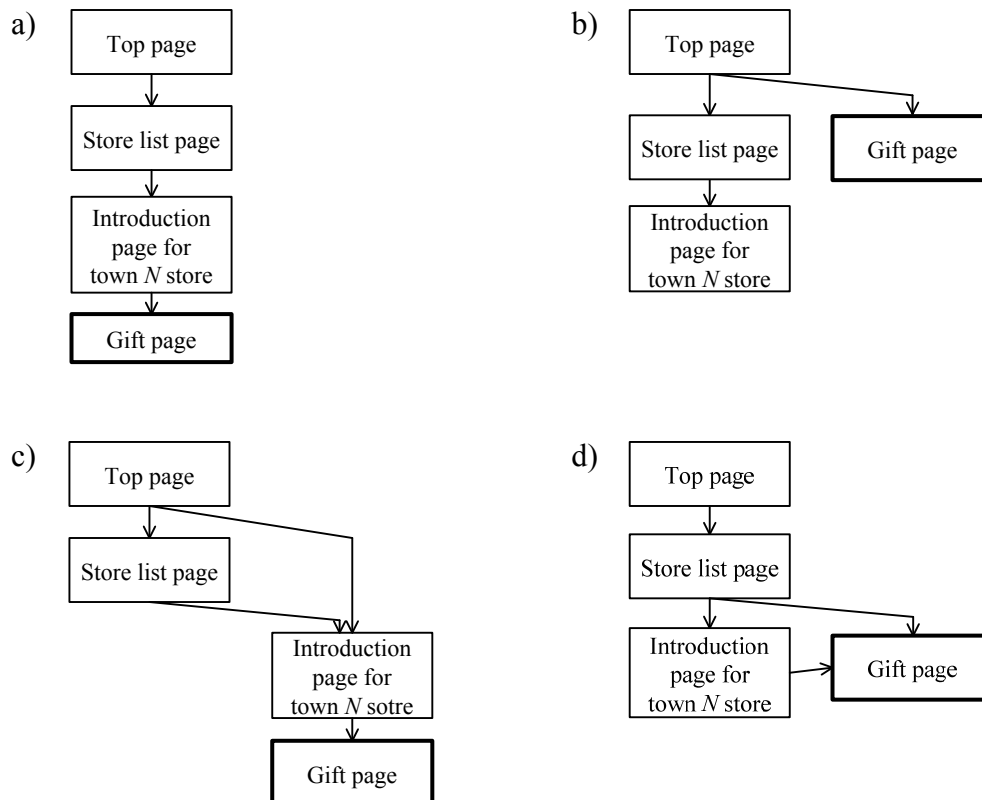
When compression of an image with the photo-retouching software is not considered, which of the following is the highest resolution in dpi (dots per inch) for the image scanner that Mr. *D* can select in accordance with Mr. *E*’s advice or instructions?

- a) 60                      b) 100                      c) 300                      d) 1,200

[Technology]

**Q99.** In order to release the completed gift page to the public on the Web site of the company's headquarters, a link is placed on the site. When the page is published, the implementation of a questionnaire that includes a gift is notified on the top page, with the aim of increasing the number of visitors to the introduction page for town  $N$  store and guiding visitors smoothly from the top page to the gift page. Which of the following is the diagram that shows the most appropriate page structure?

A rectangular box “” in the diagrams represents one screen on the Web site, and an arrow “” represents a link between pages.

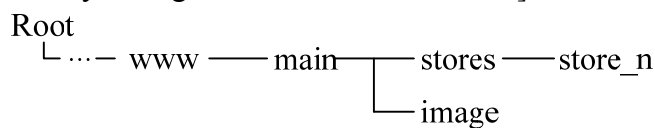


[Technology]

**Q100.** Mr. *D* was instructed by Mr. *E* to transfer the completed “ank01.html” file to the directory “store\_n” on the Web server, and to transfer the data used on the gift page such as photographs to the “image” directory before the release to the public. So, Mr. *D* added a tag to display photographs to “ank01.html” so that the photographs of the gifts are displayed correctly.

When the directory configuration and the file specification on the Web server are as shown below, which of the following is a tag that is inserted into blank *A* to display a photograph converted to the JPEG format (filename: s01.jpeg)? Here, the “img” tag displays an image that is specified as src=“filename”.

[Directory configuration on the Web server]



[File specification]

- (1) A file is referenced as “directory name\...\directory name\file name”, where the directory names on the path are listed and separated with “\” in sequence, followed by the file name.
- (2) The current directory is represented by “.” (a period).
- (3) The directory one level above is represented by “..” (two periods).
- (4) When a reference begins with a backslash “\”, it is assumed that the root directory is omitted from the beginning of the reference.
- (5) When a reference does not start with “\”, “.” (a period), or “..” (two periods), it is assumed that “.” for the current directory is omitted from the beginning of the reference.

[Tag to display photograph 1]



- |                |                    |
|----------------|--------------------|
| a) ..\..\image | b) ..\main\image   |
| c) .\image     | d) \www\main\image |

## Spreadsheet Software Functions and Terminology

The following defines the basic functions and technical terms of spreadsheet software.

In addition, when worksheet functions not described here, such as save, read, print, line creation, and graph creation, are used, they are described in the exam question text.

### 1. Worksheets

- (1) The work area that is composed of a grid of rows and columns is called a worksheet. A worksheet has 256 columns and 10,000 rows.
- (2) The position of each column and row in a worksheet is represented by a column letter and a row number. The leftmost column letter is A, and all column letters are represented as A, B, ..., Z, AA, AB, ..., AZ, BA, BB, ..., BZ, ..., IU, and IV. The uppermost row number is 1, and all row numbers are represented as 1, 2, ..., 10000.
- (3) Multiple worksheets can be used. In this case, a unique name is assigned to each worksheet in order to distinguish worksheets from one another.

### 2. Cells and cell ranges

- (1) Each box-shaped area in the grid that constitutes a worksheet is called a cell. The position of a cell is represented by a pair of the column letter and row number of the cell, and this is called a cell address.

Example: The cell address at column A and row 1 is A1.

- (2) When a group of all cells included in certain rectangular area of a worksheet is handled, the cell addresses of the top left and bottom right cells of the group are used with a semicolon “:”, and the group is represented as “top left cell address:bottom right cell address”. This is called a cell range.

Example: The cell range with the top left cell at A1 and the bottom right cell at B3 is represented as A1:B3.

- (3) When a cell address or a cell range in another worksheet is specified, the worksheet name and an exclamation mark “!” are used, and they are represented as “worksheet name!cell address” or “worksheet name!cell range” respectively.

Example: When the cell range B5:G10 in the worksheet “sheet1,” is specified from another worksheet, it is represented as sheet1!B5:G10.


### 3. Values and expressions

- (1) A cell holds a value, and this value can be referenced using the cell address. A value can be a numeric value, a character string, a logical value, or a null value.
- (2) A character string is enclosed in a pair of single quotation marks ‘ ’.  
Example: The character strings “A” and “BC” are represented as ‘A’ and ‘BC’ respectively.
- (3) A logical value is represented as true or false.

- (4) A null value is represented as null, and a cell that has a null value is called a blank cell. The initial state of a cell is null.
- (5) An expression can be entered into a cell. A cell holds the resulting value of an evaluated expression.
- (6) An expression is composed of constants, cell addresses, operators, parentheses, and functions. A constant is a notation that represents a numeric value, a character string, a logical value, or a null value. A cell address in an expression refers to the value held in the cell at that cell address.
- (7) An expression can be an arithmetic expression, a character expression, or a logical expression. An expression whose evaluation generates a numeric value is called an arithmetic expression, an expression whose evaluation generates a character string is called a character expression, and an expression whose evaluation generates a logical value is called a logical expression.
- (8) When an expression is entered into a cell, it is evaluated immediately. When the value in a cell that is referenced by an expression is changed, the expression is immediately re-evaluated.

#### 4. Operators

- (1) Unary operators are the plus sign “+” and the minus sign “-”.
- (2) Arithmetic operators are addition “+”, subtraction “-”, multiplication “\*”, division “/”, and exponentiation “^”.
- (3) Comparison operators are greater than “>”, less than “<”, greater than or equal to “≥”, less than or equal to “≤”, equal to “=”, and not equal to “≠”.
- (4) For grouping symbols, a pair of parentheses “( )” is used.
- (5) When there are multiple operations and parentheses in an expression, the order of calculation is prioritized as shown in the table below.

Type of operation	Operator	Priority
Parentheses	( )	<div style="text-align: center;"> High    Low </div>
Exponentiation	^	
Unary operation	+, -	
Multiplication and division	*, /	
Addition and subtraction	+, -	
Comparison operators	>, <, ≥, ≤, =, ≠	Low

#### 5. Copying of cells

- (1) A value or expression in a cell can be copied into other cells.
- (2) In a cell copy operation, when the source cell holds an expression containing a cell address, the cell reference method that changes the cell address in the expression so that the difference in the cell addresses of the source cell and destination cell can be maintained is called a relative reference. In this case, the expression that is entered into the destination cell is the expression modified by

adding the difference in column letter and row number between the source cell and destination cell to each cell address in the expression that is entered into the source cell.

Example: When the expression  $A1 + 5$  in cell A6 is copied into cell B8, the expression  $B3 + 5$  is entered into cell B8.

- (3) In a cell copy operation, when the source cell holds an expression containing a cell address, the cell reference method that does not change either of or both the column letter and row number of the cell address is called an absolute reference. A dollar symbol “\$” is placed immediately before either of or both the column letter and row number to which an absolute reference is applied.

Example: When the expression  $\$A\$1 + \$A2 + A\$5$  in cell B1 is copied into cell C4, the expression  $\$A\$1 + \$A5 + B\$5$  is entered into cell C4.

- (4) In a cell copy operation, when the source cell holds an expression that refers to another worksheet, the name of the referenced worksheet does not change at the copy destination.

Example: When the expression `Sheet1!A1` in cell A6 of the worksheet “Sheet2” is copied into cell B8 of the worksheet “Sheet3”, the expression `Sheet1!B3` is entered into cell B8 of “Sheet3”.

## 6. Functions

The functions defined in the table below are available for use in an expression.

Format	Description
<code>SUM(cell range<sup>1)</sup>)</code>	Returns the sum of the values in a specified cell range. Example: <code>SUM(A1:B5)</code> returns the sum of the values in the cell range A1:B5.
<code>AVG(cell range<sup>1)</sup>)</code>	Returns the average of the values in a specified cell range.
<code>SAMPLE_STD_DEV (cell range<sup>1)</sup>)</code>	Sample standard deviation: Returns the standard deviation of the sample values in a specified cell range.
<code>POPULATION_STD_DEV (cell range<sup>1)</sup>)</code>	Population standard deviation: Returns the standard deviation of the population values in a specified cell range.
<code>MAX(cell range<sup>1)</sup>)</code>	Returns the maximum value in a specified cell range.
<code>MIN(cell range<sup>1)</sup>)</code>	Returns the minimum value in a specified cell range.
<code>IF(logical expression, expression 1, expression 2)</code>	Returns the value of expression1 when the value of the logical expression is true, and returns the value of expression 2 when it is false. Example: <code>IF(B3 &gt; A4, 'Chicago', C4)</code> returns the character string “Chicago”, if the value in cell B3 is greater than the value in cell A4. Otherwise, the value in cell C4 is returned.
<code>COUNT(cell range)</code>	Returns the number of non-blank cells in a specified cell range.

COUNTIF(cell range, search condition)	Returns the number of cells within a specified cell range that meet the specified search condition. The search condition is described using a combination of a comparison operator and an expression, and the value of each cell contained in the cell range is evaluated using the specified comparison operator. Example 1: COUNTIF(H5:L9, > A1) returns the number of cells in cell range H5:L9 that hold a greater value than the value in cell A1 . Example 2: COUNTIF (H5:L9, = 'ABC') returns the number of cells in the cell range H5:L9 that hold the character string "ABC".
INT (arithmetic expression)	Integer: Rounds a value down to the maximum integer that is less than or equal to the value of a specified arithmetic expression. Example 1: INTEGER(3.9) returns 3. Example 2: INTEGER(-3.9) returns -4.
MOD(arithmetic expression 1, arithmetic expression 2)	Modulo arithmetic: Returns the remainder after the value of arithmetic expression 1 (dividend) is divided by the value of arithmetic expression 2 (divisor). The equation below holds for functions MOD and INT. $\text{MOD}(x, y) = x - y * \text{INT}(x / y)$ Example 1: MOD(10, 3) returns 1. Example 2: MOD(-10, 3) returns 2.
SQRT(arithmetic expression)	Square root: Returns the non-negative square root of the value of a specified arithmetic expression. The value of the arithmetic expression must be a non-negative numeric value.
AND(logical expression 1, logical expression 2, ...) <sup>2)</sup>	Returns true only when the values of logical expression 1, logical expression 2, and all other logical expressions specified are true. Otherwise, it returns false.
OR(logical expression 1, logical expression 2, ...) <sup>2)</sup>	Returns true when the value of at least one expression out of logical expression 1, logical expression 2, and all other logical expressions specified is true. Otherwise, it returns false.
NOT(logical expression)	Returns false when the value of a specified logical expression is true, and returns true when the value of the logical expression is false.
ROUNDUP(arithmetic expression, position)	Returns the value of a specified arithmetic expression that is rounded to the position specified. The function ROUNDUP rounds the value up, ROUNDOFF rounds the value off, and ROUNDDOWN rounds the value down. Here, the position is the number of places as counted from left to right with the first position being 0. Example 1: ROUNDUP(-314.159, 2) returns -314.16. Example 2: ROUNDUP(314.159, -2) returns 400. Example 3: ROUNDUP(314.159, 0) returns 315.
ROUNDOFF(arithmetic expression, position)	
ROUNDDOWN (arithmetic expression, position)	
CONCATENATE (expression 1, expression 2, ...) <sup>2)</sup>	Treats the value of expression 1, expression 2, and all other expressions as a character string, and returns these as a single character string joined in order of the arguments. Example: CONCATENATE('Chicago', 'Washington', 123, 456) returns the character string "ChicagoWashington123456".
RANK(arithmetic expression, cell range <sup>1)</sup> , order option)	Returns the rank order of the value of a specified arithmetic expression in a cell range in ascending order when the order option is 0, and in descending order when the order option is 1. Here, if the same value occurs more than once in the cell range, these values are given the same rank order and the subsequent rank order is set as this rank order plus the number of cells in the same rank order.
RANDOM( )	Returns a uniform random number (real value) that is greater than or equal to 0 and less than 1.
TLOOKUP(cell range, row position, column position)	Table lookup: Counts each row and column from the top left position of a specified cell range as 1, 2, ..., and returns the value of a cell at the location specified using a row position and a column position. Example: TLOOKUP(A3:H11, 2, 5) returns the value of cell E4.



<p>VLOOKUP (expression, cell range, column position, search option)</p>	<p>Vertical lookup: Scans the leftmost column of a specified cell range vertically from top to bottom, and searches for the first row with a cell that meets the search option. For the row found, counts each column from the leftmost column of the cell range as 1, 2, ..., and returns the value of the cell in the column specified by the column position.</p> <ul style="list-style-type: none"> <li>• When the search option is 0: searches for values that matches the expression value.</li> <li>• When the search option is 1: searches for the maximum value that is less than or equal to the expression value. Here, the leftmost column must be sorted in ascending order from top to bottom in advance.</li> </ul> <p>Example: VLOOKUP(15, A2:E10, 5, 0) searches the leftmost column in the cell range from cell A2 to A10. Under this condition, if the value 15 is first found in cell A6, the value in cell E6 is returned, which is located at the 5th column E in the same row as cell A6.</p>
<p>HLOOKUP (expression, cell range, row position, search option)</p>	<p>Horizontal lookup: Scans the top row of a cell range horizontally from left to right, and searches for the first column with a cell that meets the search option. For the column found, counts each row from the top row of the cell range as 1, 2, ..., and returns the value of the cell in the row specified by the row position.</p> <ul style="list-style-type: none"> <li>• When the search option is 0: searches for values that matches the expression value.</li> <li>• When the search option is 1: searches for the maximum value that is less than or equal to the expression value. Here, the top row must be sorted in ascending order from left to right in advance.</li> </ul> <p>Example: HLOOKUP(15, A2:G6, 5, 1) searches the top row in the cell range from cell A2 to G2. Under this condition, if the maximum value less than or equal to 15 is first found in cell D2, the value in cell D6 is returned, which is located at the 5th row 6 in the same column as cell D2.</p>

Notes: <sup>1)</sup> Values other than numeric values contained in the cell range that is passed as an argument are not processed.

<sup>2)</sup> One or more expressions can be passed as a list of arguments.