April 2013

Fundamental IT Engineer Examination (Morning)

Questions must be answered in accordance with the following:

Question Nos.	**Q1 - Q80**
Question Selection	**All questions are compulsory.**
Examination Time	**9:30 - 12:00 (150 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 spring Fundamental IT Engineer Examination conducted?

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

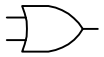
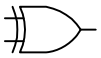
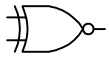
   Since the correct answer is "b)" (April), mark your answer sheet as follows:

   [Sample Answer]

Do not open the exam booklet until instructed to do so.
Inquiries about the exam questions will not be answered.

Symbols commonly used in questions

Unless otherwise noted in each question, the logic gate symbols are applied as shown in the table below.

Graphic symbol	Explanation
	AND gate
	NAND gate
	OR gate
	NOR gate
	Exclusive OR (XOR) gate
	Exclusive NOR gate
	Buffer
	NOT gate
	Three-state buffer (or tri-state buffer)

Note: The small circle or “bubble” on either the input or output terminal shows inversion or negation of the logic state.

Q1. Which of the following is the result of calculating the arithmetic expression "B6−7C"? Here, all numbers are represented in unsigned hexadecimal.

a) 32 b) 3A c) B2 d) BA

Q2. There are several formats for representing an integer in a computer. When a set of unsigned binary integers that are arranged in ascending order is interpreted in different formats and then sorted again in ascending order of their values, which of the following is the format that maintains the same order as the original unsigned binary integers?

a) Biased (i.e., offset binary) format
b) One's complement format
c) Signed magnitude format
d) Two's complement format

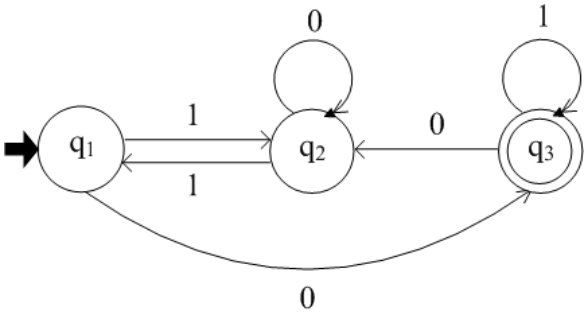
Q3. The distribution of days that are required to complete a certain activity can be approximated by a standard normal distribution with a mean of 500 days and a standard deviation of 12 days. What is the approximate 95% confidence interval in days for the activity?

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

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

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

Q5. The figure below shows the state transition diagram of an automaton. Which of the following is a bit string for which the automaton stops in the accepting (or final) state after the entire bit string has been read? Here, the double circle marked with "q_3" represents the accepting state.



a) 1011 b) 1100 c) 1101 d) 1110

Q6. Which of the following is the logical expression whose resulting value is zero (0) only when the binary values of "x_1, x_2, ..., x_n" are all zeros (0s) or all ones (1s)? Here, "$\cdot$" and "+" represent the logical product and logical sum operators respectively, and "$\overline{x}$" is the logical negation of "x".

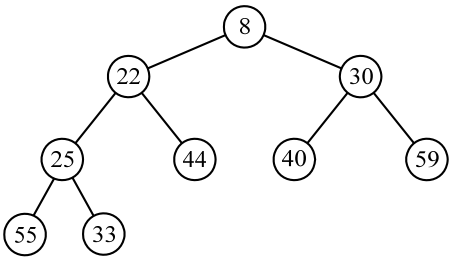
a) $(x_1 \cdot x_2 \cdots x_n) + (x_1 + x_2 + \cdots x_n)$

b) $(x_1 \cdot x_2 \cdots x_n) + \overline{(x_1 + x_2 + \cdots x_n)}$

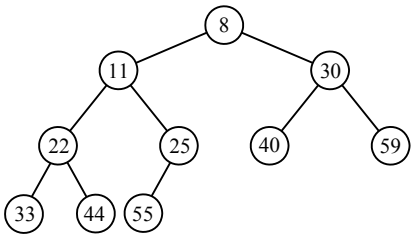
c) $\overline{(x_1 \cdot x_2 \cdots x_n) + (x_1 + x_2 + \cdots x_n)}$

d) $\overline{(x_1 \cdot x_2 \cdots x_n) + \overline{(x_1 + x_2 + \cdots x_n)}}$

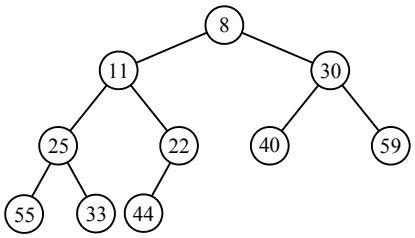
Q7. When "11" is inserted in the min-heap shown below, which of the following min-heaps is created? Here, a new node is first placed at the bottom (or last) of the tree, and then it is shifted up to its proper place to maintain the min-heap structure.



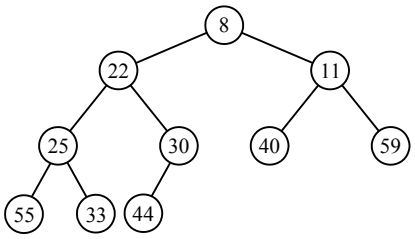
a)



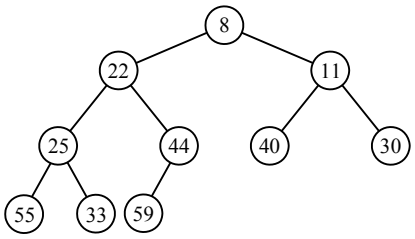
b)



c)



d)



Q8. The figure below shows the structure of a singly-linked list. In order to insert Philadelphia between New York and Washington DC, which of the following is an appropriate operation to be performed? Here, "null" indicates the end of the list.

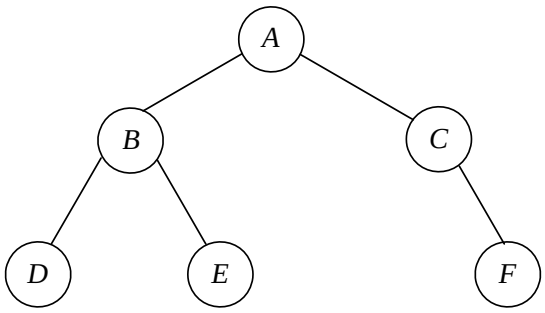
Head pointer

10

Address	Element	Pointer
10	Boston	50
30	Miami	null
50	New York	90
70	Atlanta	30
90	Washington DC	70
110	Philadelphia	

a) The pointers for New York and Philadelphia are set to 90 and 110 respectively.
b) The pointers for New York and Philadelphia are set to 110 and 50 respectively.
c) The pointers for New York and Philadelphia are set to 110 and 70 respectively.
d) The pointers for New York and Philadelphia are set to 110 and 90 respectively.

Q9. In the binary search tree shown below, which of the following is the appropriate sequence of nodes that are visited in an in-order traversal?



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

Q10. Which of the following is the appropriate description of the "selection sort" algorithm?

a) An intermediate reference value is determined, and then the elements are divided into two groups of "larger" values and "smaller" values. This operation is recursively repeated.
b) Each set of the elements extracted at regular intervals is sorted, and then the interval is further decreased. The operation is repeatedly performed until the interval becomes 1.
c) The element with the largest value is determined and swapped for the last element, and then the largest value of the unsorted elements is determined and swapped for the second-to-the-last element. This operation is repeated in the same way.
d) Two adjacent elements are repeatedly compared and swapped if the first element is larger than the second. This operation is repeated until all elements are arranged in an orderly fashion.

Q11. Which of the following is a role of the program register (i.e., program counter) of the CPU?

a) In order to decode an instruction, it contains the instruction that is read out from the memory.
b) In order to execute a conditional branch instruction, it contains the state of operation results.
c) In order to perform an arithmetic or logical operation, it contains data that is read out from the memory.
d) In order to read out an instruction, it contains the address where the next instruction is stored.

Q12. When the average instruction execution time of a computer is 20 nanoseconds, what is the performance of this computer in MIPS?

a) 5 b) 10 c) 20 d) 50

Q13. There is a digital video recording system installed with four security cameras. In this system, the video data from each camera is captured at 30 frames per second with a resolution of 640×480 pixels and a color depth of 16 bits per pixel, and then it is stored in the hard disk drive. Which of the following is the approximate storage capacity that is required for recording all video data for one minute? Here, 1 MB is 10^6 bytes, and 1 GB is 10^9 bytes.

a) 19 MB b) 74 MB c) 1.2 GB d) 4.5 GB

Q14. Cache memory is usually organized at multiple levels, such as L1 for level 1 and L2 for level 2, with L1 having the smallest storage capacity but the fastest memory speed. The data in L1, L2, and main memory can be accessed using 1, 10, and 100 clock cycles, respectively. When the cache miss rates in L1 and L2 are 5% and 50% respectively, what is the average memory access time in clock cycles?

a) 2.8 b) 3.7 c) 37 d) 52.3

Q15. The magnetic head of a hard disk drive is currently positioned at cylinder number 100, and the cylinder numbers 120, 90, 70, 80, 140, 110, and 60 are lined up in the I/O request queue. What is the total number of cylinders that the head moves to satisfy the conditions below?

[Conditions]

(1) The seek optimization method is applied to I/O requests, which are sorted in order of increasing cylinder number so that the head can move in the same direction to the extent possible.
(2) The head is currently moving in the direction where cylinder number increases.
(3) When there are no more I/O requests in the current direction, the direction of movement is reversed.
(4) The results are not affected by the processing order of I/O requests.
(5) New I/O requests do not occur during the process.

a) 80 b) 120 c) 160 d) 220

Q16. Which of the following is the most appropriate explanation of cloud computing?

a) It accumulates the computational capacity of several PCs so that a computational capacity of the same level as a supercomputer can be achieved.
b) It connects all electric appliances to a network as intelligent products so that these devices can be monitored and operated at any time and from any place.
c) It enables PCs on a network to communicate with each other based on an equal relationship, without the use of a specific server.
d) It provides the resources of a computer via a network so that the user can easily receive services with high scalability and availability.

Q17. Which of the following is an essential activity for achieving a fault tolerant system?

a) Automatically recording the history, such as the change information of the database, during the system operation in order to perform cause analysis and recovery when a failure occurs in the system
b) Designing simple operations in which operational errors do not occur easily, or designing an operation in such a way that even if an operational error occurs, it does not result in a fatal error
c) Providing redundancy for a system configuration to minimize the effect of a component failure so that the processing can be continued without any effect on the overall system
d) Taking a data backup periodically so that after the occurrence of a failure the state prior to the failure can be restored promptly in an alternate system environment

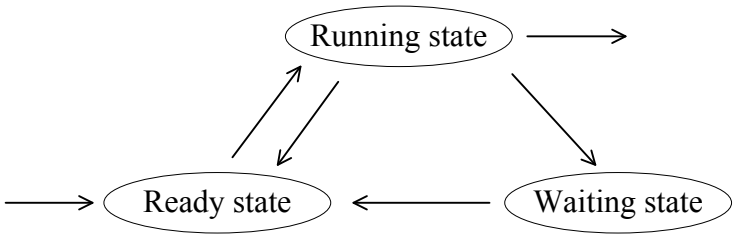
Q18. In reliability design, which of the following is an appropriate example of fail-soft?

a) In a system with a cluster configuration, even when a server does not work, another server takes over applications and provides functions.
b) In order not to lose data even when an application is shut down by mistake, the application regularly saves a copy of data on a storage device during editing.
c) In order not to stop a system because of partial functional failures, the system is composed only of hardware and software that are fully verified and highly reliable.
d) On the input screen of a reception system that requires an e-mail reply, two input fields for the e-mail address are provided and checked to see if they are the same.

Q19. Which of the following is an appropriate description concerning MTBF and MTTR?

a) MTBF increases as the number of device types that constitute the system increases.
b) MTBF increases through the preventive maintenance of a system.
c) MTTR increases and MTBF decreases through the remote maintenance of a system.
d) MTTR increases owing to functions such as an error log or an instruction trace.

Q20. The diagram below shows the state transition of the tasks in a multitasking computer system. When does a task in the running state move to the ready state?



a) When a process based on an I/O request is completed
b) When a task is generated
c) When a task with a higher priority is set to the ready state
d) When an I/O request is issued

Q21. In memory pool management of a real time system using various sizes of memory resources, which of the following is an appropriate characteristic of the fixed-length method in comparison with the variable-length method?

a) The memory efficiency is good, and the processing speed for allocation and deallocation is slow and constant.
b) The memory efficiency is good, and the processing speed for allocation and deallocation is slow and variable.
c) The memory efficiency is poor, and the processing speed for allocation and deallocation is fast and constant.
d) The memory efficiency is poor, and the processing speed for allocation and deallocation is fast and variable.

Q22. When CPU processing and printing are performed for four jobs under the conditions below, how many minutes does it take to complete them from the start of the first CPU processing until the end of the last printing?

[Conditions]

(1) The multiplicity of jobs is 1 during execution.
(2) The CPU processing time of each job is 20 minutes.
(3) 400 Mbytes of printing data are spooled for each job when the CPU processing ends. The printing function of the OS operates after spooling is completed, and printing is performed by the printer.
(4) One printer is available, and the printing speed is 10 minutes per 100 Mbytes.
(5) The functions of CPU processing and printing can operate in parallel, and do not affect each other.
(6) The time period that is not mentioned in the conditions, such as the time required for spooling, can be ignored.

a) 120 b) 160 c) 180 d) 240

Q23. When the number of concurrently running programs is increased in a virtual storage system with the small and insufficient capacity of main memory, which of the following is the state in which the overhead of the system increases and the processor utilization of the applications decreases?

a) Bottleneck
b) Fragmentation
c) Paging
d) Thrashing

Q24. Which of the following is the language processor that translates and executes a source program written in high-level language, on a line-by-line basis?

a) Assembler
b) Compiler
c) Generator
d) Interpreter

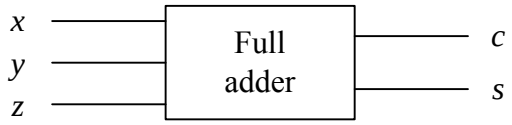
Q25. For the purpose of monitoring the execution process of a program in order of time, which of the following is used as a dynamic debugging tool that records the contents of the memory and registers as well as the execution sequence of program instructions?

a) Assertion checker
b) Code auditor
c) Inspector
d) Tracer

Q26. Which of the following is an appropriate explanation of DRAM?

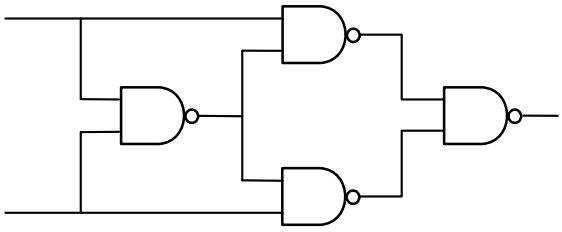
a) It is a memory chip on which data can be written using a specially-designed device and erased by exposure to ultraviolet light.
b) It is often used as main memory, and one bit is represented depending on whether or not its capacitor is charged.
c) It is used as memory to store microprograms that are written at the time of manufacturing.
d) It is used as high-speed memory such as cache which is composed of flip-flops, and the manufacturing cost is high.

Q27. The figure below shows a logic circuit representing a full adder. When 1, 0, and 1 are entered into *x*, *y*, and *z* respectively, which of the following is the appropriate combination of the output values of *c* (carry) and *s* (sum)?



	c	*s*
a)	0	0
b)	0	1
c)	1	0
d)	1	1

Q28. Which of the following is the logic gate that is equivalent to the logic circuit shown below?



a) AND b) NAND c) XNOR d) XOR

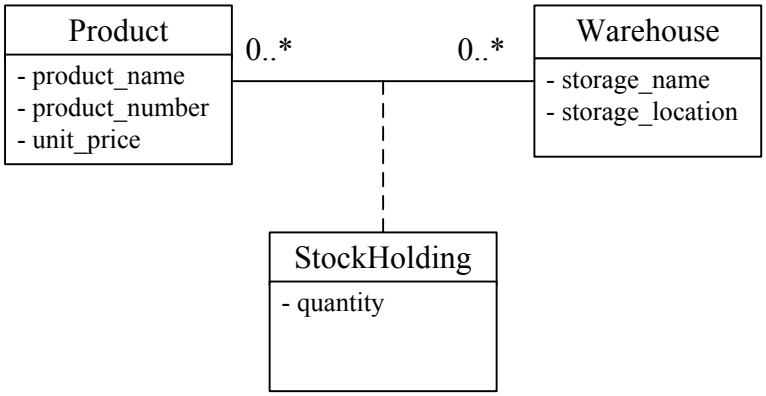
Q29. When a 60-minute monaural audio signal is digitalized using a PCM format with a sampling frequency of 44.1 kHz and a quantization bit rate of 16 bits, what is the approximate data volume in Mbytes? Here, the data is not compressed.

a) 80 b) 160 c) 320 d) 640

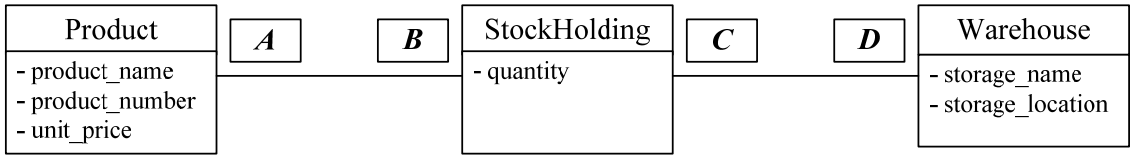
Q30. Among the descriptions concerning three-dimensional computer graphics, which of the following is an explanation of polygon?

a) It is a basic element that is used for constituting a polyhedron taking the form of a closed solid or for approximating a quadric surface or a free-form surface.
b) It is a basic element, such as a pattern or design, which is pasted on the surface of a modeled object.
c) It is an image obtained by converting a model recorded inside a computer to a two-dimensional form so that it can be rendered on the screen.
d) It is an image that transforms smoothly from an image *a* including an object *A* to an image *b* including a different object *B* having another shape.

Q31. As shown in the class diagram below, there is a many-to-many association between the two classes Product and Warehouse. When there is a need to know how many of each product are stored in each warehouse, the association class StockHolding can be added between the two classes Product and Warehouse so as not to hide the original many-to-many relationship.



If the class diagram shown below is depicted using a full class instead of the association class, which of the following is the appropriate combination of cardinalities that are inserted into blanks *A* through *D*?



	A	*B*	*C*	*D*
a)	0..*	1	0..*	1
b)	0..*	1	1	0..*
c)	1	0..*	0..*	1
d)	1	0..*	1	0..*

Q32. As shown below, when the SQL statement is executed on the relational database table "Staff", which of the following tables is created?

```
SELECT StaffID, BranchID FROM Staff WHERE BranchID = 'B03'
UNION
SELECT StaffID, BranchID FROM Staff WHERE Salary > 5000;
```

Staff

StaffID	Salary	BranchID
S01	2000	B01
S02	4000	B01
S03	3000	B03
S04	8000	B03
S05	3000	B03
S06	4000	B07
S07	6000	B08

a)

StaffID	BranchID
S04	B03

b)

StaffID	BranchID
S03	B03
S04	B03
S05	B03
S07	B08

c)

StaffID	BranchID
S03	B03
S04	B03
S05	B03
S04	B03
S07	B08

d)

StaffID	BranchID
S03	B03
S04	B03
S05	B03
S03	B08
S04	B08
S05	B08
S07	B03
S07	B08

Q33. Which of the following is the appropriate flow of execution of SQL statements?

a) Code generation → Optimization → Decomposition → Execution
b) Decomposition → Code generation → Optimization → Execution
c) Decomposition → Optimization → Code generation → Execution
d) Optimization → Decomposition → Code generation → Execution

Q34. In a relational database system, which of the following is an appropriate purpose of recording changes in a database file as a journal file?

a) To determine whether to commit or roll back the database updates
b) To enable recovery to be undertaken effectively in the event of a failure
c) To move transaction log records to the database backup files
d) To support concurrency control of the simultaneous execution of transactions

Q35. Which of the following is the most appropriate description concerning the exclusive control of a DBMS?

a) Exclusive control is necessary for data that might be updated simultaneously by several people.
b) Exclusive control is necessary for improving the processing speed of data that is frequently accessed.
c) Exclusive control is necessary for preventing the occurrence of a deadlock when data is accessed.
d) In order to improve the processing speed, the range of the data on which exclusive control is performed must be made as wide as possible.

Q36. When an optical fiber cable is used for data communication, which of the following is the approximate bandwidth (in units of THz) of the light within the range of wavelength from 1000 to 1400 nanometers? Here, in consideration of data transmission efficiency and such other factors, the effective speed of the light on the optical fiber cable can be assumed to be 2×10^8 m/s.

a) 50 b) 57 c) 75 d) 86

Q37. Which of the following is an appropriate description concerning interconnection devices between LANs?

a) The bridge relays frames based on the IP address.
b) The gateway converts the protocols of only the first through third layers of the OSI basic reference model.
c) The repeater extends the transmission distance by amplifying signals between the same types of segments.
d) The router relays frames based on the MAC address.

Q38. Among the layers of the OSI basic reference model, which of the following is the appropriate layer that is primarily responsible for the translation, encryption, and compression of data?

a) Data link layer
b) Physical layer
c) Presentation layer
d) Session layer

Q39. In a TCP/IP network using IPv4 addresses, which of the following is an effective IP address that can be allocated to a network device?

a) 172.16.5.0/40
b) 192.168.251.256/25
c) 203.164.15.9/28
d) 252.169.15.40/30

Q40. Which of the following is an appropriate explanation of POP3 that is used in an e-mail system?

a) It is a protocol used by the user to send an e-mail.
b) It is a protocol used to authenticate a user based on the user ID and password after the establishment of a PPP link.
c) It is a protocol used to exchange e-mail messages between mail servers.
d) It is a protocol used to retrieve e-mails from the mailbox of a mail server.

Q41. A PKI involves two types of key pairs: signature key pairs, in which the private key is used for signing and the public key for checking; and exchange key pairs, in which the public key is used by an application to encrypt data, and the private key is used to decrypt the encrypted data. Which of the following is the key pair(s) that may be escrowed or backed up to prevent the loss of important data even when the corresponding key or keys are forgotten?

a) Both exchange key pair and signature key pair
b) Either exchange key pair or signature key pair depending on conditions
c) Exchange key pair
d) Signature key pair

Q42. Which of the following can be achieved by receiving an e-mail text and its hash value from the sender, and then comparing this hash value with another hash value calculated by the recipient from the e-mail text? Here, the hash value that the recipient receives from the sender is correct.

a) Checking the delivery of the e-mail
b) Detecting the presence or absence of falsification in the e-mail text
c) Preventing spoofing
d) Preventing wiretapping of the e-mail text

Q43. Which of the following is a security measure where it is effective to confirm the destination address with the sender when an e-mail is sent?

a) A preventive measure against unauthorized relay of e-mail
b) A preventive measure against wrong transmission of e-mail
c) Anti-spam measure using OP25B
d) Anti-spam measure using SPF

Q44. Which of the following is the purpose of using a WAF (Web Application Firewall)?

a) To block attacks to a vulnerability arising from a Web server and an application
b) To detect the intrusion of a worm in a Web server and remove the worm automatically
c) To detect vulnerabilities and inconsistencies of applications in an integration test during content development for a Web server
d) To find security holes of a Web server and apply OS security patches

Q45. As a security measure on the Internet, a type of challenge-response test called a CAPTCHA can be used to determine whether the client is a human or a computer program. Which of the following is an appropriate purpose of using such a measure?

a) To protect against a relay attack
b) To protect against a virus or a worm
c) To protect against automated spamming
d) To protect against spyware or adware

Q46. Which of the following is an appropriate description concerning a use case diagram in UML?

a) It is used to describe the sequence of states that an object goes through in response to external events.
b) It is used to model the functional, informational, behavioral, and organizational workflow perspectives.
c) It is used to represent mutual actions by means of messages sent and received between objects.
d) It is used to show what system functions are performed for which actor, from the user's perspective.

Q47. During system development, a domain model is often created as part of the business modeling activities. Among the diagrams in UML, which of the following is the diagram that contains the implementation view of the entities in the domain model?

a) Class diagram
b) Communication diagram
c) Object diagram
d) Use case diagram

Q48. In UML, the state machine diagram (previously called statechart diagram) is used for describing the state machine model of a target system. Which of the following is an appropriate description of the state machine diagram?

a) It shows how data flows in the system through a sequence of processes.
b) It shows how the system responds to internal and external events.
c) It shows relationships among objects in the system at a point in time.
d) It shows the flow of events from one activity to another.

Q49. In the course of object oriented design, which of the following can be regarded as a subclass of the base class “automobile”?

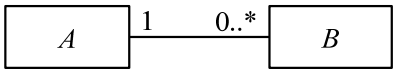
a) Engine
b) Serial number
c) Tire
d) Truck

Q50. The integration test for software that is composed of a set of modules arranged in a hierarchical structure is performed from a high-level module. In such a case, which of the following is a test module that is used as a substitute for the low-level module?

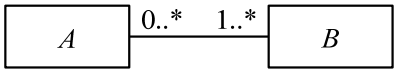
a) Driver
b) Emulator
c) Simulator
d) Stub

Q51. When the data model conforms to the notation described below, which of the following is an appropriate description concerning the interpretation of the E-R diagram shown below?

[Notation]

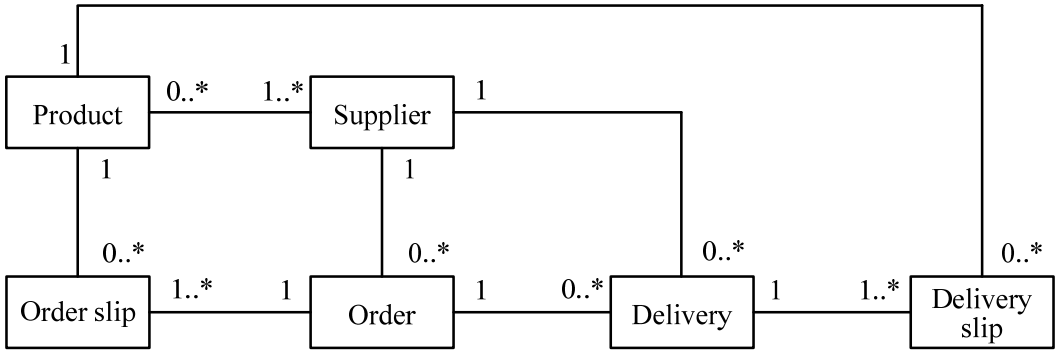


One data item of entity *A* corresponds to *n* ($n \geq 0$) data items of entity *B*, and one data item of entity *B* corresponds to one data item of entity *A*.



One data item of entity *A* corresponds to *n* ($n \geq 1$) data items of entity *B*, and one data item of entity *B* corresponds to *m* ($m \geq 0$) data items of entity *A*.

[E-R diagram]



a) A signle order is not made from multiple suppliers.
b) Multiple products are not ordered with a single order.
c) Order slips correspond to delivery slips on a one-to-one basis.
d) The identical product is purchased from a signle supplier.

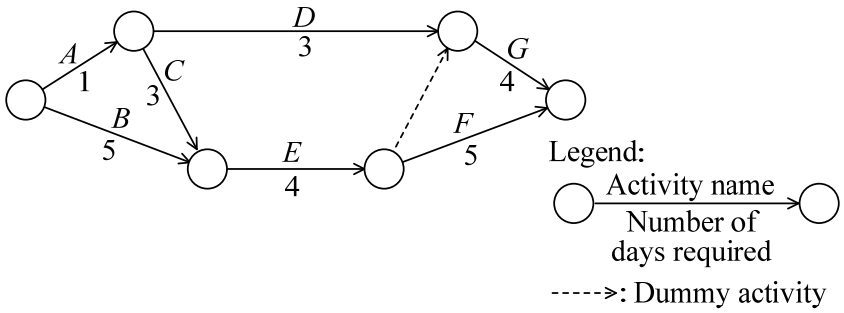
Q52. Which of the following is the software development process model that aims to achieve a high degree of completion of a system by dividing the system into some subsystems and repeating the development cycle for each subsystem in consideration of minimizing the risk in each cycle?

a) Evolutional model
b) Incremental model
c) Spiral model
d) Waterfall model

Q53. Which of the following is the most appropriate description concerning maintenance management that is to be planned for the development environment of an embedded system used during the development of a product?

a) It is necessary that the development environment leased from a rental company be always maintained under the responsibility of the rental company.
b) It is necessary to maintain the development environment by updating it to reflect the latest status, even if it is not frequently used.
c) It is necessary to maintain the development environment such as through periodic operational checks regardless of usage frequency.
d) It is not necessary to maintain the development environment after the commercialization of the product because the environment is not used again.

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



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

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

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

a) 18 b) 24 c) 30 d) 32

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

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

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

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

Q58. According to the ISO/IEC 20000 series, which of the following has the objective that aims to minimize disruption to the business by proactive identification and analysis of the cause of incidents and by managing problems to closure?

a) Business relation management
b) Change management
c) Incident management
d) Problem management

Q59. Which of the following is a service delivery process that is defined, agreed, recorded, and managed in IT service management?

a) Quality management
b) Risk management
c) Schedule management
d) Service level management

Q60. When there are several business systems available in a company, which of the following is the most appropriate method for access control?

a) Based on the name list of the new employees, the registration of all users is performed beforehand in all business systems.
b) In order to promptly respond to the change in the person in charge of a business operation, a common user ID is used for each business group.
c) Irrespective of the user's job title, the appropriate access rights are set in each business system on the basis of the user's job role.
d) When staff reassignment occurs frequently, the access rights are changed all at once at the beginning of the year.

Q61. When an audit is performed on the reliability of programming, which of the following is the most appropriate item to be reported as a finding?

a) A third party other than the programmer who creates the program performs the integration test.
b) The programmer performs programming based on the program design specifications.
c) The programmer selects a subset of unit test items from all the program logic paths on a sampling basis.
d) The programming team leader records and stores the execution results of the unit test.

Q62. When a department that outsources system development must undergo a system audit concerning "progress management" of the outsourcing partner, which of the following is an appropriate set of materials that should be submitted?

a) Business reports received periodically from the outsourcing partner, and documents showing the verification result of the business reports
b) Documents clearly specifying the method of acceptance inspection of deliverables
c) Documents clearly specifying the method of collection and disposal of data and other materials
d) Documents indicating that software is deposited with a third party (escrow agent)

Q63. In a system audit, which of the following acts as audit evidence?

a) Findings described in the audit report by the audit team
b) Individual audit plans created by the audit team
c) Minutes of the meeting held by the audit team to collect the audit opinions
d) System operation records obtained by the audit team from the audited department

Q64. When an information strategy is developed, which of the following is an item that must always be made consistent with the strategy?

a) Medium and long-term management plans
b) New emerging information technologies
c) The annual plan of the information systems department
d) The improvement plan of a mission-critical system

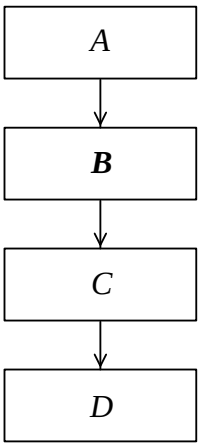
Q65. Which of the following is an improvement index in supply chain management?

a) Ratio of increase in number of loyal customers
b) Ratio of prevention of drop in unit sales price
c) Ratio of reduction in dead stock
d) Ratio of reduction in overtime

Q66. Which of the following is provided by an ASP (Application Service Provider)?

a) A service in which a facility equipped with high-speed lines and earthquake-resistant equipment owned by the provider is provided in order to install the server and communication equipment of the customer
b) A service in which an external provider collectively undertakes business operations such as general affairs, personnel affairs, accounting, and payroll calculation that are performed within the customer's organization
c) A service in which some of the servers owned by the provider are lent to a customer and used like the customer's own servers
d) A service in which the functions of a general-purpose application system are provided to several customers via a network

Q67. When an information system is procured according to the procedure shown in the figure below, which of the following is to be inserted into blank *B*?



The buyer specifies the purpose of computerization and the details of business operations, and requests the supplier to provide information.

The buyer specifies the system to be procured and the procurement conditions, and requests the submission of a proposal.

The buyer decides the supplier, based on the proposal and capabilities.

The role and responsibility sharing between the buyer and the supplier is confirmed mutually in writing.

a) Conclusion of a contract
b) RFI
c) RFP
d) Selection of supplier

Q68. Which of the following is an explanation of core competence management?

a) A flat organization structure with minimal hierarchical layers is maintained to accelerate decision making.
b) Comparative analysis with other successful companies is performed to drive management innovation.
c) Knowledge scattered across the company is shared to improve the overall problem solving capability.
d) Management is centered on proprietary know-how and technology that are not easy for other companies to imitate.

Q69. In the product life cycle, which of the following is the stage where the market begins to understand the value of the product, and both product lines and sales channels need to be expanded?

a) Introduction stage
b) Decline stage
c) Growth stage
d) Maturity stage

Q70. A SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis is a technique that is used to identify and evaluate the *internal* and *external* factors that are *helpful* or *harmful* to achieving the objectives of business organizations or projects. Which of the following is the appropriate matrix that shows a combination of those factors?

a)

	Helpful	Harmful
Internal	Opportunities	Weaknesses
External	Strengths	Threats

b)

	Helpful	Harmful
Internal	Strengths	Threats
External	Opportunities	Weaknesses

c)

	Helpful	Harmful
Internal	Strengths	Weaknesses
External	Opportunities	Threats

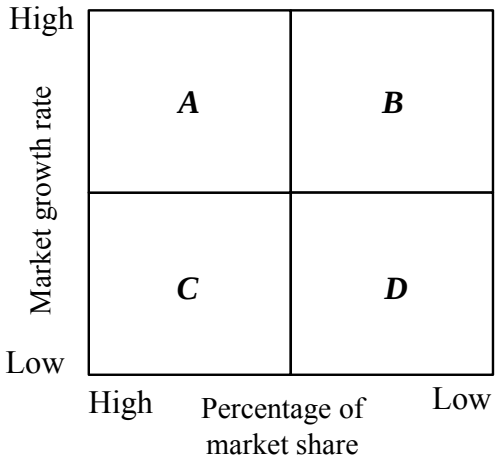
d)

	Helpful	Harmful
Internal	Strengths	Weaknesses
External	Threats	Opportunities

Q71. Which of the following is an appropriate form of transaction where one company (i.e., the bidder) gains a decisive share of the basic equity of another target business?

a) Acquisition
b) Business alliance
c) Capital participation
d) Merger

Q72. Product Portfolio Management (PPM) is a method for analyzing the positioning of a product within the market and reviewing the resource allocation. As shown below, PPM 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 is the appropriate quadrant in which a product referred to as "cash cow" is categorized?



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

Q73. Which of the following is an appropriate explanation of direct telemarketing?

a) A type of direct marketing that involves not only selling products on the phone but also asking for donations or opinions
b) A type of direct marketing that uses electronic mail as a means of communicating commercial or fund-raising messages to potential or current customers
c) A type of direct marketing that uses short message service to send customers sales alerts, links to website updates, appointment or delivery reminders, or personalized messages
d) A type of direct marketing where a company makes efforts to market products and services and to build customer relationships over the Internet

Q74. Which of the following is an appropriate example of the effective utilization of RFID?

a) Identification and control of humans or objects by using a small wireless chip
b) Information entry by scanning a digital code printed on paper through a reader
c) Short-range data communication using infrared rays
d) Voice data communications between a cell phone and headphones

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

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

Q76. Which of the following is an explanation of a CIO?

a) An executive who is positioned to perform investment decision-making, funding, accounting, and financial reporting
b) An executive who is positioned to plan and execute strategies including information management and information system control
c) An organization that is positioned to approve or reject the change requests made to the system
d) An organization that is positioned to manage multiple projects in a consolidated manner

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

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

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

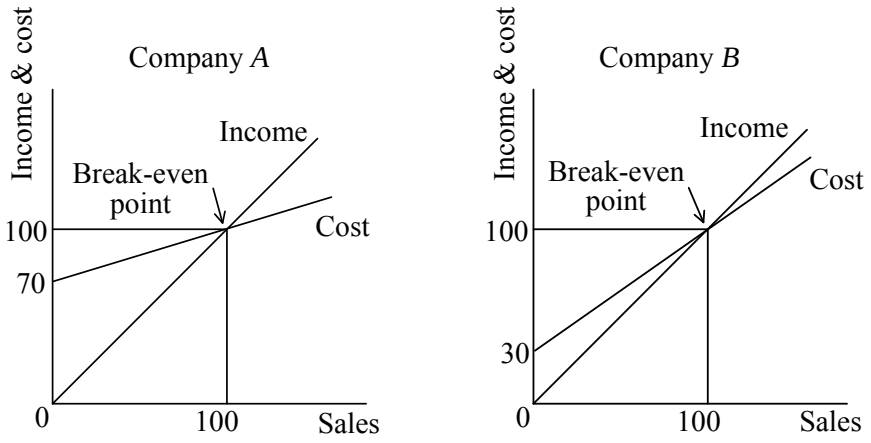
a) Brainstorming
b) Delphi method
c) Focus group
d) Tree diagram method

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

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

a) 402 b) 938 c) 1220 d) 1340

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



a) Both companies have the same break-even point and fixed cost, so the profit and loss is also equal as long as the sales are equal.

b) The break-even points of both companies are equal, so the sales necessary for making equal profits are also equal for both companies.

c) The variable cost ratio of Company *A* is lower than Company *B*, and therefore, when the sales above the break-even point are equal, the profit of Company *A* is higher than Company *B*.

d) When the sales of both companies above the break-even point are equal, Company *B* that has a lower fixed cost makes a higher profit than Company *A*.