



April 2016

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]

Q1	<input type="radio"/> a	<input checked="" type="radio"/> b	<input type="radio"/> c	<input type="radio"/> d
-----------	-------------------------	------------------------------------	-------------------------	-------------------------

**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 following notational conventions are applied as shown in the tables.

I. Standards

Notation in the exam questions	Name of the standard
ISO 9001	ISO 9001:2008
ISO 14001	ISO 14001:2004
ISO/IEC 20000-1	ISO/IEC 20000-1:2011
ISO/IEC 20000-2	ISO/IEC 20000-2:2012
ISO/IEC 25010	ISO/IEC 25010:2011
ISO/IEC 27001	ISO/IEC 27001:2005
ISO/IEC 27002	ISO/IEC 27002:2013
ISO/IEC 12207	ISO/IEC 12207:2008
ISO 21500	ISO 21500:2012
ITIL	ITIL 2011 edition
PMBOK	PMBOK Guide – Fifth Edition

II. Logic Circuit

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

Company names or product names mentioned in the examination questions are the trademarks or registered trademarks of their respective companies or organizations. The symbol ® or ™ is not used within.

Q1. Which of the following decimal values is equivalent to a hexadecimal fraction 0.B1?

- a) $2^0 + 2^{-2} + 2^{-3} + 2^{-7}$ b) $2^0 + 2^{-3} + 2^{-4} + 2^{-8}$
c) $2^{-1} + 2^{-3} + 2^{-4} + 2^{-7}$ d) $2^{-1} + 2^{-3} + 2^{-4} + 2^{-8}$

Q2. Which of the following is a solution for the logical equation on variable X below? Here, A , B , and C are logical constants; the operators “+”, “ \cdot ”, and “ $\bar{}$ ” denote logical OR, logical AND, and NEGATION, respectively.

$$A \cdot B + X + B \cdot C = A \cdot B + \bar{A} \cdot C$$

- a) $A \cdot C$ b) $\bar{B} \cdot \bar{C}$ c) $\bar{B} + C$ d) $\bar{A} \cdot C$

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

- a) $1/5$ b) $7/15$ c) $3/5$ d) $13/15$

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

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

Q5. With a randomized version of the quicksort algorithm, where the pivot is selected randomly, which of the following shows the average-case and the worst-case time complexities? Here, $O()$ is used to denote the order of growth rate.

	Average-Case Time Complexity	Worst-Case Time Complexity
a)	$O(n \log n)$	$O(n)$
b)	$O(n \log n)$	$O(n^2)$
c)	$O(n^2 \log n)$	$O(n)$
d)	$O(n^2 \log n)$	$O(n^2)$

Q6. There is a language defined by a context-free grammar with the production rules below:

$$\begin{aligned}E &\rightarrow T + E \mid T \\T &\rightarrow F * T \mid F \\F &\rightarrow (E) \mid C \\C &\rightarrow 0 \mid 1 \mid 2 \mid 3 \mid 4 \mid 5 \mid 6 \mid 7 \mid 8 \mid 9\end{aligned}$$

In this grammar, non-terminals are E, T, F, and C; terminals are parentheses, plus sign, asterisk, and numbers; E is the start symbol. Which of the following shows that the expression $7 + 3 * (6 + 4)$ is a sentence of this language?

- | | |
|------------------------------------|--------------------------------|
| a) $E \rightarrow 7 + 3 * (F + T)$ | b) $E \rightarrow 7 + 3 * E$ |
| c) $E \rightarrow 7 + 3 * (T)$ | d) $E \rightarrow 7 + T * (E)$ |

Q7. Let A be an array of integers of size 10, whose i^{th} entry is represented by $A[i]$ for $i = 0$ to 9, and its initial value is 0. For a positive integer k , the rules below determine the entry in which the value k is stored. When the integers 16, 43, 73, 24, and 85 are processed in this order, in which entry is the last value 85 stored? Here, $x \bmod y$ represents the remainder after the division of x by y .

[Rules]

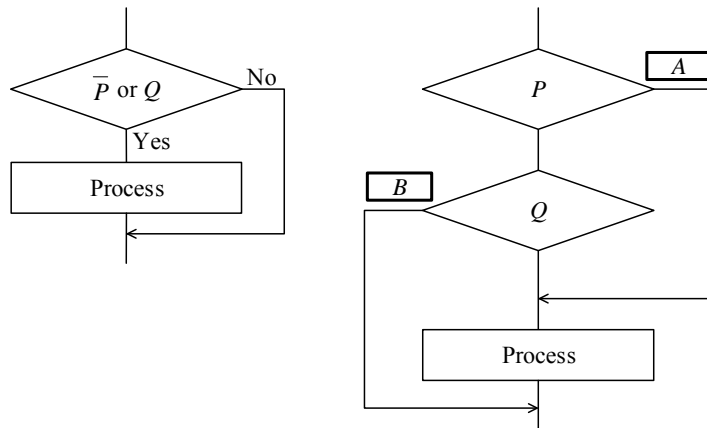
- (1) If $A[k \bmod 10] = 0$, then store k in $A[k \bmod 10]$.
- (2) Otherwise, if $A[(k + 1) \bmod 10] = 0$, then store k in $A[(k + 1) \bmod 10]$.
- (3) Otherwise, if $A[(k + 4) \bmod 10] = 0$, then store k in $A[(k + 4) \bmod 10]$.
- (4) Otherwise, discard k .

- | | | | |
|-----------|-----------|-----------|-----------|
| a) $A[3]$ | b) $A[5]$ | c) $A[6]$ | d) $A[9]$ |
|-----------|-----------|-----------|-----------|

Q8. Typical list data type implementations are either array based or pointer based. Which of the following describes a characteristic of array-based implementations?

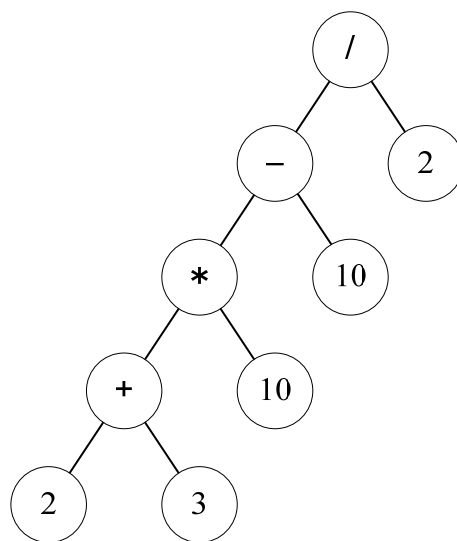
- a) In addition to space for each element in a list, space for a pointer to the next element is also required.
- b) Moving to the middle of a list takes an amount of time proportional to the number of elements, as it requires visiting all the entries from the beginning to the middle.
- c) Regardless of the actual number of elements in a list, insertion and removal of an element can be performed in a fixed time.
- d) Regardless of the actual number of elements in a list, some space may remain unused as the space for storing the maximum number of elements is pre-allocated.

Q9. To make the flowcharts below equivalent, which of the following combinations is appropriate for labels A and B ? Here, \bar{P} represents the negation of P .



	A	B
a)	No	No
b)	No	Yes
c)	Yes	No
d)	Yes	Yes

Q10. What is the value of the arithmetic expression resulting from an in-order traversal of the binary tree below?



- a) 11 b) 20 c) 27 d) 45

Q11. In a CPU with a four (4)-stage pipeline composed of fetch, decode, execute, and write back, each stage takes 10, 6, 8, and 8 ns, respectively. Which of the following is an approximate average instruction execution time in nanoseconds (ns) in the CPU? Here, the number of instructions to be executed is sufficiently large. In addition, the overhead for the pipelining process is negligible, and the latency impact from all hazards is ignored.

- a) 6 b) 8 c) 10 d) 32

Q12. Which of the following is the computer architecture where a processor executes the same instruction on multiple data?

- a) MIMD b) MISD c) SIMD d) SISD

Q13. Which of the following is an addressing mode that provides an offset to the program counter (PC) content to determine the address of the operand?

- a) Immediate addressing mode b) Indirect addressing mode
c) Register indirect addressing mode d) Relative addressing mode

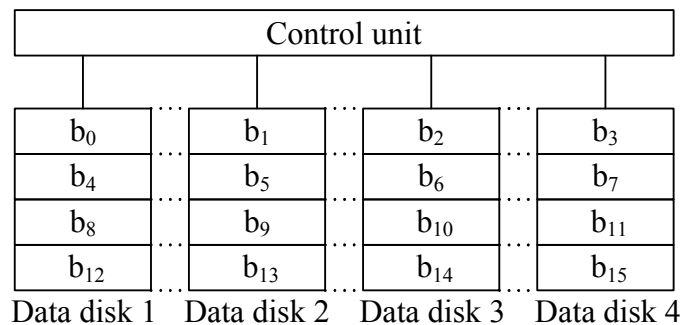
Q14. Which of the following is used to translate a logical address generated by a CPU into a physical address?

- a) Direct Memory Access Controller (DMAC) b) Memory Address Register (MAR)
c) Memory Management Unit (MMU) d) Translation Lookaside Buffer (TLB)

Q15. Which of the following is an appropriate description concerning cache memory?

- a) In a multi-tasking environment, a cache memory maintains data from each task to improve performance.
b) Multiprocessors where each has a cache memory need to synchronize values within the cache to maintain coherency.
c) The operating system manages the data transfer between registers and a cache memory.
d) The speed and size of a cache memory are the only consideration when improving performance.

Q16. Which of the following is a technique of segmenting and storing data on multiple hard disks as shown in the figure? Here, b_0 through b_{15} show the sequence in which the data are stored to the data disks on a bit-by-bit basis.



- a) Blocking
- b) Disk cache
- c) Mirroring
- d) Striping

Q17. Which of the following is an appropriate description of throughput?

- a) Even if some idle time resulting from operator intervention between the end of a job and the start of the next job occurs in a system, throughput is not affected.
- b) Multi-programming contributes to reducing turnaround time, but is not useful in improving throughput.
- c) Spooling, which involves temporarily saving the output to a printer in a hard disk, is useful in improving throughput.
- d) Throughput is an index of CPU performance and is not affected by the I/O speed, overhead time, and other such factors.

Q18. Which of the following is the mean time between failures (MTBF) value of the entire system where unit A and unit B are connected in series and both units operate as one system? The MTBF value of unit A and unit B is 200 and 300 hours, respectively.

- a) 200
- b) 250
- c) 300
- d) 500

Q19. When the multiplicity of processing is increased in the virtual memory of a computer system, page-in and page-out operations occur very frequently, and the response speed of the system decreases suddenly. What is this phenomenon called?

- a) Memory compaction
- b) Overlay
- c) Roll-out
- d) Thrashing

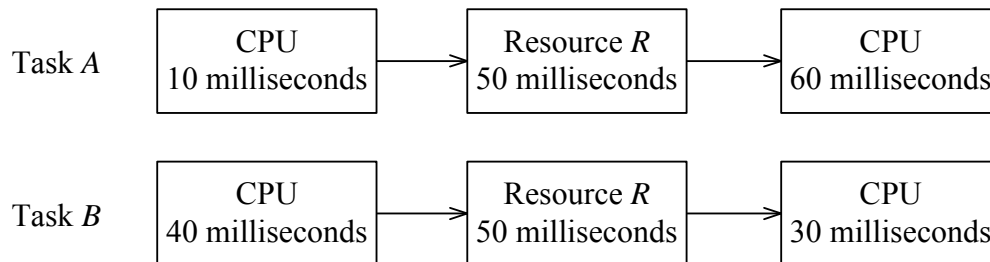
Q20. A company performs a full backup every Sunday night and differential backups every night other than Sunday night. If the failure occurs on Wednesday morning, which of the following backups is least needed to restore the system?

- a) The latest differential backups from Tuesday.
- b) The latest full and the latest differential backups from both Monday and Tuesday.
- c) The latest full and the latest differential backups from Tuesday.
- d) The latest full backups from Sunday.

Q21. Which of the following is an appropriate explanation for a non-preemptive scheduling method?

- a) A task cannot move to a running state until another task in the running state either moves to the waiting state by itself or finishes.
- b) Each time a new task becomes the ready state, a comparison is made for all tasks in the ready state from the standpoint of the remaining execution time, and the tasks are executed in an order starting from the shortest execution time.
- c) When a task becomes the ready state, a comparison is made between the priority of the task and that of the one in the running state at that time, and the task with the higher priority moves to the running state.
- d) When a task in the running state does not move to the waiting state within a predetermined time period, the task is interrupted, and the next task in the waiting queue moves to the running state.

Q22. There is a system composed of two (2) CPUs, and the CPU that is not in use is assigned to a task for which there is an execution request. When two (2) tasks *A* and *B* are run on this system, these tasks exclusively use a common resource *R*. The figure below shows the usage periods of the CPUs and resource *R* for tasks *A* and *B*, and the order in which the tasks are run. When the execution of both the tasks is started simultaneously, how much time, in milliseconds, is required until the completion of processing of both the tasks? Here, both the CPU and resource *R* are available when tasks *A* and *B* are started.

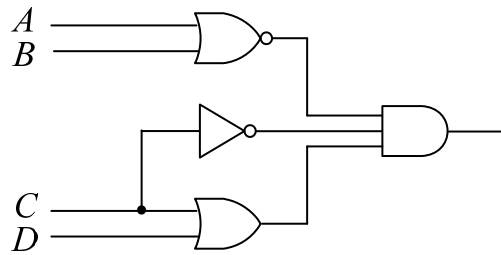


- a) 120 b) 140 c) 150 d) 200

Q23. According to the Open Source Definition by OSI (Open Source Initiative), which of the following is the appropriate description concerning open source licensing?

- a) The license allows any party to freely use, modify, and distribute a program. A royalty fee is required only if the program is redistributed commercially.
- b) The license allows authors to put usage restrictions on a program to prevent such program from being used in business activities.
- c) The license requires that all derivative works must be kept secret if the derivative works are based on an original program.
- d) The license requires that the source code of a program must be made available either for free or at a reasonable reproduction cost.

Q24. Which of the following is a logical (or Boolean) expression that is equivalent to the logic circuit shown below? Here, “+” is the logical sum, “.” is the logical product, and “ \overline{X} ” is the negation of X.



- a) $\overline{A \cdot B \cdot C \cdot C \cdot D}$ b) $(\overline{A} + \overline{B}) \cdot \overline{C} \cdot (C + D)$
c) $\overline{A \cdot B} + \overline{C} + D$ d) $\overline{A} \cdot \overline{B} \cdot \overline{C} \cdot D$

Q25. Which of the following is a sequential circuit that has two (2) stable states?

- a) Adder circuit b) Flip-flop
c) NAND gate d) NOR gate

Q26. Which of the following is an appropriate input for a common anode seven-segment display to display a character shown as output? Here, A represents the most significant bit (MSB) and G represents the least significant bit (LSB).

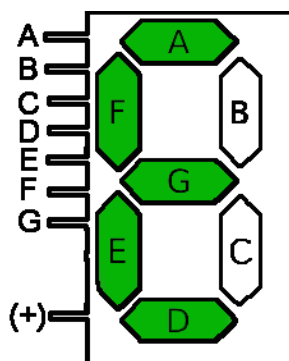


Figure: Display of character “E” in a seven-segment display

- a) 0110000 b) 0000110 c) 1001111 d) 1111001

Q27. Which of the following is more suitable for outline fonts than for bitmap fonts?

- a) To display single-byte and double-byte characters at the same time
- b) To display characters as quickly as possible
- c) To display characters in monospace
- d) To enlarge characters by a given scale factor

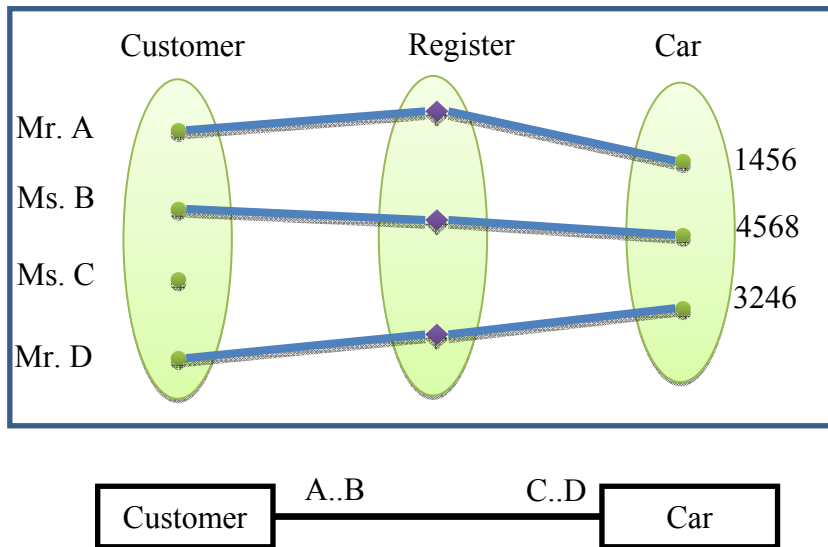
Q28. Which of the following is an explanation of texture mapping?

- a) It is a process by which surfaces that should not be visible to the user are prevented from being rendered.
- b) It renders a scene by calculating reflection, refraction, and transparency from the light source.
- c) It renders shadows based on light sources and shapes of objects when a scene is realized.
- d) It represents surface characteristics by pasting an image onto the surface of a three-dimensional object.

Q29. Which of the following is an appropriate purpose for adopting a three-layer schema architecture for DBMS?

- a) To avoid making any impact on an application program even if the physical storage structure of data is changed
- b) To derive a new table from a source table through a relational operation as if the new table actually existed
- c) To restrict programming languages such that the application program and DBMS are linked closely
- d) To use an interactively used SQL statement from an application program as well

Q30. Which is the most suitable multiplicity of the “Register” relationship between “Customer” entity and “Car” entity that matches the following diagram? Here, “A..B” and “C..D” respectively indicate the minimum and maximum possible participations to the relationship.



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

Q31. Which of the following is an appropriate method used to remove data redundancy in relational database systems?

- a) Entity-relationship
- b) Functional dependency
- c) Hierarchical
- d) Normalization

Q32. In a relation schema $R = (A, B, C, D, E)$, the following functional dependencies are held:

$A \rightarrow BC$

$CD \rightarrow E$

$B \rightarrow D$

$E \rightarrow A$

Which of the following is a combination of two candidate keys for R ?

- a) A and E b) B and C c) B and D d) C and D

Q33. Which of the following is the main purpose of transaction support in a database management system?

- a) To ensure that either all the updates corresponding to a given transaction are made or none of them is made
- b) To ensure that only authorized users can access the database
- c) To help users update data by providing a graphical user interface
- d) To provide an accessible catalog in which descriptions of data items are stored

Q34. Which of the following is a data link layer function that enables receivers to control the amount of data to be received from the senders?

- a) Congestion control
- b) Error control
- c) Flow control
- d) Media access control

Q35. TCP/IP is a layered set of communication protocols consisting of the Network Interface layer, the Internet layer, the Transport layer, and the Application layer. Which of the following is a combination of the Transport layer protocols?

- a) DHCP, TCP
- b) HTTP, UDP
- c) IP, TCP
- d) TCP, UDP

Q36. Which of the following is responsible for converting a domain name to a corresponding IP address?

- a) DHCP server
- b) DNS server
- c) IMAP server
- d) SMTP server

Q37. Which of the following is an appropriate description of Transmission Control Protocol (TCP)?

- a) It ensures reliability by retransmission of data segments if any of them is lost.
- b) It is an end-to-end protocol but does not have any mechanism for congestion control.
- c) It is connectionless and uses a checksum to ensure the integrity of the data.
- d) It is connection oriented but cannot operate if packets are received out of order.

Q38. On the Internet, sometimes when one tries to load a Web page by specifying a URL like <http://www.jitec.ipa.go.jp/>, the page does not show up and an error page is shown instead. However, one can browse this page correctly by specifying its IP address like this: <http://118.151.146.137/>. Which of the following TCP/IP layer is responsible for this problem?

- a) Application layer
- b) Internet layer
- c) Network Interface layer
- d) Transport layer

Q39. Which of the following is an appropriate method of authenticating users by using a password?

- a) The hash value of the user ID corresponding to the password is registered, and the password entered during authentication is converted by the hash function and compared.
- b) The hash value of the user ID corresponding to the password is registered, and the user ID entered during authentication is converted by the hash function and compared.
- c) The password is converted to a hash value and registered, and the password entered during authentication is converted by the hash function and compared.
- d) The password is converted to a hash value and registered, and the user ID entered during authentication is converted by the hash function and compared.

Q40. When malware that has made a successful intrusion into a PC communicates with a command-and-control server on the Internet, which of the following is a reason for using the TCP port number 80 as the destination port in most cases?

- a) As this port is used for browsing websites, there is a high probability that communication is allowed by the firewall.
- b) As this port is used for browsing websites through the HTTPS protocol, there is a low probability that this port is detected by an intrusion detection system.
- c) As this port is used for name resolution of a domain name, there is a low probability that this port is detected by an intrusion detection system.
- d) As this port is used in a DNS zone transfer, there is a high probability that communication is allowed by the firewall.

Q41. Which of the following is a technique that is classified as social engineering?

- a) Acquiring a password by calling a user and pretending to be a system administrator
- b) Analyzing a password by using a round-robin attack tool
- c) Entering a system by using software vulnerabilities, such as a buffer overflow
- d) Entering a system from a back door created automatically by a virus infection

Q42. When Mr. A, who has a digital certificate, uses an e-mail to place an order with store *B*, he uses his own private key and digitally signs the e-mail. Store *B* then uses Mr. A's public key to confirm the signature. Which of the following can be achieved using this method? Here, only Mr. A can use his private key.

- a) It can be confirmed that store *B* is permitted to sell products to Mr. A.
- b) It can be confirmed that the order arriving at store *B* is an order from Mr. A.
- c) The order details sent from Mr. A to store *B* can be prevented from being leaked to third parties.
- d) The order sent from Mr. A can be made to arrive at store *B*.

Q43. Which of the following is an appropriate description of risk assessment?

- a) As the purpose of risk assessment is to prevent a future loss, referencing of data used in the past risk assessment is avoided.
- b) Risk assessment is implemented after a risk is identified and the budget for responding to the risk is decided according to the amount of loss.
- c) The implementation of risk assessment is avoided before the response to all risks identified beforehand is complete.
- d) The priority order of the response to risks is determined by the size of the risk based on the expected amount of loss and occurrence probability.

Q44. Which of the following is a description of measures against information leakage?

- a) A checksum is added to the data to be sent.
- b) A copy of the data backup medium is stored at a remote location.
- c) The contents of the hard disk of a notebook PC are encrypted.
- d) The hard disk in which data are stored is mirrored.

Q45. There is a network that is divided into three (3) segments, namely, an external segment, a demilitarized zone (DMZ), and an internal network by one (1) firewall. In the network, when a service for users is published on the Internet by using a system consisting of a Web server and a database (DB) server containing critical data, which of the following is the most appropriate method of server installation for protecting important data from unauthorized access from the Internet? Here, only a specific protocol is allowed for communication between the external segment and the DMZ, and between the DMZ and the internal network by the firewall, and communication between the external segment and the internal network is not allowed.

- a) The Web server and the DB server are installed in an internal network.
- b) The Web server and the DB server are installed in the DMZ.
- c) The Web server is installed in an external segment, and the DB server is installed in the DMZ.
- d) The Web server is installed in the DMZ, and the DB server is installed in an internal network.

Q46. Which of the following is a purpose of using a WAF (Web Application Firewall)?

- a) An attack on a vulnerability attributed to a Web server and a Web application is blocked.
- b) The entry of a worm into a Web server is detected, and the worm is automatically exterminated.
- c) The security hole of a Web server is identified, and an OS security patch is applied.
- d) The vulnerabilities and inconsistencies of a Web application are detected during the integration test of content development of the Web server.

Q47. Which of the following is an explanation of the pattern-matching method used by antivirus software?

- a) A virus is detected by collating information with the checksum of a file.
- b) A virus is detected by comparing a file before and after infection, and examining whether any change has been made to the file.
- c) A virus is detected by monitoring an abnormal phenomenon that is caused by a virus in a system.
- d) A virus is detected through comparison with the signature of an already-known virus.

Q48. Which of the following can be implemented with the functions of HTTPS (HTTP over SSL/TLS)?

- a) Blocking of communication aside from TCP port numbers 80 and 443
- b) Encryption of communication between a Web server and a browser
- c) Restriction of unauthorized access to a Web server through packet filtering in the Network Interface layer
- d) Prevention of an attack on a Web server from an SQL injection

Q49. According to ISO/IEC 25010 (Systems and software engineering — Systems and software Quality Requirements and Evaluation (SQuaRE) — System and software quality models), which of the following is an appropriate quality characteristic that means the degree to which a product or system provides functions that meet stated and implied needs when used under specified conditions?

- a) Functional suitability
- b) Performance efficiency
- c) Reliability
- d) Usability

Q50. In unit testing, which of the following activities is part of “white box testing”?

- a) Boundary value analysis
- b) Condition testing
- c) Equivalence partitioning
- d) Orthogonal array testing

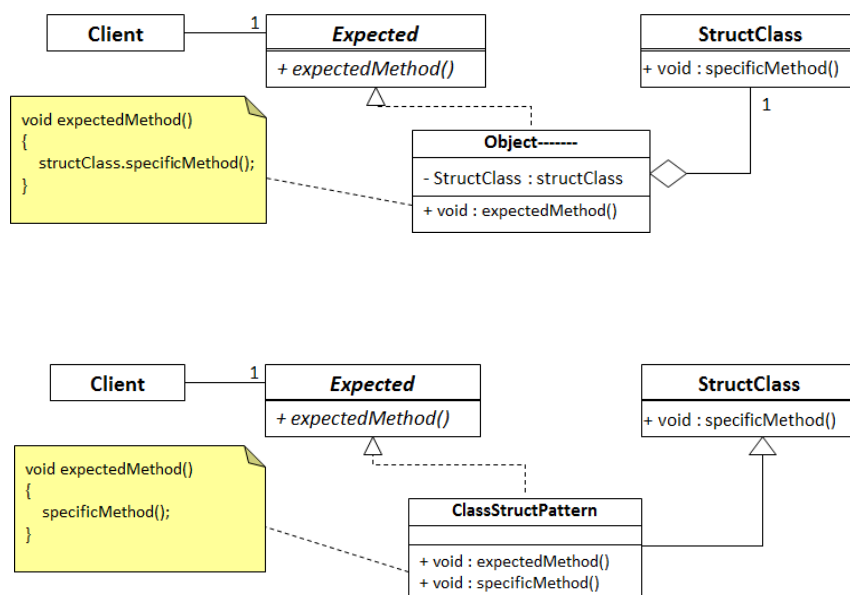
Q51. Which of the following is a mechanism that allows several subclasses of a common parent class to override the same method with different behaviors?

- a) Aggregation
- b) Composition
- c) Inheritance
- d) Polymorphism

Q52. The integration test for a software that is composed of a set of modules arranged in a hierarchical structure is performed from a low-level module. In such a case, which of the following is a test module used as a substitute for a higher level module?

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

Q53. Which of the following is a structural design pattern that allows classes with incompatible interfaces to work together and that can be implemented in either form in the two diagrams below?



- a) Adapter
- b) Factory
- c) Iterator
- d) Singleton

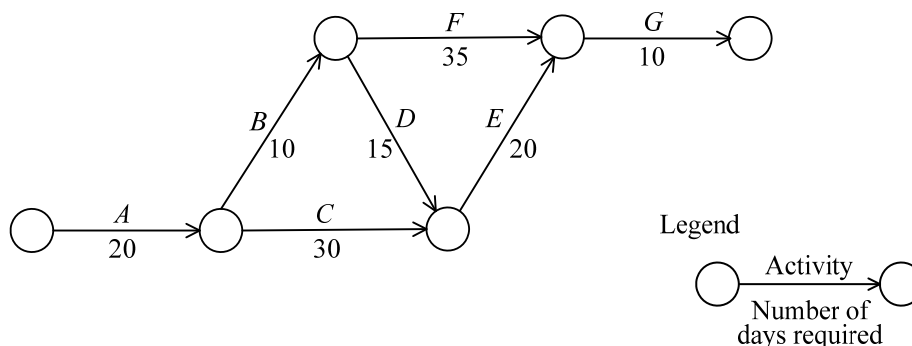
Q54. Which of the following is a term for the process of generating a Unified Modeling Language (UML) class diagram from a program?

- a) Backtracking
- b) Forward engineering
- c) Re-engineering
- d) Reverse engineering

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

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

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



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

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

- a) The project completion date is accelerated by 1 day.
- b) The project completion date is delayed by 1 day.
- c) The project completion date is delayed by 3 days.
- d) The project completion date is neither accelerated nor delayed.

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

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

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

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

Q59. According to ISO/IEC 20000-1 (Information technology — Service management — Part 1: Service management system requirements), which of the following is an appropriate description of problem management?

- a) It is a process used to determine the effect of a change, assess its impact or priority, and then approve or reject it.
- b) It is a process used to identify the root cause of an incident, minimize the adverse impact of the incident, and prevent it from occurring again.
- c) It is a process used to provide a single point of contact between IT service users and the service provider.
- d) It is a process used to restore normal service operations as soon as possible to minimize the adverse impact of an incident.

Q60. Which of the following term indicates the amount of data transactions allowed to be lost after a downtime occurs?

- a) Maximum Tolerable Outage (MTO)
- b) Recovery Point Objective (RPO)
- c) Recovery Time Objective (RTO)
- d) Service Delivery Objective (SDO)

Q61. In the Information Technology Infrastructure Library (ITIL), lowering an indicator that represents maintainability is given as an example of a key performance indicator (KPI) for availability management. Which of the following corresponds to this indicator?

- a) Mean time between failures
- b) Mean time between service incidents
- c) Mean time to restore services
- d) The number of interruptions within a fixed period

Q62. Among the items to be written into an audit report by a system auditor, which of the following deviates from the scope of work of an auditor?

- a) Judging the urgency of improvements
- b) Ordering improvements
- c) Pointing out improvements
- d) Recommending improvements

Q63. When software asset management is audited, which of the following is the most appropriate point to be checked?

- a) Checking to see whether compatibility with existing systems is evaluated at the time of installation
- b) Checking to see whether evidence, such as a software license certificate, is properly retained
- c) Checking to see whether failures are localized through database partitioning or other methods
- d) Checking to see whether the organizational and functional structure of the software provider is taken into consideration

Q64. Which of the following is subject to system audits that evaluate and verify internal control related to IT?

- a) The methods for ensuring accuracy in the processes of input and update of the database being done by the sales department
- b) The process of creation of a mid-term business plan being led by the business planning department
- c) The results of employee personnel evaluations being led by the personnel department
- d) The status of production equipment review being conducted by the manufacturing department for the purpose of reducing defects

Q65. Which of the following is an appropriate sequence of procedure for creating a business model?

- A. Associating a business process with an existing organization
 - B. Clarifying a business process
 - C. Associating a business process with an information system
 - D. Clarifying a data class (information model)
 - E. Associating a business process with a data class
-
- a) $B \rightarrow D \rightarrow C \rightarrow E \rightarrow A$
 - b) $B \rightarrow D \rightarrow E \rightarrow C \rightarrow A$
 - c) $D \rightarrow B \rightarrow C \rightarrow E \rightarrow A$
 - d) $D \rightarrow B \rightarrow E \rightarrow C \rightarrow A$

Q66. Which of the following is an appropriate description of cloud computing?

- a) It is a collection of computer resources from multiple locations designed to reach a common goal.
- b) It is a field of computer science that studies distributed systems in which components located on networked computers communicate and coordinate their actions by passing messages.
- c) It is a model for enabling ubiquitous, convenient, on-demand access to a shared pool of configurable computing resources.
- d) It is a service provisioning model in which a service provider makes computing resources and infrastructure management available to the customers as needed and charges them for a specific usage rather than a flat rate.

Q67. Which of the following is an appropriate combination of layers managed by vendors when using IaaS?

- a) Middleware, Servers, Storage, Networking
- b) Middleware, Virtualization, Servers, Storage
- c) Operating system, Virtualization, Storage, Networking
- d) Virtualization, Servers, Storage, Networking

Q68. Which of the following is a work that is performed when nonfunctional requirements are defined?

- a) Clarifying flows of information (i.e., data) between functions constituting business operations
- b) Creating development criteria and standards based on programming language used in system development
- c) Defining the scope to be implemented as system functions
- d) Specifying the interface for exchanging information with other systems

Q69. Which of the following is an appropriate explanation of the “Question mark” product in the product portfolio management (PPM) matrix?

- a) It needs appropriate investments to maintain, although it has a large rate of market share and a high rate of market growth.
- b) It needs minimal investments to harvest owing to a large rate of market share and a low rate of market growth.
- c) It needs significant investments to nurture owing to a small rate of market share and a high rate of market growth.
- d) It needs to be withdrawn owing to a small rate of market share and a low rate of market growth.

Q70. An apparel manufacturing and selling company is evaluated by value chain analysis. When activities in the company are classified into inbound logistics, productions, outbound logistics, sales/marketing, and services, which of the following is classified as inbound logistics?

- a) Activity to deliver clothes to a buyer
- b) Activity to order material, carry out inspections, and manage inventory
- c) Advertising activity
- d) Sewing activity

Q71. Which of the following is a price-setting method based on cost-plus pricing?

- a) On the assumption of a discount for a customer, the price is set by adding a profit margin from the beginning.
- b) On the basis of manufacturing cost and operating expenses, the price is set by incorporating a desired margin.
- c) The maximum profit and minimum risk are considered based on price analysis, and the price is set step by step.
- d) The price is set with an estimated competitive price on the market.

Q72. Which of the following is an explanation of consumer generated media (CGM)?

- a) It allows the customers of a company who want to join a mailing list to be registered to it and periodically delivers information via e-mail.
- b) It enables the distribution of digital content that an individual reader creates, and it enables sharing of such content between users.
- c) It integrates online shops offered by personal tenants, issues common loyalty points, and settles credit card payments on behalf of those tenants.
- d) It offers functions for trading goods in an auction format and works as an intermediary between consumers in personal trading.

Q73. Which of the following is an explanation of an e-marketplace?

- a) It is a method in which many sellers and buyers meet in a market set up on the Internet and trade directly without an intermediate distributor.
- b) It is a method that aims for overall optimization from material procurement to product distribution by sharing information such as ordering, inventory, sales, and logistics between a company and its business partners.
- c) It is a method that converts information concerning business transactions into a standardized format and electronically exchanges data such as estimation, ordering, shipment and delivery, and payment between companies.
- d) It is a method that runs a sales promotion campaign on the Internet and then draws customers to a real store to encourage them to make purchases.

Q74. Which of the following is an explanation of a smart grid?

- a) It is a system that aims at the utilization of recyclable energy, supply of stable electric power, and optimum demand adjustment through the integrated control of power generation and power consumption based on communication and information-processing technology.
- b) It is a system that can provide ideal health advice to each individual by performing analysis based on similar case reports, such as the result of health examinations and medication use.
- c) It is a system that can search for information on restaurants and entertainment, send and receive traffic information, and communicate the current position at the time of an emergency by using information-processing equipment installed in vehicles.
- d) It is a system that supports varied work styles by enabling mutual communication between workers with varied working styles, such as home-based employees and senior workers.

Q75. Products *A*, *B*, *C*, and *D* are to be introduced to the market. The table below shows the expected profit for each product with three (3) sales forecasts (High, Medium, and Low) that are estimated to occur in accordance with the probability in the table. Which of the following is the product that is expected to make the highest profit according to the expected value principle?

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

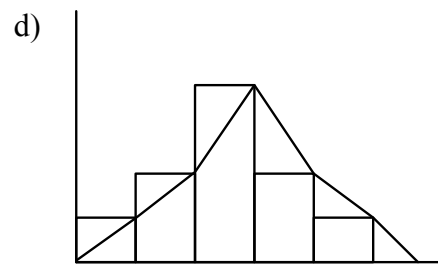
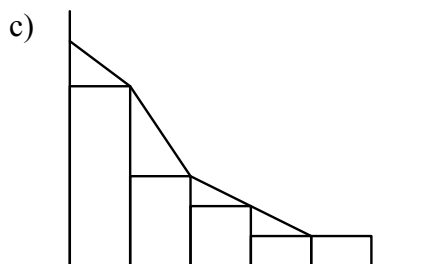
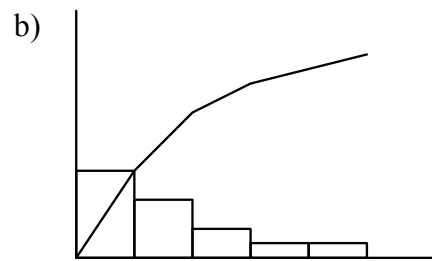
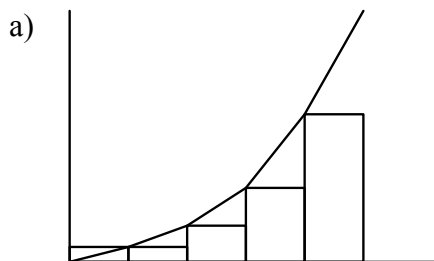
a) *A*

b) *B*

c) *C*

d) *D*

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



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

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

a) 64.50

b) 65.00

c) 65.40

d) 70.00

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

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

a) 7,080

b) 7,600

c) 7,800

d) 8,000

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

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

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

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