



October 2011

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 autumn Fundamental IT Engineer Examination conducted?

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

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

[Sample Answer]










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

Symbols commonly used in questions



Unless otherwise noted in each question, the following graphic symbols are used for logic gates and circuit components.

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

II. Circuit symbol

Graphic symbol	Explanation
	Resistor
	Earth (Ground)

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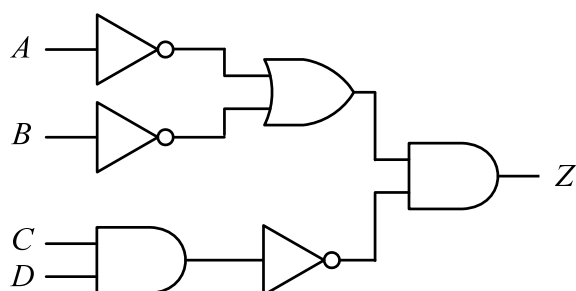
Q1. Which of the following is equivalent to the result of the arithmetic expression “ $753_8 - A6_{16}$ ”? Here, each number is written in radix notation; that is, the radix is represented by a subscript following the number.

- a) 101001101_2 b) 501_8 c) 325_{10} d) 135_{16}

Q2. Which of the following is equivalent to the logical expression “not ($A \leq B$ or $C < D$)”? Here, A , B , C , and D are variables, and the resulting values of “ $A \leq B$ ” and “ $C < D$ ” can be either 1 for true or 0 for false.

- a) $A < B$ and $C \leq D$ b) $A > B$ and $C \geq D$
c) $A < B$ or $C \leq D$ d) $A > B$ or $C \geq D$

Q3. Which of the following is a logical equation that is equivalent to the logic circuit shown below? Here, the “ \cdot ” is the logical product, “ $+$ ” is the logical sum, and \overline{X} is the negation of X .

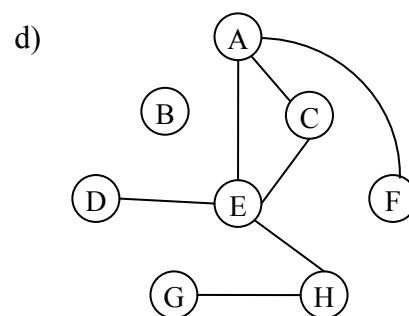
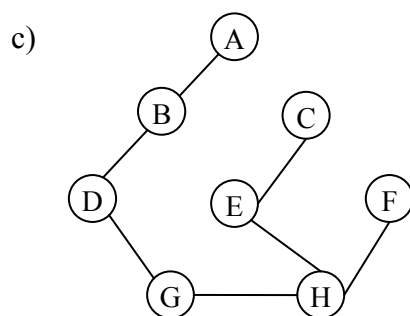
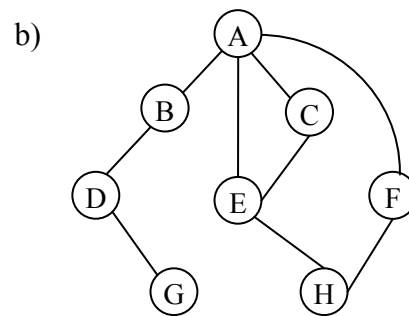
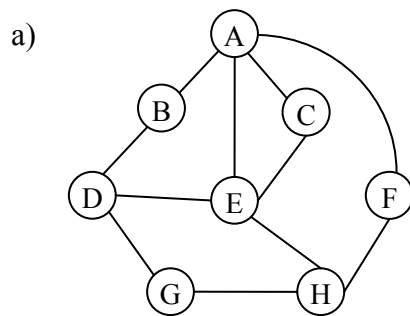


- a) $Z = (\overline{A+B}) + (\overline{C \cdot D})$ b) $Z = (\overline{A+B}) + (C \cdot D)$
c) $Z = (\overline{A \cdot B}) \cdot (\overline{C+D})$ d) $Z = (\overline{A \cdot B}) \cdot (C+D)$

Q4. An empty tank can be filled with water in 20 minutes by using Pipe A or in 30 minutes by Pipe B , and the tank filled with water can be emptied of water in 40 minutes by using Pipe C . When the three pipes A , B , and C work together, approximately how long (in minutes) does it take to fill the empty tank with water?

- a) 9.2 b) 10.0 c) 17.1 d) 24.0

Q5. Among network topologies represented using graphs, which of the following can be regarded as a spanning tree?



Q6. There is a two-dimensional array A with ten rows and ten columns. Each element in the array is two bytes long and is stored sequentially in memory in the customary “horizontal row first and vertical column second” order. When the first element $A(1,1)$ is stored in memory address 500 that is represented in hexadecimal, what is the memory address of $A(3,5)$ in hexadecimal?

- a) 518 b) 530 c) 548 d) 554

Q7. A leap year in the Gregorian calendar includes an extra day at the end of February. Any year that is divisible by 4 and does not end in 00 is a leap year. Years ending in 00 are leap years only if they are divisible by 400. How many leap years are there between 1895 and 2011 in the Gregorian calendar?

- a) 27 b) 28 c) 29 d) 30

- Q8.** There are two one-dimensional arrays A and B of size m and n respectively. Each array contains unique integer values sorted in ascending order. As shown in a sample figure below, these two arrays are merged into a single one-dimensional array C . Which of the following is the appropriate order of the computational complexity of this merge algorithm?

A :

3	6	15	17
---	---	----	----

B :

7	9	11	18	20
---	---	----	----	----

C :

3	6	7	9	11	15	17	18	20
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- a) $O(m)$ b) $O(n)$ c) $O(m+n)$ d) $O(m \times n)$
- Q9.** Which of the following is the expression that represents the result “ x ” obtained by the series of three-address instructions below? Here, in a three-address instruction, an instruction using three operands “ $c = a \text{ op } b$ ” is represented as “ $op(a, b, c)$ ”. “ op ” represents an operator. In the expression that represents the result “ x ”, priority decreases in order of $*$, $/$, $+$, and $-$.

$/ (c, d, w1)$
 $+ (b, w1, w2)$
 $/ (e, f, w3)$
 $- (w3, g, w4)$
 $* (w2, w4, x)$

- a) $b + c / d * e / f - g$ b) $b + c / d * (e / f - g)$
c) $(b + c / d) * e / f - g$ d) $(b + c / d) * (e / f - g)$

Q10. Which of the following is the characteristic of pipeline control?

- a) Each machine instruction is replaced with a combination of lower level microinstructions at the time of execution.
- b) In order to execute multiple instructions simultaneously, each instruction is assigned to a specific computing unit when the compiler generates an object code.
- c) Multiple instructions are executed simultaneously by dynamically deciding which computing unit to use at the time of executing each instruction.
- d) The processing of each instruction is divided into multiple stages in the processor, and thus multiple instructions are executed in parallel.

Q11. Which of the following is a method of creating a program that can use the instruction cache effectively?

- a) The frequently executed parts of the program are put together.
- b) The program is created so that the entire code can be executed evenly.
- c) The program is created so that the entire work area can be accessed evenly.
- d) The work areas to be accessed by the program are put together.

Q12. In a virtual storage computer system with cache memory, main memory, and disk storage, it takes 2 nanoseconds, 10 nanoseconds, and 10 milliseconds, on average, to access data available in the cache, main memory, and disk storage, respectively. When the cache hit ratio and the main memory hit ratio (after a cache miss) are 0.95 and 0.99 respectively, which of the following is the approximate average time in microseconds to access the necessary data?

- a) 4.7 b) 4.9 c) 5.0 d) 5.2

Q13. When the size of a still image is $1,600 \times 1,200$ pixels and each pixel has a 256-level gray scale ranging from 0 to 255, approximately how many megabytes are needed at least to store five such still images?

- a) 2 b) 4 c) 10 d) 15

Q14. Which of the following is a self-luminous display that is classified as a kind of light-emitting diode technology?

- a) CRT display
- b) Liquid crystal display
- c) OLED display
- d) Plasma display

Q15. Which of the following is an appropriate characteristic of a client/server system?

- a) A tightly-coupled system configuration is employed so that both client and server can work well together to access common resources.
- b) Databases installed within clients that provide services can be flexibly expanded with a change in the scale.
- c) The client works together with servers in order to provide services in response to many requests from servers.
- d) The server provides functions as services for the client and performs the intended application in cooperation with the client.

Q16. In a client/server system, which of the following is the most appropriate advantage of using “stored procedures” that are available to all clients and do not need to be replicated in each client?

- a) Data traffic between client and server can be reduced.
- b) Distributed processing can be easily implemented.
- c) Memory usage of both client and server can be reduced.
- d) The number of access to the database can be reduced.

Q17. Which of the following is the appropriate RAID configuration that provides disk striping at the block level rather than byte level and reserves one disk for parity information?

- a) RAID1
- b) RAID2
- c) RAID3
- d) RAID4

Q18. In an on-line real-time system, there occur transactions at a frequency of 20 times per second. Each of the transactions is completed after it performs the CPU processing once and the hard disk I/O processing four times. The I/O processing time of a hard disk drive is 40 milliseconds per each I/O, and the CPU processing time is negligibly small. When each hard disk drive is accessed evenly, at least how many hard disk drives are required for this transaction processing?

- a) 3 b) 4 c) 5 d) 6

Q19. In memory pool management for real-time systems that use memory resources of various sizes, which of the following is an appropriate characteristic of the fixed-length method in comparison with the variable-length method?

- a) Memory efficiency is high, and processing speed to allocate or release memory is slow and constant.
- b) Memory efficiency is high, and processing speed to allocate or release memory is slow and inconstant.
- c) Memory efficiency is low, and processing speed to allocate or release memory is fast and constant.
- d) Memory efficiency is low, and processing speed to allocate or release memory is fast and inconstant.

Q20. Which of the following is the method of improving the throughput of the entire system by transferring data from main memory to a low-speed output device via a high-speed auxiliary storage device?

- a) Blocking b) Paging
- c) Spooling d) Swapping

Q21. Which of the following is an appropriate description concerning the use of an application on a computer with virtual memory?

- a) A specially designed module for using virtual memory needs to be embedded in the application.
- b) In order to use virtual memory, each individual application needs to be configured to use virtual memory.
- c) Insufficient main memory causes excessive page faults during running the application and reduces the system throughput.
- d) Only those applications that are installed on the hard disk in advance can use virtual memory.

Q22. A certain computer system runs in a multi-programming environment using a non-preemptive algorithm. In this system, two processes *A* and *B* are stored in the process queue, and *A* has a higher priority than *B*. The table below shows estimated execution time for each process; for example, process *A* uses CPU, I/O, and then CPU sequentially for 30, 60, and 30 milliseconds respectively. Which of the following is the estimated time in milliseconds to complete both *A* and *B*? Here, the multi-processing overhead of OS is negligibly small. In addition, both CPU and I/O operations can be executed concurrently, but I/O operations for *A* and *B* cannot be performed in parallel.

Unit: millisecond

Process name	Execution time		
	CPU	I/O	CPU
<i>A</i>	30	60	30
<i>B</i>	45	45	—

- a) 120
- b) 135
- c) 165
- d) 210

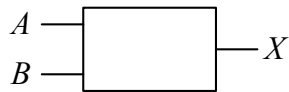
Q23. Which of the following is the appropriate CASE tool that is prepared especially for the software development phases including program design, programming, and testing?

- a) Component CASE tool
- b) Integrated CASE tool
- c) Lower CASE tool
- d) Upper CASE tool

Q24. Which of the following is a language processor that can be used to create a program suited to the processing objectives, based on necessary conditions, such as input, process, and output, specified by parameters?

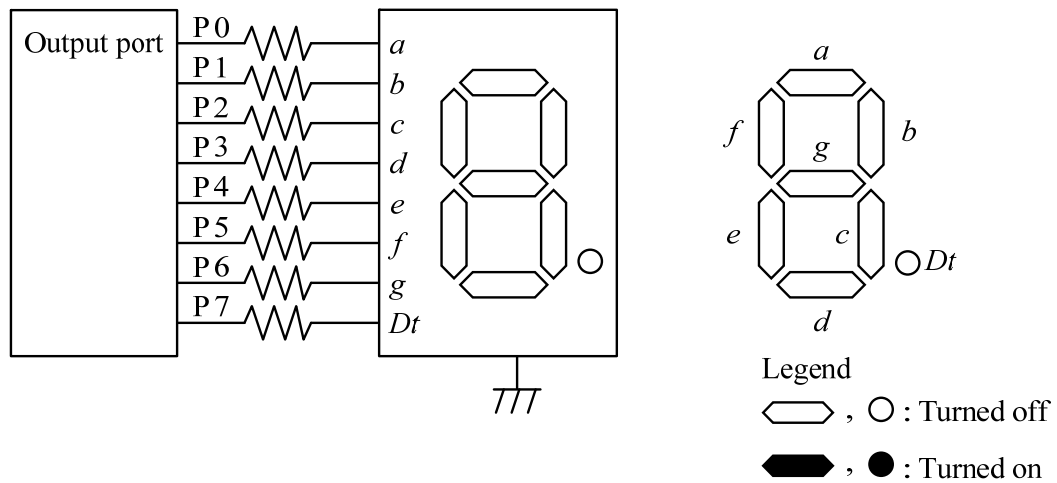
- a) Assembler b) Compiler c) Generator d) Interpreter

Q25. Which of the following is the appropriate logic circuit with two inputs and one output where the output X is 0 only when the two inputs A and B are both 1s?



- a) AND circuit b) NAND circuit
c) OR circuit d) XOR circuit

Q26. On a seven-segment LED lighting circuit as illustrated below, when 6D in hexadecimal is written out to the output port, which of the following is displayed? Here, P7 is the MSB (Most Significant Bit), and P0 is the LSB (Least Significant Bit). When 1 is written to a port, the corresponding LED segment is turned on.



- a)
- b)
- c)
- d)

Q27. Which of the following is an appropriate explanation of flash memory?

- a) Data can be written electrically only once.
- b) Data is rewritten (i.e., refreshed) within a given period of time.
- c) Data is written electrically and erased with ultraviolet light.
- d) Data is written or erased electrically and erased either all at once or in blocks.

Q28. When a GUI screen is designed for both users who are familiar with keyboard operation and users who are not, which of the following is an appropriate consideration to implement a user interface with good usability?

- a) Both mouse and keyboard interfaces should be provided for as many operations as possible, in order to increase operational flexibility.
- b) Frequently used operations should be executed by double-clicking a mouse button in lieu of an equivalent keyboard action.
- c) Important items, such as mandatory items, should be grouped together irrespective of the format of the data entry sheet, so as not to cause a lack of input.
- d) The number of items for keyboard entry should be minimized, and as many items as possible should be selected from the list by using a mouse, not a keyboard.

Q29. Which of the following is the image processing technique that is used for pasting a two-dimensional image such as a pattern or design onto the surface of a modeled object?

- a) Anti-aliasing
- b) Blending
- c) Ray tracing
- d) Texture mapping

Q30. Which of the following is a concept that is included in both E-R and Enhanced E-R diagrams?

- a) Cardinality
- b) Generalization
- c) Specialization
- d) Superclass

Q31. When the SELECT statement is executed to join two tables T1 and T2 as shown below, which of the following tables is created?

SELECT * FROM T1 INNER JOIN T2 ON T1.V < T2.X

T1

U	V
aa	1
bb	2
cc	3

T2

X	Y	Z
3	4	7
2	5	8
1	6	b

- a)

U	V	X	Y	Z
aa	1	3	4	7
- b)

U	V	X	Y	Z
aa	1	3	4	7
bb	2	3	4	7
- c)

U	V	X	Y	Z
aa	1	3	4	7
bb	2	2	5	8
cc	3	1	6	b
- d)

U	V	X	Y	Z
aa	1	3	4	7
aa	1	2	5	8
bb	2	3	4	7

Q32. Which of the following is the appropriate SQL command that can be used to undo any changes made to the database since the last commit?

- a) Close b) Drop c) Revoke d) Rollback

Q33. Which of the following is the primary purpose of locking a resource in database management systems?

- a) To improve overall performance
- b) To maintain data integrity
- c) To prevent risk of deadlocks
- d) To prevent unauthorized access

Q34. There is a database that manages user information (user database). From a viewpoint of security management, which of the following is the appropriate access privilege granted to an application program that searches the user database and displays the results? Here, the functions of privileges are described below.

[Functions of privileges]

- Read privilege: Records on the user database can be read.
- Update privilege: Records on the user database can be registered, updated, and deleted.
- Administrator privilege: Tables on the user database can be read, registered, updated, and deleted.

- a) Administrator privilege
- b) Read and update privileges
- c) Read privilege
- d) Update privilege

Q35. Which of the following is an appropriate set of characteristics of a data warehouse in comparison with traditional databases?

- a) Integrated, non-subject-oriented, volatile, and time-variant
- b) Integrated, subject-oriented, non-volatile, and time-variant
- c) Integrated, subject-oriented, volatile, and time-invariant
- d) Non-integrated, subject-oriented, volatile, and time-variant

Q36. Which of the following is the broadcast MAC address that is used by multiple protocols, such as ARP (Address Resolution Protocol) and RIP (Routing Information Protocol), in order to transmit data to all of the hosts on the local subnet?

- a) 00-00-00-00-00-00
- b) EE-FF-EE-FF-EE-FF
- c) F0-F0-F0-F0-F0-F0
- d) FF-FF-FF-FF-FF-FF

Q37. In an IPv4 environment, when the subnet mask “255.255.255.224” is used for a class C network, how many IP addresses including reserved or ineffective addresses can be assigned to subnets and hosts per subnet respectively?

Number of IP addresses		
	Subnet	Host
a)	8	32
b)	16	16
c)	16	32
d)	32	8

Q38. Which of the following is the appropriate layer of the OSI basic reference model that provides RPC (Remote Procedure Call) support, maintains the integrity of the connection between nodes, and controls data exchange?

- a) Application layer
- b) Network layer
- c) Presentation layer
- d) Session layer

Q39. Which of the following is a connectionless protocol that offers speed and low overhead as its primary advantage in the transport layer of the OSI basic reference model?

- a) ARP
- b) ICMP
- c) IP
- d) UDP

Q40. Which of the following is a protocol used by the ping command in order to verify that the communication link between source and destination is working in the TCP/IP network environment?

- a) ARP
- b) ICMP
- c) SMTP
- d) SNMP

Q41. Which of the following is an appropriate combination of information that a DHCP server dynamically provides for a client host to participate in the TCP/IP network?

- a) IP address, MAC address, default gateway address, and DNS server address
- b) IP address, MAC address, DNS server address, and routing information
- c) IP address, subnet mask, default gateway address, and DNS server address
- d) IP address, subnet mask, default gateway address, and routing information

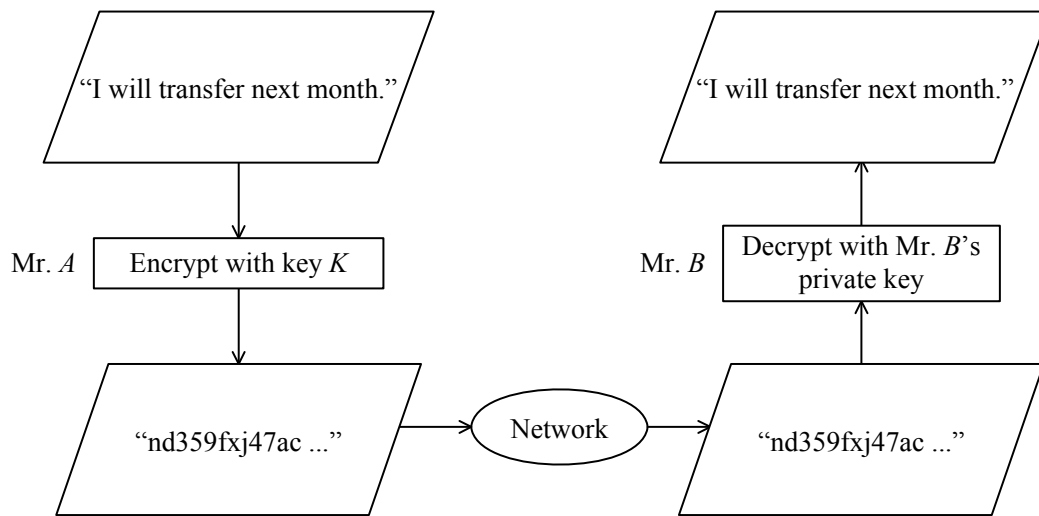
Q42. Which of the following is the appropriate combination that is defined as a socket address in TCP/IP network environments?

- a) IP address and port number
- b) IP address and socket number
- c) MAC address and port number
- d) MAC address and socket number

Q43. A message with a digital signature is received via e-mail. Which of the following can be checked by verifying the digital signature of the received message?

- a) The e-mail has not been leaked.
- b) The e-mail has not been relayed improperly.
- c) The message has not been falsified.
- d) The message has not been retransmitted on a specific date and time.

Q44. When Mr. *A* sends his confidential message to Mr. *B* by using public key cryptography as shown in the figure below, which of the following is the appropriate key *K* used for encryption?



- a) Common private key
- b) Mr. *A*'s private key
- c) Mr. *A*'s public key
- d) Mr. *B*'s public key

Q45. Which of the following is a technique of social engineering that obtains sensitive or confidential data by searching for residual data left in a computer after job execution or by examining discarded or stolen media such as printed papers, tapes, and discs?

- a) Salami technique
- b) Scavenging
- c) Sniffing
- d) Spoofing

Q46. Which of the following is a collection of infected computers that have been compromised without their owners realizing it and are being remotely controlled by attackers, in order to typically send spam or attack other computers?

- a) Botnet
- b) Honeynet
- c) Rootkit
- d) Web beacon

Q47. A packet filtering-type firewall is installed at the connection point between an in-house network and the Internet. When the firewall makes possible access to the Web server (port number 80) on the Internet from a PC on the in-house network, which of the following is the appropriate combination that is permitted by the packet filtering rules?

		Source	Destination	Source port number	Destination port number
a)	Outgoing packet	PC	Web server	80	1024 or more
	Response packet	Web server	PC	1024 or more	80
b)	Outgoing packet	PC	Web server	1024 or more	80
	Response packet	Web server	PC	80	1024 or more
c)	Outgoing packet	Web server	PC	80	1024 or more
	Response packet	PC	Web server	80	1024 or more
d)	Outgoing packet	Web server	PC	1024 or more	80
	Response packet	PC	Web server	80	1024 or more

Q48. Which of the following is a diagram used in UML2.0 for the purpose of depicting the interactions between the system, external systems, and users, or graphically describing who uses the system and in what ways the user expects to interact with the system?

- a) Component diagram
- b) Deployment diagram
- c) Sequence diagram
- d) Use case diagram

Q49. Which of the following is the most appropriate statement concerning the use of frameworks in software development?

- a) Compiled programs written with the use of a framework can run on different platforms without modification and re-compilation.
- b) Frameworks can shorten the development period for software projects by taking advantage of the work and experience of others.
- c) Programs using frameworks are generally faster because frameworks are typically optimized for performance and efficiency.
- d) Use of frameworks eliminates programming errors by promoting reuse of design and algorithms and allowing programmers to focus on application logic.

Q50. In software development, which of the following is the most appropriate primary purpose of performing a system test?

- a) To verify the functionality and operability of the deliverables principally on developer's own responsibility in the production environment
- b) To verify the functionality of each software component on programmer's own responsibility
- c) To verify the functionality of multiple software components as well as the interfaces between the components
- d) To verify the operational readiness and determine whether the software is acceptable to end users

Q51. In object-oriented design, which of the following is a way to form new classes using classes that have already been defined and to take over data structures and procedures of the pre-existing classes referred to as base classes?

- a) Delegation b) Encapsulation c) Inheritance d) Polymorphism

Q52. Which of the following is an activity to be performed in software architecture design within the development process?

- a) Clarifying the details of the processing executed by each line of the program
- b) Determining how to implement software requirements already defined
- c) Finalizing specifications based on customer opinions
- d) Organizing the requirements in charts to analyze them in step-by-step detail

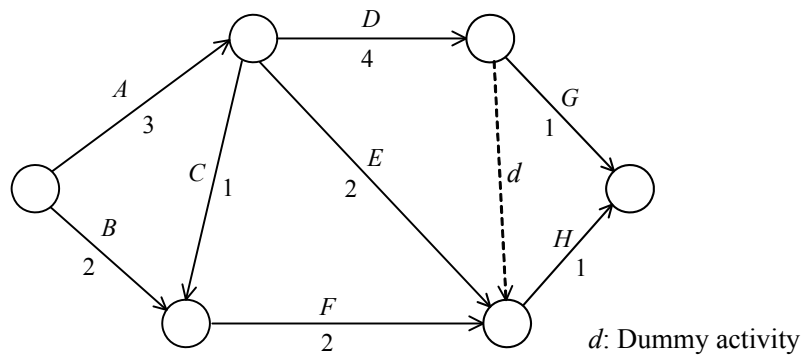
Q53. In a software test phase, when a bug control chart is used to evaluate test progress and software quality, which of the following is the most appropriate perspective to consider?

- a) If the cumulative total number of completed test items, the cumulative total number of bugs, and the number of unresolved bugs all remain unchanged, it is necessary to check if the software has a bug that is hard to resolve.
- b) If the test items are processed as scheduled and there are not so many unresolved bugs, software quality is considered to be high even when the cumulative total number of bugs does not increase.
- c) The schedule is delayed because of more bugs than expected during the first half of the test phase, and then is reviewed on the assumption that the test phase is completed with a delay of a few days.
- d) The test completion date can be almost exactly predicted from the changes in the cumulative total number of bugs and the number of unfinished test items, regardless of the number of unresolved bugs.

Q54. Which of the following is a technique that analyzes software or hardware and creates a design document, such as an E-R diagram based on the definition information of database system in the production environment?

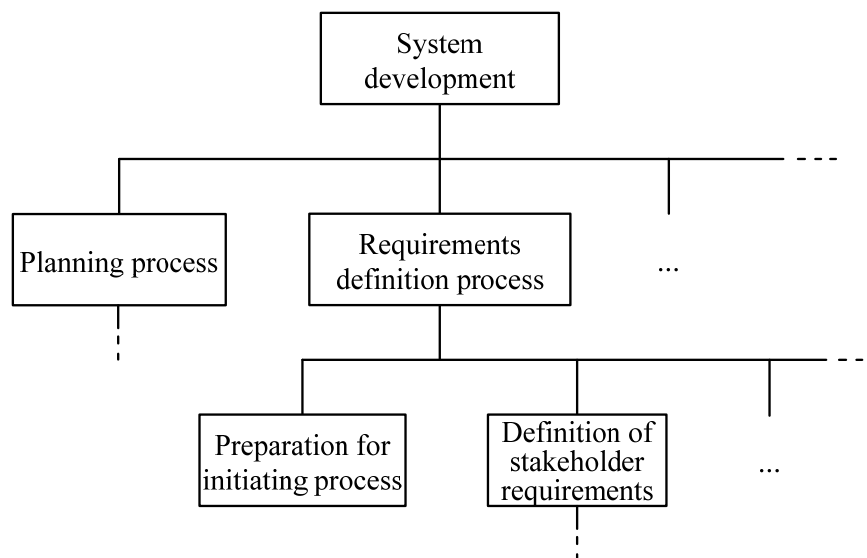
- | | |
|---------------------------|------------------------|
| a) Concurrent engineering | b) Forward engineering |
| c) Reverse engineering | d) Social engineering |

Q55. When a certain project includes activities *A* through *H* as shown in the arrow diagram below, which of the following is the earliest start date of activity *H*? Here, the number shown beside an arrow indicates the number of days required for each activity, and the project starts on day zero (0).



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

Q56. Which of the following is the term that refers to a detailed breakdown of a project into a hierarchy of activities as shown in the figure below?



- a) CPM b) EVM c) PERT d) WBS

Q57. It takes 36 days for Mr. *A* to complete a certain task, and 18 days for Mr. *B* to complete the same task. When Mr. *A* performs the task together with Mr. *B*, approximately how many days does it take to complete the task? Here, the task can be divided and performed in parallel, and both Mr. *A* and Mr. *B* can achieve an average working efficiency of 90 % every day during the cooperative task.

- a) 11 b) 12 c) 13 d) 14

Q58. When the number of programs composing the system and the number of person-days required for coding per program are as shown in the table below, what is the minimum number of staff members required to develop the system in 95 days? Here, in addition to coding, the activities of design and testing are also necessary to develop the system, and those activities require eight times as many person-days as coding.

	Number of programs	Number of person-days required for coding per program
Input processing	20	1
Output processing	10	3
Calculation processing	5	9

- a) 8 b) 9 c) 12 d) 13

Q59. According to ISO/IEC 20000-1:2011 (Information technology – Service management – Part 1: Service management system requirements), which of the following refers to an unplanned interruption to a service, a reduction in the quality of a service, or an event that has not yet impacted the service to the customer?

- a) Incident b) Known error
c) Problem d) Request for change

Q60. An IT service is provided under the conditions described below. In order to meet the SLA, the maximum allowable downtime should be less than how many hours during the service hours per month? Here, the number of business days in a month is 30.

[Conditions of the SLA]

- Service hours: 7 a.m. to 9 p.m. (i.e. 14 hours per day) on each business day
- Availability: 99.5% or more

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

Q61. Company *A* issues an ID in the format shown below in the member registration processing. The table below shows the transition of the number of IDs issued by the end of each fiscal year. When this trend is assumed to continue in the future, in which fiscal year is Company *A* expected to run out of IDs in this format? Here, the IDs of resigned members are managed as vacant numbers and are not reused.

[Format of the ID]

XXNNN (e.g., AZ059)

- For *X*, use an uppercase alphabetic character (A through Z).
- For *N*, use a number (0 through 9).

[Transition of the cumulative number of IDs issued by the end of each fiscal year]

Fiscal year	2007	2008	2009	2010
Cumulative number of IDs issued	317,000	383,000	447,000	512,000

- a) Fiscal year 2011 b) Fiscal year 2012
c) Fiscal year 2013 d) Fiscal year 2014

Q62. When a hearing is conducted during a system audit, which of the following is the appropriate action to be taken by a system auditor?

- a) When a difference of opinion arises with the auditee department during the hearing, thorough consultations are conducted until the audited party is convinced.
- b) When a problematic matter is found as a result of the hearing, backup data is collected and on-site investigations are conducted.
- c) When the auditee department has several persons subject to the hearing, the auditor intensively hears from the person of the highest rank.
- d) When the current status based on the hearing is regarded as a problem, some technical advice on the ideal status is given to the auditee department.

Q63. Which of the following is pertinent to an audit finding in an audit of a user acceptance test?

- a) The environment in which the user acceptance test is conducted is separated from the actual production environment so as not to interrupt business operations.
- b) The test cases are prepared to ensure that all user requirements are implemented properly and correctly from the viewpoint of users.
- c) The test is conducted by the information systems department without involving users, and the test results are approved by the person in charge of the department.
- d) The test is conducted with the participation of users who are familiar with the business operations concerned.

Q64. From the viewpoint of internal controls, which of the following is a framework that can secure data integrity by means of a check and balance system in the organization?

- a) In order to implement an efficient data entry system that meets the business needs, the information systems department develops such a data entry system and enters data.
- b) The information systems department remains independent of the user departments that enter data, in order to ensure that the user departments can maintain the precision and accuracy of data.
- c) The staff members of the information systems department remain in the same department for a long time so that they can secure data consistency in system development by taking advantage of their experience.
- d) When the staff members of the information systems department are transferred to another department, they take the relevant reference materials with them so as to make contribution in an emergency such as a system failure.

Q65. Which of the following is an appropriate explanation of SOA?

- a) It is a concept for improving management efficiency by managing the business processes of the entire business group in an integrated manner and by utilizing the management resources effectively.
- b) It is a design approach to architecture that builds software applications as reusable services and utilizes those services in a network such as the Internet in order to achieve a high level of productivity.
- c) It is a management technique for clarifying problems by analyzing and organizing the flow of business operations in units of operations and for making continuous improvements to the efficiency of business operations.
- d) It is a strategy for entrusting part of a company's business operations from planning to operation, including not only the business system but also the business operations themselves, entirely to an external company.

Q66. Which of the following is an appropriate explanation of SCM (Supply Chain Management)?

- a) It is a business concept for managing customer information collected through various channels in a centralized manner and for building closer ties with customers by using such information.
- b) It is a business process for managing the series of business operations linking purchase, production, sale, and distribution from the viewpoint of total optimization among companies in order to reduce delivery lead time and stock.
- c) It is a business system for managing the skills and behavioral characteristics of employees and for implementing appropriate personnel allocation and evaluation from the viewpoint of personnel strategy.
- d) It is a systematic approach to sharing skills, experiences, and best practices across work units, jobs, and locations, including the effective use of available data and organizational learning.

Q67. Which of the following is the most appropriate explanation of system integration?

- a) A part of a company's business processes is farmed out to other independent companies that have better skills and more experiences.
- b) Business applications or tools are developed and delivered over the Internet, usually for rent rather than outright purchase.
- c) Necessary tasks related to an information system, such as planning, construction, and operations, are performed all together based on an underpinning contract.
- d) Only the necessary software functions including maintenance and support are selected and purchased over the Internet.

Q68. In verification of stakeholder requirements, which of the following means the ability to keep track of the process until the implementation of a change request related to a defined requirement is completed?

- a) Interoperability
- b) Maintainability
- c) Traceability
- d) Usability

Q69. Which of the following is applicable to the definition of “**non-functional**” requirements?

- a) Creating development criteria and standards suitable for the language used in system development
- b) Defining the scope of system functions to be designed and implemented in system development
- c) Identifying the flow of information (i.e., data) between functions that compose the business operations
- d) Identifying the interface functions to be used for the exchange of information with other systems

Q70. The marketing strategies are categorized into four basic types: leader, challenger, follower, and nicher. The market follower is a firm that is not a market leader and that does not attempt to be a market leader. In addition, the follower can often find the reinvention of ideas easier than the originators. Which of the following is the basic strategy of the follower as a competitive position?

- a) All-around strategy for covering the entire market and ensuring the largest share
- b) Differentiation strategy needed to attack the leader in pursuit of market share
- c) Imitation strategy for quickly responding to market opportunities
- d) Specialization strategy for focusing on a specific product or market segment

Q71. The product life cycle is a concept based on the idea that all products pass through four stages: introduction, growth, maturity, and decline. Which of the following is the characteristic of the maturity stage in the product life cycle?

- a) As demand decreases, some companies withdraw from the market. A company should judge whether it can become a strong player in this stage and, if necessary, should consider entering an alternative market.
- b) As demand increases, product differentiation and market segmentation become evident. Competition between competitors increases, and addition of new models and reduction of costs become important.
- c) Sales grow slowly, and success depends on whether new demand can be created. It is necessary to provide information, such as features, benefits, and price, for potential target customers.
- d) The market begins to understand the value of the product. Both the product line and sales channels need to be expanded. In this stage, sales increase, but investment is required.

Q72. Which of the following is a type of information system that helps companies change or otherwise alter their business strategy and structure and thus create a competitive advantage?

- a) DSS
- b) KMS
- c) MIS
- d) SIS

Q73. Which of the following is an appropriate explanation of CRM?

- a) It is a method for improving business performance by sharing information between all customer channels within a company and by increasing customer satisfaction.
- b) It is a method for improving efficiency by sharing information between related companies including production, inventory, purchasing, sales, and distribution.
- c) It is a method for improving management efficiency by controlling company-wide business resources in an integrated way so that they can be used effectively.
- d) It is a method in which wholesalers and manufacturers expand transactions with retail shops by supporting their business activities to increase sales and profits.

Q74. Which of the following is the characteristic of the cell production system where production is grouped into cells with each cell taking responsibility for the production of each product?

- a) A “Kanban” card is used as a communication tool for making work instructions and on-site management visible in the manufacturing field.
- b) A single worker or a group of several workers completely assembles each product from start to finish.
- c) Each process runs autonomously, and production in the succeeding process is performed based on output from the preceding process.
- d) The required parts, specifications, and quantities are communicated from the succeeding process to the preceding process.

Q75. Which of the following is an appropriate explanation of XBRL?

- a) It is a data description language developed for financial information exchange and reporting, based on XML (eXtensible Markup Language).
- b) It is a document display format that can store not only text and images but also information such as layouts and fonts in a file.
- c) It is a page description language that can represent Web pages, including images, sounds, and video, on the Internet.
- d) It is a programming language initially developed for small computers and mainly intended to create various types of forms in an easy way.

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

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

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

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

Q78. Which of the following is an appropriate chart that can be used for planning the work schedule and for keeping track of the progress status in a project?

- a) Composite bar chart
- b) Control chart
- c) Gantt chart
- d) Pareto chart

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

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

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

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