October 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 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	ⓐ	●	ⓒ	ⓓ

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/IEC25010:2011
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.

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Q1. If a given bit string contains at least one 1-bit, the algorithm below leaves the rightmost 1-bit unchanged but makes all the others 0. For example, if the given bit string is 00101000, the result will be 00001000. Which of the following is the appropriate logical operation to be filled in *D*?

Step 1: By regarding the given bit string *A* as an unsigned binary number, let *B* be the result of subtracting 1 from *A*.
Step 2: Calculate the XOR (exclusive logical sum) of *A* and *B*, and let *C* be the result.
Step 3: Calculate the [*D*] of *A* and *C*, then set the result back to *A*.

a) AND (logical product)
b) NAND (negative logical product)
c) OR (logical sum)
d) XOR (exclusive logical sum)

Q2. When 4-bit signed numbers in 2's complement are used, which of the following operations will cause either an overflow or an underflow?

a) Add *B* to *A* when *A* is 0110 and *B* is 1111.
b) Add *B* to *A* when *A* is 1110 and *B* is 0110.
c) Subtract *B* from *A* when *A* is 0111 and *B* is 1010.
d) Subtract *B* from *A* when *A* is 1111 and *B* is 1111.

Q3. When two unbiased dice are rolled one by one, what is the probability that either the first one is 2 or the sum of the two is less than 5?

a) $\frac{1}{6}$
b) $\frac{2}{9}$
c) $\frac{5}{18}$
d) $\frac{1}{3}$

Q4. A leap year is either a multiple of 4 but not a multiple of 100, or a multiple of 400. How many leap years are there from 1998 to 2110?

a) 26
b) 27
c) 28
d) 29

Q5. Which of the following is the most appropriate description of a queue?

a) Data that is stored first is retrieved first.
b) Data that is stored last is retrieved first.
c) It references specific data by using an index.
d) It represents the hierarchical relationship of data by using at least two (2) pointers.

Q6. Binary search is used to search for an element from a sorted data of n elements.Which of the following is an expression that represents the order of computational complexity for this process?

a) $\log n$ b) n c) n^2 d) $n \log n$

Q7. In Java technologies, which of the following is the specification of creating reusable software components that have frequently used functionalities?

a) Java applet b) Java application
c) JavaBeans d) JavaScript

Q8. Which of the following best describes the characteristics of XML?

a) The style languages such as XSL and CSS used in HTML can also be used in XML.
b) XML allows a tag to be defined in order for an easier data exchange between information systems over the network.
c) XML is developed on its own specification, whereas HTML is on the SGML basis.
d) XML is HTML based and has some features added primarily for a performance improvement of displaying a web page.

Q9. Which of the following is the addressing method that references data in the main memory as shown in the figure below?

a) Direct addressing
b) Indexed addressing
c) Indirect addressing
d) Relative addressing

Q10. Which of the following is classified as an internal interrupt?

a) An interrupt because of the occurrence of a memory parity error
b) An interrupt because of the operation of division by zero (0)
c) An interrupt caused by a power failure, such as an instantaneous failure of the commercial power supply
d) An interrupt caused by the completion of I/O

Q11. ECC is used for error detection and correction in memory. If $n + 2$ redundant bits are required for a data bus with a width of 2^n bits, how many redundant bits are required for a data bus with a width of 128 bits?

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

Q12. Which of the following lists contain *A* through *D* in the order of shorter effective memory access time of the main memory?

	Cache memory			Main memory
	Existence	Access time (nanoseconds)	Hit rate (%)	Access time (nanoseconds)
A	No	-	-	15
B	No	-	-	30
C	Yes	20	60	70
D	Yes	10	90	80

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

Q13. Which of the following is an appropriate description of the reliability of computer systems?

a) As the system configuration becomes more complicated, MTBF increases.
b) Availability of systems can be improved by increasing MTTR and MTBF.
c) Preventive maintenance of systems is performed to increase MTBF.
d) Remote maintenance of systems can increase MTTR and improve availability.

Q14. A system is operated as a virtual machine environment with 20 physical machines. When the operating conditions are shown below, what is the minimum number of physical machine failures that causes the system to enter fall back operation?

[Operating conditions]

(1) If a physical machine fails, the virtual machines that were running on it are made to run evenly on all the other physical machines, and the resources that were used are distributed in the same way.
(2) When there are 20 physical machines, 70% of the resources of all physical machines are used.
(3) If the resources used on a single physical machine exceed 90%, the whole system enters fall back operation.
(4) Conditions other than (1) through (3) above do not need to be considered.

a) 2
b) 3
c) 4
d) 5

Q15. Which of the following is an appropriate graph that shows the relationship between CPU utilization and average response time in an online real-time system? Here, transactions occur according to a Poisson distribution, and the processing time for a transaction follows an exponential distribution.

a)

b)

c)

d)

Q16. Which of the following occurs when a program attempts to access a page that is mapped in the virtual address space, but is not located in the main memory? Here, the OS supports paging.

a) Fatal error
b) Page fault
c) Scheduling error
d) Segmentation fault

Q17. Which of the following is an appropriate explanation of spooling?

a) It determines the execution order for jobs that are loaded into a system according to characteristics and priority.
b) It sends communication data to a pre-registered agent instead of sending it directly to a counterpart.
c) It temporarily saves input data from a keyboard to the queue in the main memory.
d) It temporarily saves output data for a low-speed device, such as a printer, to a high-speed hard disk, and then sends it to the intended device.

Q18. In a paged virtual memory system, the LRU method is used in the page replacement algorithm. When the page frame assigned to the main memory is 4, and pages are accessed in the order of 1, 2, 3, 4, 5, 2, 1, 3, 2, 6, which of the following page is replaced at the time of accessing page 6? Here, no page exists in the main memory in the initial state.

a) 1 b) 2 c) 4 d) 5

Q19. There is a system in which the print requests waiting for output are assigned to an available printer in an order of *A*, *B*, and *C*, and then the printer available first among the three (3) printers *A* through *C* of the same model. If the print time of each print request is 5, 12, 4, 3, 10, and 4 (minutes) in the order of the requests waiting for output, which of the following lists of printers is arranged in an order starting from the longest time assigned for printing? Here, all printers are available in the initial state.

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

Q20. Which of the following is an open source integrated development environment that includes software and support tools for application development?

a) Eclipse b) Perl c) PHP d) Ruby

Q21. Which of the following is a characteristic of DRAM and not of SRAM?

a) It does not require refresh nor access operations in order to retain data.
b) It has a simple memory cell structure, and thus the price per bit is low.
c) It is mainly used for cache memory
d) It uses flip-flops for the memory cells to save data.

Q22. Which of the following is a logical expression that is equivalent to the digital circuit shown in the figure below? Here, "•" is the logical product, "+" the logical sum, and "$\overline{X}$" the negation of X.

a) $X = A \cdot B + \overline{A \cdot B}$
b) $X = A \cdot B + \overline{A} \cdot \overline{B}$
c) $X = A \cdot \overline{B} + \overline{A} \cdot B$
d) $X = (\overline{A} + B) \cdot (A + \overline{B})$

Q23. Which of the following is the name of a phenomenon where multiple ON/OFF signals are generated within a few milliseconds after a push-button switch with a mechanical contact is pressed once?

a) Buffering
b) Chattering
c) Sampling
d) Sharing

Q24. Which of the following shows the path information from the front page of a web site to the current page, a user is currently viewing?

a) Breadcrumbs
b) Navigation bar
c) Scroll bar
d) Site map

Q25. Which of the following is an explanation of the morphing technique in computer animation?

a) A hand-drawn outline is read with a scanner, then each enclosed area is filled with a single color.
b) Based on the digital data collected from the actual movement of a body, multiple images with a realistic movement are created.
c) In order to make a perspective two-dimensional animation, each image of moving parts is superposed on the background one by one in descending order of its distance from the viewer.
d) In order to represent a smooth transition between two images, multiple intermediate images are created for interpolation.

Q26. When new naming conventions for data items are provided, which of the following problems cannot be avoided only by the naming conventions described below?

[Naming conventions]

(1) Always add a classification word such as the “name”, “code”, “number”, “amount”, or “date” at the end of the data item name, and set the data type determined for each classification word.
(2) Create a dictionary in which data item names and their meanings are registered, and ensure that synonyms and homonyms do not occur.

a) Both the date type and the character string exist together as the data type of the data item “ReceiptDate”.
b) It cannot be determined whether the data item “Customer” is the “CustomerCode” or “CustomerName”.
c) The scope of the possible values of the data item “OrderAmount” varies according to the table.
d) There is a data item called “AwardAmount” that has the same meaning as the data item “BonusAmount”.

Q27. The data model shown in the figure below is implemented as three (3) tables. At this time, which of the following is an appropriate combination of *A* and *B* in the "Transfer" table in which the transaction of "the sales of 500 dollars to Company *C* are booked in the cash account on April 4, 2015" is recorded? Here, the data model is described in UML.

Account

Account Code	Account Title
208	Sales
510	Cash
511	Deposits
812	Travel expenses

Transfer

Account Code	Debit/ Credit	Amount	Transaction Number
A	*B*	500	0122
208	Credit	500	0122
510	Credit	500	0124
812	Debit	500	0124

Accounting transaction

Transaction Number	DateOf Posting	Description
0122	2015-04-04	Company *A*
0124	2015-04-04	Company *A*

	A	*B*
a)	208	Credit
b)	208	Debit
c)	510	Credit
d)	510	Debit

Q28. In the process of table implementation, which of the following is an appropriate SQL statement that removes a column in an existing table?

a)
```
ALTER TABLE table_name
  DELETE COLUMN column_name
```

b)
```
ALTER TABLE table_name
  DROP COLUMN column_name
```

c)
```
UPDATE TABLE table_name
  DELETE COLUMN column_name
```

d)
```
UPDATE TABLE table_name
  DROP COLUMN column_name
```

Q29. When a manager is analyzing the sales of products in a supermarket, he makes a query to list all products with their sales amount, including the products that have no sales amount. Which of the following is an appropriate combination of statements to be filled in the boxes in the query? Here, the columns of Product and Sales are shown below.

```
Product:   (ProductID, PName, Price, Cost)
Sales:     (SalesID, ProductID, SalesDate, Unit, Amount)
```

```
SELECT Product.PName, SUM(Amount)
FROM Product [      A      ] Sales
on Product.ProductID = Sales.ProductID
GROUP BY [      B      ];
```

	(A)	(B)
a)	INNER JOIN	Amount
b)	INNER JOIN	Product.PName
c)	LEFT JOIN	Amount
d)	LEFT JOIN	Product.PName

Q30. Which of the following is an appropriate description of locks?

a) For a resource on which transaction T1 has acquired an exclusive lock, transaction T2 can acquire an exclusive, but not a shared, lock.
b) For a resource on which transaction T1 has acquired an exclusive lock, transaction T2 can acquire either an exclusive or a shared lock.
c) For a resource on which transaction T1 has acquired a shared lock, transaction T2 can acquire a shared, but not an exclusive, lock.
d) For a resource on which transaction T1 has acquired a shared lock, transaction T2 can acquire either a shared or an exclusive lock.

Q31. In a CSMA/CD based LAN, which of the following is an appropriate description of the transmission operation performed by a network node?

a) All nodes are connected in a ring topology, and a special frame is sent around to control the transmission right. Only the node that receives the special frame can transmit data.
b) Each node checks if the transmission medium is in use, and can transmit data if the medium is not in use. If a conflict is detected, a retransmission occurs after a random interval of time.
c) Each node is assigned a logical priority, and a transmission right is passed along in the order of priority. Only the node with the right can transmit data.
d) Only the node that has been assigned a time slot for transmission can transmit data.

Q32. Which of the following is an appropriate description of network devices?

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

Q33. In a TCP/IP environment, which of the following is a standard for attaching image data to an email?

a) JPEG b) MIME c) MPEG d) SMTP

Q34. Concerning email protocols, which of the following descriptions is correct?

a) IMAP allows the message to remain on the server even after it is downloaded to a local PC.
b) IMAP uses UDP for faster downloading of emails, whereas POP3 uses TCP.
c) POP3 and IMAP uses the same port number for interoperability in email communication.
d) POP3 is used for sending email messages from the sender's mail server to the receiver's mail server.

Q35. In IPv6 networks, what is the length of an IP address in bits?

a) 32 b) 64 c) 128 d) 256

Q36. Which of the following is a secure communication protocol that provides a hybrid cryptosystem where public key cryptography is used to transfer a shared private key securely to the other side, and private key cryptography is used to encrypt subsequent communications for the remaining session?

a) AES (Advanced Encryption Standard)
b) RSA
c) SSL/TLS (Secure Socket Layer/Transport Layer Security)
d) WAF (Web Application Firewall)

Q37. In a meeting session, the security administrator provides a presentation regarding risks on social media and recommends that the attendees not give unnecessary personal information on social media websites. From which of the following attacks do the social media users effectively reduce the security risk most by following this recommendation?

a) Brute-force attack
b) Cognitive password attack
c) DoS (Denial of Service) attack
d) Phishing attack

Q38. Which of the following is an appropriate description of a Trojan horse used for security attacks in computing?

a) It is a brute force attack algorithm.
b) It is an effective way to detect an intruder.
c) It is a rogue program that tricks users.
d) It is a user who steals valuable information.

Q39. Which of the following is an appropriate combination of the usage method of a signature key in a digital signature, and the purpose of a digital signature?

a) By the sender creating a digital signature with the signature key and attaching it to a message, the recipient can confirm the identity of the sender.
b) By the sender encrypting a message to which a fixed string is added with the signature key, the recipient can identify sections that have been falsified.
c) By the sender encrypting a message with the signature key, the content of the message cannot be understood by unrelated parties.
d) The recipient can use the signature key to decrypt an encrypted message to the plain text message.

Q40. Which of the following is an example of improper use of a key logger?

a) It interrupts the communication between two parties, and then collects and falsifies the information being exchanged.
b) When Internet banking is used, it collects the password entered by the user.
c) When the browser is initiated, it arbitrarily displays a tool bar that the user has not installed.
d) When the user browses movies on a browser, it arbitrarily displays unintended advertisements for the user.

Q41. Biometric authentication includes a method of authentication by extracting physical characteristics, and a method of authentication by extracting behavior characteristics. Which of the following has behavior characteristics?

a) Performing authentication by extracting characteristics from the branching angle of the branching point of a blood vessel, and the length between the branching points
b) Performing authentication by extracting characteristics from the speed of and pressure on a pen when a signature is written
c) Performing authentication by extracting characteristics of chaotic wrinkles spreading out from the pupil
d) Performing authentication by extracting the characteristic points called minutiae from the patterns formed by ridge lines

Q42. Which of the following is the most effective method of detecting falsification of the contents of a web server?

a) Communications to the web server are monitored to ensure that there is no communication other than HTTP and HTTPS.
b) The hash value of each file of the contents of the web server is stored and periodically compared with the hash value generated from each file.
c) The memory usage of the web server is checked periodically to ensure that a buffer overflow has not occurred.
d) The updated date of each file of the contents of the web server is stored and compared periodically with the updated date of each file.

Q43. When a digital certificate has been installed in an in-house system accessed from a smartphone by an employee, which of the following can be checked using the in-house system?

a) Ensuring that the applications on the smartphone are the latest versions of the applications
b) Ensuring that the most recent security patch has been applied to the OS of the smartphone
c) Ensuring that the smartphone has been allowed to access the in-house system
d) Ensuring that the smartphone is not infected by a virus

Q44. Which of the following is a technique where a system is actually attacked and an intrusion attempt is made in order to detect security-related vulnerabilities of a computer or network?

a) Penetration test
b) Regression test
c) Software inspection
d) Walk-through

Q45. Which of the following can be used to detect worms by using SHA-256 to calculate a hash value from a subject file, and then cross-checking this against a database of hash values from files containing specimens of known worms?

a) A worm that has the same file size as a worm specimen
b) A worm that is in the same subspecies as a worm specimen
c) A worm with code strings that have the same characteristics as a worm specimen
d) The same worm as a worm specimen

Q46. Which of the following is the most appropriate explanation of the deployment diagram defined in UML 2.x (including 2.0 and later versions)?

a) It addresses the dynamic view of the system. In other words, it is drawn for a single class to show the lifetime behavior of a single object.
b) It describes the types of objects in the system and the various kinds of static relationships that exist among them.
c) It shows a static view of the run-time configuration of processing nodes, such as servers and clients, as well as the components that run on these nodes.
d) It shows the organizations and dependencies among a set of pieces that are independently purchasable and upgradeable, and addresses the static implementation view of the system.

Q47. In software development for small projects, which of the following is an appropriate explanation of test driven development (TDD)?

a) All functionalities are identified at the start of the project. Code and test cases are developed together and functionalities are developed simultaneously.
b) Continuous testing is implemented during the coding process using automated testing. The process eliminates the requirement for system testing
c) Development is done in increments of functionality where test cases are executed and the code is developed to pass the test cases before moving to the next increment.
d) Test cases are executed at the end for each stage of the development process where all code must first pass the test case before proceeding to the next stage.

Q48. There is a program module that is executed only when the value of integer x is $25 \leq x < 50$. When this module is tested using the boundary value analysis, which of the following is an appropriate combination of values to be tested?

a) 24, 25, 49, 50
b) 24, 25, 50, 51
c) 25, 26, 49, 50
d) 25, 26, 50, 51

Q49. Which of the following is an appropriate category of system maintenance preformed for the purpose of modifying the system to cope with changes in the software environment (e.g. DBMS, Operating system)?

a) Adaptive maintenance
b) Corrective maintenance
c) Perfective maintenance
d) Preventive maintenance

Q50. Which of the following is an appropriate order of six phases used in every SDLC (Software Development Life Cycle) model?

a) Requirements Analysis → Design → Programming → Deployment → Testing → Maintenance
b) Requirements Analysis → Design → Programming → Testing → Deployment → Maintenance
c) Requirements Analysis → Design → Programming → Testing → Maintenance → Deployment
d) Requirements Analysis → Programming → Testing → Design → Maintenance → Deployment

Q51. According to PMBOK, which of the following is an appropriate explanation of project definition?

a) It is a group of related projects, subprograms, and program activities managed in a coordinated way to obtain benefits not available from managing them individually.
b) It is a number of people who are gathered to undertake a common job with different tasks with the aim of finishing all the tasks timeously to satisfy their customers or stakeholders.
c) It is a temporary endeavor undertaken to create a unique product, service, or result.
d) It is the application of knowledge, skills, tools, and techniques to a program to meet the program requirements and to obtain benefits and control not available by managing projects individually.

Q52. A project has been defined to contain the activities along with their required times for completion as shown in the table below. Which of the following is the critical path for this project?

Activity Number	Activity	Time (weeks)	Immediate Predecessor's Activity Number
1	Collection requirements	3	
2	Analyze process	2	1
3	Analyze data	2	2
4	Design Process	6	2
5	Design data	3	3
6	Design screens	2	3,4
7	Design reports	4	4,5
8	Programming	5	6,7
9	Test and Documentation	7	7
10	Install	2	8,9

a) 1-2-3-5-7-9-10
b) 1-2-3-5-7-8-10
c) 1-2-4-7-9-10
d) 1-2-4-6-8-10

Q53. In the Earned Value Management technique, which of the following is used to calculate the Cost Performance Index (CPI)?

a) Earned Value (EV) – Planned Value (PV)
b) Earned Value (EV) / Planned Value (PV)
c) Earned Value (EV) – Actual Cost (AC)
d) Earned Value (EV) / Actual Cost (AC)

Q54. According to PMBOK, which of the following is the project management knowledge area that includes the activities of make-or-buy decisions, development time and material contracts, and selection of sellers from bidders?

a) Project Communication Management
b) Project Cost Management
c) Project Integration Management
d) Project Procurement Management

Q55. In order to check whether a system works normally, users in the system user department and operators in the system operations department jointly conduct operational testing prior to full operation. Which of the following is an appropriate description of the users should prioritize during testing?

a) Testing whether all application programs work according to the specifications
b) Testing whether online, batch, and other processing is performed according to the operational procedures
c) Testing whether the performance objective is achieved
d) Testing whether the system operates according to predetermined business procedures

Q56. When data in the business operations department is entered in a data sheet by the information system department, which of the following is an appropriate task executed by the information system department?

a) In order to prevent unauthorized use or leakage of confidential information, data sheets are disposed of immediately after the completion of data entry.
b) The data sheets are retained in the information system department until the due date for processing, and confirmation including a check of the number of sheets received is performed for all sheets collectively just before the due date.
c) To enable the business operations department to check the processing results of each data sheet, the processing results list is sent to the business operations department.
d) When the data sheet contains an error, and only when the error is obvious, the data sheet is corrected and an entry is made based on the judgment of only the person in charge of data entry.

Q57. Among the structures and characteristics of a service desk organization, which of the following is a description of a local service desk?

a) By consolidating the service desks at a single site or limited locations, service staff can be deployed effectively and a large number of calls can be handled.
b) By deploying the service desk near the users, it is possible to provide services for users who have different languages and cultures or for VIPs by dedicated service staff.
c) By performing centralized and integrated management of all service staff including those at the dispersed locations, well-controlled services can be provided.
d) By using communication technology, services such as a single service desk can be provided, even if the service staff is dispersed across several regions and departments.

Q58. When a version management system for source code is installed, which of the following is an appropriate check point to be added for the confidentiality of the source code during the system audit?

a) The access control settings of the version management system are appropriate.
b) The installation cost of the version management system is at a proper level.
c) The results of the change registered in the version management system are approved by the person in charge.
d) The version management system is selected by the development department.

Q59. Which of the following is an appropriate description of the implementation structure of a system audit?

a) For an audit of the development progress in an information systems department, the audit team consists of members of the information systems department who are familiar with the details of the development.
b) In order to enable the person requesting the audit to issue improvement instructions on the basis of the audit report, the system auditor reports the audit results to the person requesting the audit.
c) When an audit of the information system is performed as a part of the business operations audit, the audit team is formed by the members of the user's department.
d) When the system auditor accepts the help of an expert, the decisions concerning the range of support, methods, and audit results is the responsibility of the expert.

Q60. Which of the following is a check point for auditing control in relation to the accuracy of the processing logic of a spreadsheet?

a) A backup of the spreadsheet is stored.
b) The person who creates and uses the spreadsheet is the same.
c) The program of the spreadsheet is documented and verified.
d) The users of the spreadsheet are defined.

Q61. Which of the following is the purpose of BPM (Business Process Management) in the context of corporate activity?

a) Analysis and effective utilization of information resources.
b) Continual improvement of business processes.
c) Effective utilization of management resources.
d) Management and analysis of customer information.

Q62. When a workflow system is used for business improvement, which of the following is an appropriate effect that can be expected?

a) A standard protocol used for data exchange between a company and its customers can be provided.
b) Processing speed for office procedures from document submission to approval can be improved.
c) Services, such as a discount, can be provided according to the amount purchased by the customer.
d) Shipping and receiving of stocked products can be automated in a warehouse.

Q63. The table below shows the result of analyzing the daily activities of a sales representative. By implementing SFA (Sales Force Automation), the preparation time for customer visits can be reduced by 0.1 hours per customer visit. In order to increase the number of customer visits to six (6) per day without changing the total working hours and the hours per customer visit, how many hours must be reduced from "Other working time"?

Time analysis of working hours for a day

Total working hours					Number of customer visits per day
	Customer visit time	Office work			
			Preparation time for customer visits	Other working time	
8.0	5.0	3.0	1.5	1.5	5

a) 0.3 b) 0.5 c) 0.7 d) 1.0

Q64. Which of the following is an explanation of SOA?

a) It is a concept that considers the functions of software as components called services, and combines these services in order to develop application systems.
b) It is a concept that enhances the efficiency and quality of sales activities by utilizing IT in order to increase sales and profits and to improve customer satisfaction.
c) It is a concept that redesigns the business processes fundamentally in order to improve cost, quality, service, and speed in an innovative manner.
d) It refers to the outsourcing of internal activities other than the core businesses in order to concentrate management resources on the core businesses.

Q65. Which of the following is an explanation of application architecture that configures enterprise architecture?

a) It systematically indicates the business processes and information flow necessary for the business strategy
b) It systematically indicates the content of data required for a business operation, the relationship between data, and the structure of data.
c) It systematically indicates the functions and configuration of a system supporting a business process.
d) It systematically indicates the technical components necessary for the development and the operation of the information system.

Q66. In the table shown below, the investment category and KPI have been arranged according to the investment purpose. Which of the following corresponds to investment purpose *C* ? Here, a) to d) are applied to any one of *A* to *D*.

Investment purpose	Investment category	KPI
A	Business efficiency improvement investment	Adhering to the delivery date, and required number of days for monthly closing of accounts
B	Information utilization investment	Number of registered proposals, and number of proposals to customers
C	Strategic investment	ROI of new business and market share of a new product
D	IT infrastructure investment	Number of system failures and search response time

a) Betterment of the work process and improvement of work quality
b) Creation of business and establishment of competitive advantages
c) Reduction of system maintenance and management cost, and improvement of system performance
d) Visualization and sharing of knowledge

Q67. A SWOT analysis is a technique that is used to identify and evaluate the internal and external factors that are advantageous or disadvantageous to achieve the objectives of the business or project. When a company's situation is analyzed as shown in the table below, which of the following is the most appropriate combination that corresponds to the company's Strengths that give the company advantages over others, Weaknesses that give the company disadvantages relative to others, Opportunities that are exploited for the company's advantages, and Threats that cause troubles for the business or project?

	Advantage	Disadvantage
Internal Factor	The company has attempted to promote innovation. Therefore, the company holds a significant number of patents.	The company cannot provide staff training as a result of its low budget. Therefore, many staff members are forced to work inefficiently.
External Factor	A world contest is determined to be held by an international committee in a location near the company next year.	This year, significant rain caused flooding in several locations, including the area near the company.

a)

	Advantage	Disadvantage
Internal	Opportunities	Weaknesses
External	Strengths	Threats

b)

	Advantage	Disadvantage
Internal	Strengths	Threats
External	Opportunities	Weaknesses

c)

	Advantage	Disadvantage
Internal	Strengths	Weaknesses
External	Opportunities	Threats

d)

	Advantage	Disadvantage
Internal	Strengths	Weaknesses
External	Threats	Opportunities

Q68. According to the "competitive strategy" by Philip Kotler, which of the following is a company that has no high market share, but has the strategic aim of achieving high profits and acquiring a unique position by focusing management resources on particular products and services?

a) Market challenger
b) Market follower
c) Market leader
d) Market nicher

Q69. Which of the following is an explanation of knowledge management?

a) Management centered on strengths that are a challenge for other companies to imitate, such as the enterprise's own know-how and technology
b) Management innovation driven by performing comparative analysis with other successful companies
c) Management which improves the overall problem-solving capability by sharing knowledge that is scattered across the enterprise
d) Management which maintains a flat organization structure with minimal hierarchical layers to accelerate decision-making

Q70. Which of the following is a characteristic of an IC tag (RFID)?

a) An IC tag handles a significant amount of information, and thus it uses an external storage device for storing information.
b) An IC tag is resistant to dirt, and the recorded information can be read even from outside the container.
c) An IC tag needs to be inserted into a dedicated magnetic reader to read the recorded information.
d) An IC tag uses GPS to display the positional and attribute information of the current location.

Q71. In IT investment opportunities, when the investment effect of five (5) years is evaluated on the basis of ROI (Return On Investment), which of the following four (4) opportunities *A* through *D* has the greatest effect? Here, the IRR (Internal Rate of Return) is zero (0).

A

Year	0	1	2	3	4	5
Profit		15	30	45	30	15
Amount of investment	100					

B

Year	0	1	2	3	4	5
Profit		105	75	45	15	0
Amount of investment	200					

C

Year	0	1	2	3	4	5
Profit		60	75	90	75	60
Amount of investment	300					

D

Year	0	1	2	3	4	5
Profit		105	105	105	105	105
Amount of investment	400					

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

Q72. Which of the following is an example of the use of social media in business?

a) A company posts its business strategies regarding accommodating itself to market changes, in professional business magazines, thus aiming to improve their reputation as a trustworthy company.
b) A company sets up a site on the Internet for sharing opinions on matters such as the usage status of its products, which leads to improvement of the product.
c) The researchers of a company buy the latest professional magazines that are not sold within the country through online shopping, which contributes to the research and development activities.
d) The sales department frequently posts product articles in magazines that are circulated in large numbers, thus aiming at improving awareness of the product.

Q73. Which of the following is an appropriate explanation of tethering as a function of cell phones?

a) A cell phone can be used by inserting a different telecommunications carrier's SIM card into the cell phone.
b) By using a cell phone as a modem or access point, data communication that uses a network, such as the Internet, is enabled on a PC, game console, or other such devices.
c) Cell phone access to websites that are harmful to young people is disabled on request to the telecommunications carrier.
d) Even outside the service area of the contracted telecommunications carrier, a cell phone can be used with the service of another carrier.

Q74. Which of the following is a role that CIO is required to perform?

a) Design and operation of an organization of legal compliance.
b) Planning and execution of the research and development policy of the company.
c) Planning and implementation of a financial strategy for business administration.
d) Promotion of use of IT services that maximizes business value.

Q75. Among the measures that a company should adopt in order to fulfill social responsibility, which of the following is implemented in terms of the environment?

a) To develop an internal organization for the purpose of green purchasing.
b) To enhance the transparency of the management status of the company for shareholders.
c) To establish a system that supports volunteer activities of employees following disasters.
d) To setup an ethics helpline within the company.

Q76. Which of the following can secure employment and create employment opportunities in an entire society by shortening the work hours per employee?

a) Cafeteria plan
b) Free agent system
c) Work sharing
d) Work-life balance

Q77. Which of the following is an explanation of an ABC analysis method?

a) A survey of the same panelists is repeatedly conducted. This data is used to understand trends in regions and changes in purchasing groups.
b) Products are arranged in order of high sales or high gross margins, and then products are divided into various levels by using the cumulative ratio. Following this, an increase in sales volume is planned for the products at the high levels.
c) Regions are divided into a grid with multiple sections, and detailed regional analysis is performed on the basis of various data, such as population and purchasing power.
d) The sales potential and the purchasing record of a product are analyzed by classifying and aggregating multiple items of survey data by factor.

Q78. Three products, *A*, *B*, and *C*, are processed by two (2) machines, M1 and M2. Processing must be conducted in the order of M1 → M2. The time required for each machine to process each product is shown in the table below.

Under these conditions, which of the following is the processing order of three (3) products that results in the shortest time from the beginning of the processing until all products are finished? Here, when M1 has processed a product, it can successively process another product.

Machine / Product	M1	M2
A	7	3
B	5	6
C	4	2

a) $A \rightarrow C \rightarrow B$
b) $B \rightarrow A \rightarrow C$
c) $B \rightarrow C \rightarrow A$
d) $C \rightarrow B \rightarrow A$

Q79. Which of the following is a technique that discovers useful information and relationships 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

Q80. Among the descriptions of personal data, which of the following is **not** an appropriate description from the viewpoint of "OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data"?

a) Personal data should be allowed to be acquired without announcing the acquisition of such data.
b) Personal data should be handled within the scope of the purpose of use agreed by the persons whose personal data are collected.
c) Personal data should be kept accurate, complete, and up-to-date within the scope of the purpose of use.
d) Personal data should be outsourced to a third party after the prior consent of the persons whose personal data are collected.