April 2014

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	ⓐ	●	ⓒ	ⓓ

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

Symbols commonly used in questions

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

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

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

Q1. Which of the following is equivalent to the calculation result of the arithmetic expression shown below?   Here, each number is represented in radix notation; that is, the radix is represented by a subscript following the number.

$$6140_8 + 10011100_2 - C46_{16}$$

a) $1011\ 0101_2$ b) 256_8 c) 180_{10} d) $B6_{16}$

Q2. What is the approximate probability (in percentage) that at least 2 people in a group of 6 randomly-selected people have a birthday on the same day of the week?

a) 65.0   b) 85.0   c) 95.7   d) 99.4

Q3. The figure below shows the state transition diagram of an automaton.   If the automaton stops in the accepting (i.e., final) state when an input string is terminated, then the input string is recognized as valid.   Which of the following describes the necessary and sufficient conditions so that an input string can be valid?   Here, the double circle marked with "q_2" represents the accepting state.   The leftmost arrow pointing to "q_1" represents the starting state.
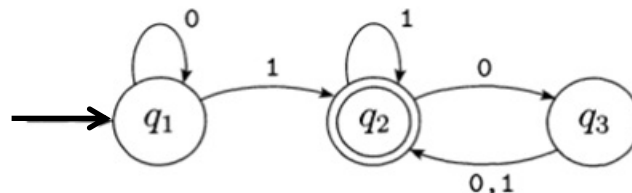
a) An input string must contain at least one 1 and any even number of 0s following the last 1.
b) An input string must contain at least one 1 and any number of 0s before or after the last 1.
c) An input string must contain at least one 1 and any odd number of 0s.
d) An input string must contain at least one 1 at the end of the string.

Q4. What is the minimum number of bits required to uniquely encode upper-case alphabetic characters (i.e., A through Z) and numeric characters (i.e., 0 through 9) in the same number of bits?

a) 5   b) 6   c) 7   d) 8

Q5. When a 200-byte message is sent at 100 Kbps by using a 10 km cable with a propagation speed of 2×10^8 m/sec, which of the following is the total delay in milliseconds?   Here, the total delay can be defined as the sum of the transmission and propagation delays, and there is no processing delay.

a) 2.00   b) 2.05   c) 16.00   d) 16.05

Q6. When a binary tree is a heap with a depth of "n", what is the minimum number of nodes (including leaf nodes) in the heap?   Here, the depth of a node is the length of the path from the root to the node, and the root has depth zero.

a) 2^n b) $2^n - 1$ c) 2^{n+1} d) $2^{n+1} - 1$

Q7. When the binary search tree shown below is traversed in pre-order, in-order, and post-order, which of the following is the appropriate combination of the results?
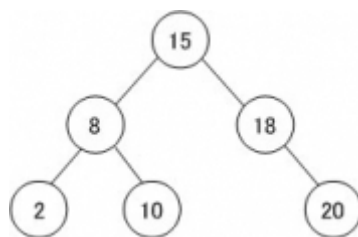
	Pre-order traversal	In-order traversal	Post-order traversal
a)	2, 8, 10, 15, 18, 20	2, 10, 8, 20, 18, 15	15, 8, 2, 10, 18, 20
b)	2, 10, 8, 20, 18, 15	15, 8, 2, 10, 18, 20	2, 8, 10, 15, 18, 20
c)	15, 8, 2, 10, 18, 20	2, 8, 10, 15, 18, 20	2, 10, 8, 20, 18, 15
d)	15, 8, 2, 10, 18, 20	2, 10, 8, 20, 18, 15	2, 8, 10, 15, 18, 20

Q8. When the hash function "x mod 13" for a given key x is used to store five keys 367, 25, 82, 66, and 13 sequentially in the one-dimensional array shown below, which of the following is the appropriate combination of indices where the keys 82 and 13 are stored? Here, if the index location specified by a hash value is already occupied, the array is searched forward from that location to find the next empty location.

Index	0	1	2	3	4	5	6	7	8	9	10	11	12
Element	91				43							362	

	Key = 82	Key = 13
a)	4	0
b)	4	1
c)	5	1
d)	5	2

Q9. Which of the following is a valid binary search tree?

a)

b)

c)

d)

– 5 –
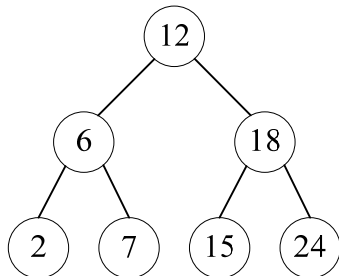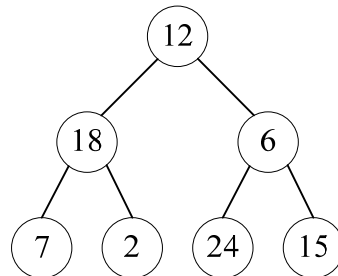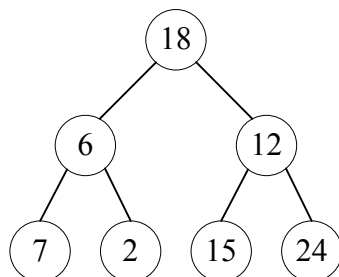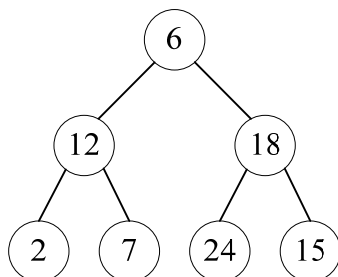
Q10. Which of the following is the average time complexity of a randomized quick sort algorithm where the pivot is selected randomly?   Here, "$O(\ )$" denotes the order of the algorithm's running time, and "n" is the number of data to be sorted.

a) $O(n)$ b) $O(n^{1.5})$ c) $O(n^2)$ d) $O(n\log_2 n)$

Q11. Which of the following is the addressing mode where the register specified is used to point to the memory address of the data to be operated upon?

a) Base register addressing mode   b) Indirect addressing mode
c) Register addressing mode   d) Register indirect addressing mode

Q12. As shown in the table below, when a computer executes three types of instructions A, B, and C, what is the performance in MIPS of the computer?

Instruction type	Execution time (nanoseconds)	Frequency of appearance (%)
A	10	40
B	20	30
C	50	30

a) 2.5   b) 8   c) 10   d) 40

Q13. Which of the following is a computer architecture where each instruction is divided into multiple stages (e.g., fetch, decode, and execute) in the processor, and multiple functional units execute two or more instructions in parallel by slightly shifting the instructions in stages?

a) Multicore   b) Pipeline   c) Superscalar   d) VLIW

Q14. Which of the following is an appropriate explanation of memory interleaving?

a) Cache memory is divided into two segments: one for instructions and the other for data, in order to remove factors which disturb pipeline processing.
b) Data is written to both cache memory and main memory at the same time in order to accelerate access from the CPU to main memory.
c) High-speed and low-capacity memory is allocated in order to remove a bottleneck caused by the gap in access speed between the CPU and main memory.
d) Main memory is divided into multiple banks, and each bank is concurrently accessed in order to accelerate access from the CPU to main memory.

Q15. Which of the following is the list that arranges A through D in order of effective access time of main memory from shortest to longest?

	Cache memory			Main memory
	Use of cache memory	Access time (nanoseconds)	Hit ratio (%)	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

Q16. Which of the following is widely used as storage media for image data in digital cameras or for music data in portable music players?

a) DRAM   b) Flash memory
c) Mask ROM   d) SRAM

Q17. When a 12-point character is displayed in bitmap on a 96-dpi display screen, how many dots are used for the height of a square font?   Here, 1 point is 1/72 inch.

a) 8   b) 9   c) 12   d) 16

Q18. In a client/server system using a database server, the generation of a large number of SQL statements causes a problem with a rapidly increasing network load between client and server.   Which of the following is an appropriate solution to this problem?

a) Reorganization of database

b) Revision of index

c) Use of dynamic SQL

d) Use of stored procedure

Q19. The table below shows the number of failures per day and the average repair time (in minutes) per failure that are observed during the first 2 days in a newly installed system. What is the approximate availability of the system during that period?   Here, the system is expected to operate for 24 hours every day.

Day	Number of failures per day	Average repair time per failure
1	12	30
2	6	20

a) 0.17

b) 0.20

c) 0.80

d) 0.83

Q20. In the RAID0 and RAID1 systems using two disks, when one disk has a reliability rate of 99% and the other has a reliability rate of 97%, which of the following is the appropriate combination of each failure rate (in percentage) of RAID0 and RAID1?   Here, the failure rate is calculated by using the formula below.

failure rate (%) = 100% − reliability rate (%)

	RAID0	RAID1
a)	0.02	3.00
b)	0.03	3.97
c)	3.97	0.02
d)	3.97	0.03

Q21. Which of the following is a term that shows the amount of work that is processed per unit of time by a computer system?

a) Response time
b) Throughput
c) Time slice
d) Turnaround time

Q22. Which of the following is the most appropriate explanation of a dual system?

a) It loads the online processing program of the currently used system onto the backup system that is set to the standby state. In the event of a failure in the currently used system, it immediately switches to the backup system and continues the processing.

b) It prepares a dual-redundant unit or device, such as processor, memory, channel, and power supply, and continues the processing even in the event of a failure in either of the devices.

c) It provides a currently used system for performing online processing and also a backup system that is made to wait while performing the batch processing. In the event of a failure in the currently used system, it switches to the backup system and continues the online processing.

d) It provides a duplicate system for performing the same processing, and performs a cross check of the processing results. In the event of a failure in either system, it continues the processing through degraded operation.

Q23. Among the explanations of task scheduling methods, which of the following has the highest possibility that a specific task continues to wait for the allocation of CPU time?

a) Each task is added to the end of the Ready queue in order of arrival into the system, and the CPU time is always allocated to the first task in the Ready queue.

b) Each task is executed in the order listed in the Ready queue. Once a fixed period of time has elapsed, the execution of the task is suspended and it is added to the end of the Ready queue.

c) The priority of each task is determined, and each task is executed in high to low priority order. The priority is increased gradually according to the length of the waiting time until the CPU time is allocated.

d) The processing is executed from the task with the estimated shortest processing time. The subsequent task is started when the processing being executed is either completed or has been suspended for some reason.

Q24. Which of the following is classified as an external interrupt?

   a) An interrupt that is caused by access to a non-existent page in virtual memory
   b) An interrupt that is caused by an arithmetic overflow or divide-by-zero
   c) An interrupt that is caused by an interval timer when the specified time elapses
   d) An interrupt that is caused by the execution of a software interrupt instruction

Q25. Which of the following is an appropriate explanation of the LRU method that is used as a page replacement algorithm?

   a) The page that has existed for the longest time is replaced.
   b) The page that has not been used for the longest time is replaced.
   c) The page that was last referenced is replaced.
   d) The page that was referenced the least number of times is replaced.

Q26. Which of the following is an appropriate reason for using a real-time OS in an embedded system?

   a) A graphical user interface is provided from an ease-of-use perspective.
   b) No data is lost even if an application program hangs up.
   c) The highest level of system security and reliability is assured.
   d) There is a mechanism available to respond within the limited time.

Q27. Which of the following is the logical expression that indicates the output Z of the combinational circuit below? Here, "$\cdot$" is used for the logical product, "+" for the logical sum, and "$\overline{X}$" for the negation of X.
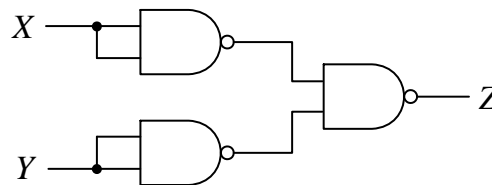
   a) $X \cdot Y$ b) $X + Y$ c) $\overline{X \cdot Y}$ d) $\overline{X + Y}$

Q28. Which of the following is a characteristic of DRAM, in comparison with SRAM?

 a) DRAM has the disadvantage of higher cost.
 b) DRAM is suitable for a higher level of integration.
 c) DRAM stores data in an electronic circuit called a flip-flop.
 d) DRAM transfers data at a faster speed.

Q29. Which of the following is the case where outline fonts rather than bitmap fonts are effective and suitable for use on an output device such as a display or a printer?

 a) Both single-byte and double-byte characters are displayed.
 b) Characters are displayed on the screen as quickly as possible.
 c) Characters are displayed with uniform width.
 d) Characters are enlarged using a given scale factor.

Q30. Audio is sampled and recorded at a frequency of 11,000 times per second with a resolution of 8 bits per sample. How many minutes of audio at maximum can be recorded in flash memory with a capacity of 512×10^6 bytes?

 a) 77   b) 96   c) 775   d) 969

Q31. Which of the following is a mechanism that is used for defining the style of a Web page?

 a) CMS   b) CSS   c) PNG   d) SVG

Q32. Which of the following is the appropriate sequence of steps used for normalizing a relational database table?

 Step A: Attributes dependent on non-key attributes are separated as another table.
 Step B: Attributes dependent on only part of key are separated as another table.
 Step C: Repetitive data is separated as another table.

 a) B → A → C   b) B → C → A
 c) C → A → B   d) C → B → A

Q33. In a relational database, which of the following is an appropriate definition of a composite key?

a) A minimal set of attributes that uniquely identifies a tuple within a relation
b) A primary or foreign key that consists of two or more attributes of a relation
c) A set of attributes from which the primary key of a relation is chosen
d) An attribute in a child table that matches the primary key values in the parent table

Q34. When the SQL statements shown below are executed for the "SMARK" table, which of the following is the appropriate table that can be obtained as a result?

```
CREATE VIEW Result
  AS SELECT * FROM SMARKS AS S
     WHERE S.Marks > 52 AND S.ID <= 0100
SELECT r.ID FROM Result AS r
     WHERE r.Status LIKE 'Pass' AND r.Mark <= 90
```

SMARK

ID	Name	Marks	Status
0014	Jack Smith	80	Pass
0016	Mary White	75	Pass
0057	Tom Scott	90	Pass
0058	Jimmy Brown	52	Fail
0076	Susan Jackson	59	Fail
0100	Bob Miller	92	Pass

a)

ID
0014
0016
0057

b)

ID
0014
0016
0057
0076
0100

c)

ID
0014
0016
0057
0100

d)

ID
0058
0076

Q35. In an SQL statement, which of the following is an appropriate explanation of the percent symbol (%) that is used with the LIKE operator in a WHERE clause?

a) It is a wildcard character that matches any single alphabetic character.
b) It is a wildcard character that matches any single character within the list.
c) It is a wildcard character that matches any single numeric character.
d) It is a wildcard character that matches any string of zero or more characters.

Q36. As shown below, there are three relational database tables Table_1, Table_2, and Table_3. Table_1 contains the students who have knowledge of Java language, and Table_2 contains the students who have knowledge of C++.   Table_3 contains the students who know C++ but do not know Java.   Which of the following is the appropriate operation in relational algebra that can be used to create Table_3?

Table_1

Student_ID	Student_Name	Class
S0005	Susan Boyle	C1
S0010	Billy Robinson	C2
S0015	George Miller	C3

Table_2

Student_ID	Student_Name	Class
S0015	George Miller	C3
S0020	Mary Porter	C1
S0010	Billy Robinson	C2
S0001	Adam Smith	C2

Table_3

Student_ID	Student_Name	Class
S0020	Mary Porter	C1
S0001	Adam Smith	C2

a) Difference   b) Intersection   c) Natural join   d) Union

Q37. Which of the following is an appropriate explanation concerning the NAT function of a router used for Internet connection?

a) A specific bit pattern in IP packets being transmitted can be detected.
b) Conversion between private IP addresses and global IP addresses can be performed.
c) Frequently accessed Web pages can be cached to provide faster response times.
d) Only the IP packets addressed to a specific terminal can be passed.

Q38. Which of the following is the appropriate protocol that is used on top of UDP for delivering real-time audio and video streams over the Internet?

a) ARP   b) ICMP   c) NNTP   d) RTP

Q39. Which of the following is an appropriate function of a switching hub (layer 2 switch) that is used as a network device?

a) A received packet is divided (i.e., fragmented) into multiple packets in the network layer.
b) A received packet is forwarded (i.e., broadcasted) to all LAN ports.
c) A received packet is forwarded only to a LAN port corresponding to a destination MAC address.
d) An IP address for a terminal connected to a LAN port is dynamically allocated.

Q40. In a TCP/IP network, which of the following is used to check if a computer or device is accessible across a network?

a) BOOTP   b) DHCP   c) MIB   d) ping

Q41. Which of the following is the most appropriate term that corresponds to the method of illegally intercepting audio and/or data being transmitted or received via a network?

a) Salvaging   b) Scavenging   c) Sniffing   d) Spoofing

Q42. Which of the following is a computer network attack that can be classified as a DDoS attack?

a) A destructive computer program bores its way through a computer's files or through a computer network and is activated on a predetermined event or at a particular date or time.

b) A program installed by a virus or even by legitimate programs allows an attacker to manipulate the compromised computer to bypass security controls and perform single or even strategic attacks against other people's computers.

c) A set of software tools is used to hide presence of a malicious program on a computer and to help an attacker obtain administrator-level access to the computer without the user's knowledge or consent.

d) All the computers infected by a virus send a large number of recursive queries simultaneously to a target computer when receiving a command from an attacker who is in a remote location.

Q43. When information, such as an e-mail or a document file, is sent or received with a digital signature via the Internet, which of the following is the appropriate combination of security properties that ensure that such information has not been altered or tampered with during transmission?

a) Atomicity and consistency   b) Authenticity and integrity

c) Availability and confidentiality   d) Durability and isolation

Q44. Which of the following is the most appropriate explanation of a digital certificate that is authorized by a trusted third party known as a CA (Certification Authority)?

a) A document that verifiably associates a public key with a particular person or party

b) A technique that is used to hide the secret data into a digital image, audio, or video file

c) A tool that serves to protect the copyright and authenticity of multimedia content

d) An electronic signature that protects the integrity and authenticity of a document

Q45. Which of the following is a biometric recognition technique that is used for identifying a person by using the person's own behavioral features as well as physiological features?

a) Fingerprint recognition

b) Iris recognition

c) Vein recognition

d) Voice recognition

Q46. Which of the following is an appropriate description concerning social engineering?

a) An attacker creates IP packets that appear to originate from valid addresses inside a trusted network.

b) An attacker intercepts and modifies the data in the packet without the knowledge of the sender or receiver.

c) An attacker manipulates people into providing inappropriate access to sensitive or confidential data.

d) An attacker searches for a valid combination of user ID and password by using a brute force attack tool.

Q47. Which of the following is a technique where a system is actually attacked and an intrusion attempt is made, with the aim of discovering security-related vulnerabilities of a computer or network?

a) Penetration test

b) Regression test

c) Software inspection

d) Walk-through

Q48. Which of the following is a network segment that is isolated from the external network (WAN) and the internal network (LAN) via firewalls in order to ensure that publicly accessible servers cannot contact other internal network segments in the event that such a server is compromised?

a) DMZ

b) DNS

c) Proxy

d) VLAN

Q49. Among the diagrams used in UML 2.x, which of the following is the diagram that can represent the interactions based on messages sent or received between objects?

a) Component diagram
b) Sequence diagram
c) State machine diagram
d) Use case diagram

Q50. When a system is developed by using object-oriented approach, which of the following is the effect of encapsulation?

a) A new class is derived as a child class, so the child class can use any necessary attributes of its parent class.
b) An increase in the types of objects receiving messages does not affect the objects sending messages, because each object responds to the same message in a different way.
c) In addition to existing types, user-defined types can be used, so the specification of a program can be extended according to the problem area.
d) When the internal data structure or the implementation of a method for an object is changed, other objects are not susceptible to the change.

Q51. Which of the following is an appropriate description concerning the black box test?

a) Even if the program to be tested contains redundant code, such kind of code cannot be detected.
b) In consideration of the internal structure of the program, it is verified whether or not the necessary path is executed.
c) The amount of test data increases rapidly with an increase in the number of branch instructions or modules.
d) The coverage rates of instructions and branches are used as criteria for creating test data.

Q52. Which of the following is the appropriate category of system maintenance that is performed for the purpose of adding new features to an existing system or enhancing existing features?

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

Q53. Which of the following is an appropriate explanation of Agile software development methodology?

a) A model in which the system is developed by enlarging the scale of the development functions while repeating a series of development processes over and over and by minimizing various risks such as a development cost increase

b) A model in which trial software is created in an early stage of development in order to determine user interfaces and system performance such as responsiveness, and to reduce the risk of rework caused by specification changes in subsequent stages

c) A model that encompasses a group of adaptive, iterative, and incremental development methods, such as XP and Scrum, and focuses on collaboration and responding to changes in the shortest period of time in a sustainable manner

d) A model that prescribes a series of development phases in which development process flows downwards without going back to an earlier phase once it is completed, and each phase has its distinct set of deliverables used for the succeeding phase

Q54. Which of the following is the order that activities *A* through *F* are performed in a system development process using a waterfall model?

[Description of activities]

A: Investigating and analyzing current problems, and defining requirements for the target system

B: Dividing functions required for the system into programs, and clarifying the flow of processing

C: Designing detailed procedures, and writing code

D: Performing tests

E: Designing the internal structure of each program

F: Defining functions needed as the system on the basis of the system requirements specifications

a) *A, B, F, C, E, D*   b) *A, F, B, E, C, D*

c) *A, F, B, E, D, C*   d) *A, F, E, B, C, D*

Q55. In the development process, which of the following is an activity that should be performed in software architecture design?

    a) Analyzing the requirements on a step-by-step-basis by using the form of a chart
    b) Deciding how to implement the software requirements that are already defined
    c) Deciding the specifications according to the baseline of customer opinions
    d) Describing the specifications so that the program is clarified on a line-by-line basis

Q56. Which of the following is an activity that is performed during the WBS creation process in project scope management?

    a) Arranging the schedule on the basis of the flow of project activities
    b) Defining project activities that create deliverables
    c) Estimating the cost by calculating person-hours for each project activity
    d) Segmenting project activities hierarchically into smaller parts or pieces

Q57. When the creation status of design documents is as described in the table below, how many person-hours are additionally needed to complete the creation of all three types of design documents?

Design document	Number of pages created	Required person-hours per page	Number of pages created until now
Basic design document	80	5	80
Outline design document	300	2	200
Detailed design document	500	2	50

    a) 550   b) 900   c) 1100   d) 2000

Q58. When the new procurement of a system is undertaken on the basis of the decision tree shown below, which of the following is the most appropriate course of action to be selected from a viewpoint of the lowest expected cost?   Here, values enclosed in parentheses indicate the probability of each option, and the rightmost value is the estimated cost of each option.   The expected cost of each choice (i.e., Build, Reuse, Buy, or Contract) is calculated as follows:

Expected cost = $\sum$ ("probability of each option" × "estimated cost of each option")

```
                                    Simple (0.3)           $30,000
                          Build●
                                    Difficult (0.7)        $40,000

                                    Minor changes (0.4)    $20,000
                          Reuse●
                                    Major changes (0.6)
                          Build            ●  Simple (0.2)  $30,000
                                              Complex (0.8)
System●                   Reuse                             $40,000

                                    Minor changes (0.7)    $20,000
                          Buy ●
                                    Major changes (0.3)
                          Contract
                                                           $50,000

                                    Make contract (1.0)
                              ●                            $35,000
```
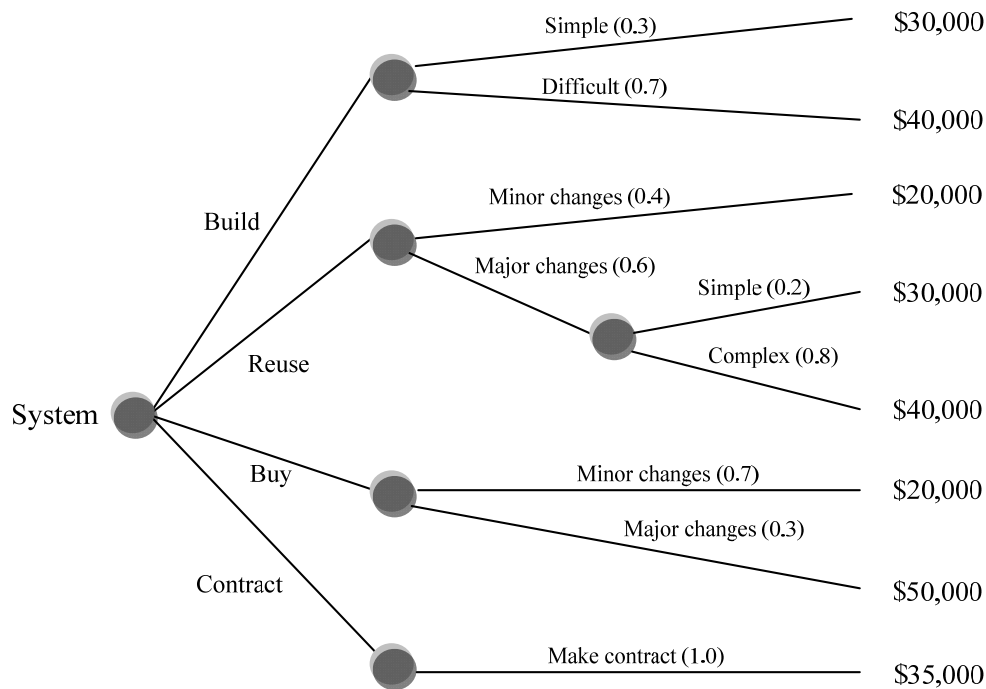
a) Build   b) Buy   c) Contract   d) Reuse

Q59. The development scale of a new system is estimated as 500 Function Points (FPs).   In the project for developing this system, in addition to the person-hours for development, 10 person-months are necessary for the installation of the system and the education of developers.   Also, 10% of the person-hours for development, installation, and education are required for project management.   How many person-months in total are necessary for this project?   Here, the productivity in development is 10 FPs per one person-month.

a) 51   b) 61   c) 65   d) 66

Q60. 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 a few locations, service staff members can be deployed effectively and a large number of calls can be handled.
b) By locating 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 staff members.
c) By performing centralized and integrated management of the entire staff members including the service staff at distributed locations, well-controlled services can be provided.
d) By using communication technology, services can be provided like a single service desk even if the service staff members are distributed across several regions and departments.

Q61. Four types of processes including service delivery process, relationship process, resolution process, and control process are defined in ISO/IEC 20000-1: 2011 (Information technology — Service management — Part 1: Service management system requirements).   Which of the following is described as a service delivery process?

a) Configuration management
b) Information security management
c) Problem management
d) Supplier management

Q62. Which of the following is an effective means of protecting an information system from the damage of over-voltage that is caused by a lightning strike?

a) Connecting computers and cables through a surge protection device
b) Digitalizing the control circuits of electric power facilities
c) Installing a private power generator
d) Providing two different communication paths

Q63. Among the system audit items concerning master file management, which of the following is pertinent to availability?

a) The maintenance of the master file can be performed only by a person who has a privileged account.

b) The server with dual-redundancy technology is used to store the master file in order to improve fault tolerance.

c) The system has functions that can collectively do the searching and processing of several data items of the master file.

d) The system provides the function that makes it possible to check data input to the master file.

Q64. Which of the following is a situation where the independence of a system auditor is maintained?

a) A system auditor is recruited from an auditing firm and placed as an internal auditor, and is asked to audit the business system development of the company.

b) The auditing department of the IT vendor to whom the business system operations of the company are outsourced is requested and put in charge of external auditing of the business system operations of the company.

c) The staff member of the sales department is appointed as a member of the audit team, and is asked to audit the measures for the protection of personal information in the sales department.

d) The staff member who has developed a system in the system department is moved to the auditing department, and is put in charge of auditing the maintenance of the system.

Q65. Which of the following is an appropriate explanation of IT governance?

a) A capability to guide the development and implementation of an IT strategy in a desired direction to gain a competitive advantage

b) A comprehensive framework and a set of best practice standards concerning the management and operations of IT services

c) A group of administrative services provided online by local governments to individuals by using the Internet and Web sites

d) A set of knowledge, skills, and abilities to take advantage and make use of information technology in order to resolve problems

Q66. From a viewpoint of corporate management, which of the following is an explanation of BPM?

a) A reduction of inventory and lead time is achieved by exchanging information about a series of business processes from the supply of components up to the sale of products on a real-time basis.

b) Business processes ranging from the sales of products up to after-sales service and also including queries and claims are consistently managed on the basis of a customer database.

c) The management cycle of analysis, design, execution, and improvement is incorporated into business processes so that business processes can be continuously reviewed for improvement and integrated with optimum processes.

d) The overall optimization of corporate management resources is achieved by managing business-critical information about business operations or activities, such as production, logistics, sales, finance, and human affairs, in an integrated manner.

Q67. Which of the following is an explanation of SOA (Service-Oriented Architecture)?

a) It is a concept that management resources can be concentrated on the core business by outsourcing the non-core business from among the in-house activities.

b) It is a concept that sales efficiency and quality are enhanced with the aid of IT in order to increase sales and profits and to improve customer satisfaction.

c) It is a concept that the business process is redesigned radically in order to improve the cost, quality, service, and speed in an innovative manner.

d) It is a concept that the functions of software are considered as components called services, and these services are combined together to construct a system.

Q68. Which of the following is an explanation of SCM?

a) A series of business operations including purchase, production, sale, and distribution is reviewed from the viewpoint of total optimization among companies in order to reduce delivery lead time and inventory.

b) Customer information collected through various channels is managed in an integrated manner in order to build closer relationships with customers by using such information.

c) Intellectual assets of individuals, such as skills and experiences, are shared across work units, jobs, and locations in order to achieve creative activities in an efficient and effective manner.

d) The skills and behavioral characteristics of a company's employees are managed for implementing appropriate personnel assignment and evaluation from the perspective of human resources strategy.

Q69. Which of the following corresponds to an example of "**non-functional**" requirements?

a) Clarifying the flow of data between the functions constituting business operations
b) Deciding the scope that is to be implemented as system functions
c) Selecting development standards based on the language used in system development
d) Specifying the interface used for exchanging information with other systems

Q70. When a company's own product is analyzed by using a SWOT analysis, which of the following is classified as an external factor?

a) Cost competitiveness
b) Functional strengths
c) Quality-related weaknesses
d) Threats of new competitors

Q71. Which of the following is the purpose of CRM?

a) To acquire customer loyalty and maximize customer lifetime value
b) To determine the order point and quantity of material necessary for production
c) To obtain the sales information of each product at the time of sales
d) To reduce loss of sales opportunities caused by insufficient inventory

Q72. Which of the following is an explanation of social media?

    a) It provides a mechanism that allows a neighboring store to use the positional information of a cell phone and send an advertisement to the cell phone user in real time.

    b) It provides a mechanism that promotes the connection between users so that the information posted by a user over the Internet is widely transmitted to a large number of users.

    c) It provides a mechanism that specifies a target keyword in advance and displays an advertisement when the keyword is used in a search operation.

    d) It provides a mechanism where the payment of remuneration is made to a customer when the customer buys a product from an EC site introduces the product on his own Web page and another customer who sees the Web page buys the same product.

Q73. Which of the following is an explanation of core competence adopted in business administration?

    a) It refers to a bundle of a company's unique skills and technologies that are the source of competitive superiority and are superior to those of competitors.

    b) It refers to a qualitative and quantitative understanding of products, services, and operations through comparison with the strongest competitor or advanced companies.

    c) It refers to fundamental reconsideration and radical redesigning of business processes to dramatically improve the cost, quality, service, and speed of a company.

    d) It refers to the ability to control the company-wide management resources in an integrated manner and to achieve an improvement in management efficiency.

Q74. Which of the following is the procurement process that enables suppliers to bid against one another on the Internet in order to sell their products or services under the conditions specified by a general customer?

    a) B to B   b) G to C

    c) Reverse auction   d) Virtual mall

Q75. Which of the following is an explanation of knowledge management?

a) Business is conducted to accelerate decision making processes by organizing a flat structure with minimal hierarchical layers.

b) Business is conducted to enhance the problem-solving ability of the entire workforce by sharing information, skills, and understanding dispersed across a company.

c) Business is conducted to promote management innovation by performing a comparative analysis with other successful companies .

d) Business is conducted with the focus on a company's own know-how, technology, and other advantages that cannot be imitated by competitors.

Q76. A restaurant is to be opened for business under the conditions shown below.   In order to make the monthly profit of 50,000 dollars, how many customers are necessary for each seat per business day?

　[Conditions]
　　Average sales for each customer per month:　　100 dollars
　　Variable cost per customer per month:　　　　20 dollars
　　Fixed cost per business day:　　　　　　　　400 dollars
　　Number of business days per month:　　　　　25 days
　　Number of seats:　　　　　　　　　　　　　10 seats

a) 2　　　　　　　b) 3　　　　　　　c) 4　　　　　　　d) 5

Q77. Which of the following is an explanation of an affinity diagram?

a) It is a method by which the causal relationship between events is clarified for events intertwined with complex factors.

b) It is a method by which the collected information is grouped according to the mutual relationship, and the problems to be resolved are clarified.

c) It is a method by which the means and measures are reviewed for problems that might have several outcomes along with the progress of a situation, and the process leading to the desired result is decided.

d) It is a method by which the means and measures for achieving the purpose and objectives are developed sequentially, and the most appropriate means or measures are searched for.

Q78. Which of the following is the graph of an ABC analysis showing product sales for each product item? Here, the vertical axis represents sales, and the horizontal axis represents product items.

a)

b)

c)

d)
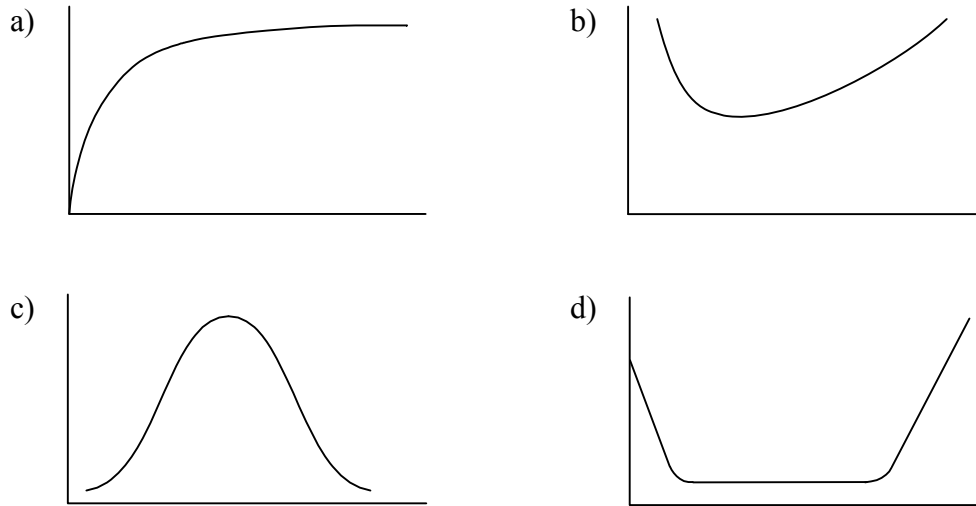
Q79. Which of the following is protected by "copyright" that is based on the WTO's Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)?

a) Algorithm
b) Compiler program
c) Programming language
d) Protocol

Q80. When OSS released under GPL is changed and distributed, which of the following is an appropriate action that complies with the rules of GPL?

a) A purchaser who obtains the derivative work must be strictly prohibited from redistributing copies.
b) All the source code of the derivative work including the modified parts must be disclosed on an on-demand basis.
c) The source code of a separate application that is statically linked to the derivative work does not need to be disclosed.
d) When the source code of the derivative work is disclosed, compensation such as related costs cannot be demanded.