October 2015

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/IEC25010:2013
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.

Q1. What is the sum of two binary fractions 1.0101 and 1.0111 expressed in decimal?

a) 2.5 　　　　　 b) 2.75 　　　　 c) 2.875 　　　 d) 2.9375

Q2. Which of the following is the logical expression equivalent to $\overline{A} + B \cdot \overline{C} + \overline{B}$?

a) $\overline{A}$

b) $\overline{A \cdot B \cdot C}$

c) $A \cdot \overline{(B + C)} \cdot B$

d) $\overline{A} + \overline{C}$

Q3. A spam filter checks each incoming message to be classified as either spam or non-spam, and only messages classified as non-spam are to be delivered to each inbox. On average, however, one percent of messages are incorrectly classified. When 95 percent of incoming messages are spam and this filter is applied, what is the percentage of spam in each inbox?

a) 0.5 　　　　 b) 1 　　　　　 c) 9.50 　　　 d) 16

Q4. Which of the following is a language processor that produces executable code for other platforms than the one on which the language processor itself is running?

a) Cross compiler 　　 b) Emulator 　　　 c) Generator 　　 d) Simulator

Q5. What is the value of the following expression in Reverse Polish Notation?

　　　9　2　1　+　−　3　×

a) 0 　　　　　 b) 4 　　　　 c) 10 　　　 d) 18

Q6. Function mod(x, y) is defined as the remainder of the division of x by y. By using this as a hash function, a 5-digit decimal number "$a_1a_2a_3a_4a_5$" is stored in the array shown below at the position mod($a_1+a_2+a_3+a_4+a_5, 13$). What is the position of the number 54321 to be stored?

Position	Array
0	
1	
2	
⋮	⋮
11	
12	

  a) 1   b) 2   c) 7   d) 11

Q7. For a pair of a queue and a stack, two operations "pop_enq" and "deq_push" are defined as follows:

   pop_enq :   pops an item from the stack and puts it into the queue
   deq_push :   takes an item from the queue and pushes it into the stack

   When four items A, B, C, and D are stored in the queue, what is the minimum number of deq_push operations required in order to reverse the order of the four items by using only these two operations?

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

Q8. In order to sort the sequence "98, 12, 4, 56, 34, 23" in ascending order by Bubble Sort algorithm, how many exchange operations are required?

  a) 5   b) 7   c) 9   d) 11

Q9. Let A be an array of size n, whose elements, $A(1)$, $A(2)$, ... $A(n)$, are in ascending order. For a value k, a procedure for finding the index m which satisfies $A(m) = k$ is described below. If no such index is found, the procedure terminates with $m = 0$. Which of the following is the appropriate operation to be filled in B? In the options, "/" denotes the quotient whose fractional part is discarded.
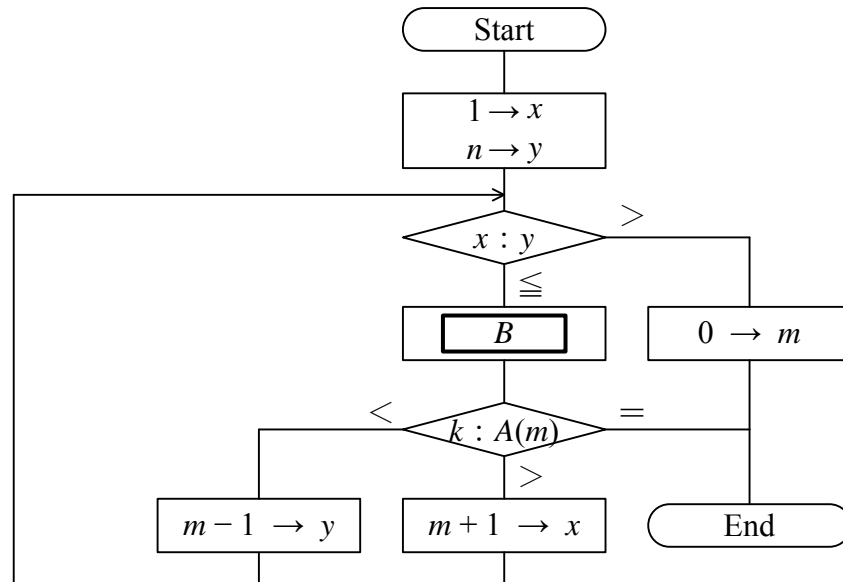
a) $(x + y) \rightarrow m$

b) $(x + y) / 2 \rightarrow m$

c) $(x - y) / 2 \rightarrow m$

d) $(y - x) / 2 \rightarrow m$

Q10. Which of the following is the addressing method that references data in main memory as shown in the figure below?
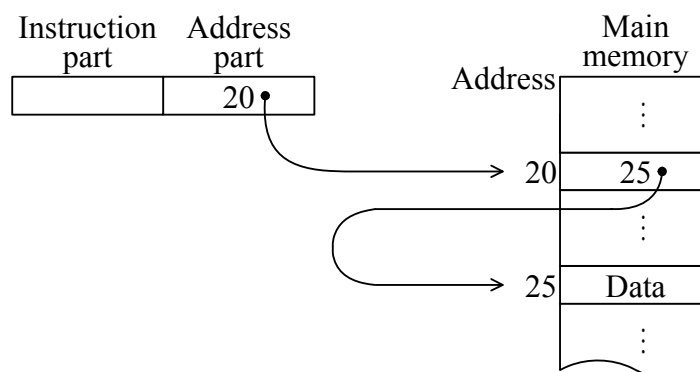
a) Direct addressing

b) Index addressing

c) Indirect addressing

d) Relative addressing

Q11. When data is read into a processor and there are no hits in the cache memory, which of the following is the action that the cache memory control unit performs?

a) The required data is read from disk cache to main memory by using the block transfer mechanism.

b) The required data is read from main memory to cache memory by using the block transfer mechanism.

c) The required data is read from the hard disk to cache memory by using the block transfer mechanism.

d) The required data is written from cache memory to the hard disk by using the block transfer mechanism.

Q12. Which of the following statement is true for DMA Controller?

a) DMA controller enables data transfer directly between input/output devices and the memory while the CPU can perform some other operations.

b) DMA controller enables data transfer directly between the cash memory and the main memory while the processor is at the waiting state.

c) DMA controller enables input/output devices to read from and write to the main memory through CPU and system bus.

d) DMA controller enables the CPU to access the main memory directly while input/output devices communicate among themselves at the same time.

Q13. Consider a disk drive that has a capacity of 8 GB. The drive has 5 platters with two surfaces, 10,000 tracks per surface and 200 sectors per track.   How many bytes are in each sector?   Here, 1GB is 1,000,000,000 bytes.

a) 100　　　　　　　b) 200　　　　　　　c) 400　　　　　　　d) 800

Q14. Which of the following is the concept of a fail-safe design?

a) When a failure occurs in a leased line, switching to a public line occurs immediately, and the processing continues even though the processing efficiency of the system declines.

b) When a failure occurs in the data transfer process of a data collecting system, only the data input process is performed, and all the data is transmitted at the time of recovery from the failure.

c) When anything other than a numeric character is entered in the numeric input field, the system issues a warning message and requests a correct input.

d) When the system determines that there is a fault in the sensor for detecting if someone has entered the working envelope or work area, the robot arm is stopped forcibly.

Q15. Which of the following is an appropriate description concerning the reliability of a computer system?

a) As the system configuration becomes more complicated, MTBF (Mean Time Between Failures) increases.

b) Availability of systems can be improved by increasing MTTR (Mean Time To Repair) and MTBF.

c) Preventive maintenance of systems is performed to increase MTBF.

d) Remote maintenance of systems can increase MTTR and improve availability.

Q16. Which of the following is the expression that indicates the availability of an entire multiplex system composed of five subsystems having an availability of P for each subsystem, as shown in the figure below? Here, as long as at least one of the paths connected in parallel is working, the system can be regarded as working.
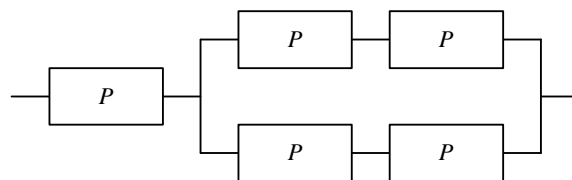
a) $1 - (1 - P)(1 - P^2)^2$

b) $P\{1 - (1 - P)^4\}$

c) $P\{1 - (1 - P)^2\}^2$

d) $P\{1 - (1 - P^2)^2\}$

Q17. In a paged virtual memory, the LRU method is adopted for the page replacement algorithm. When the page frame allocated to the main memory is 4, which of the following page is to be replaced when page 6 is accessed if the pages are accessed in the order of page 1, 2, 3, 4, 5, 2, 1, 3, 2, 6?   Here, no page exists in the main memory in the initial state.

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

Q18. A real-time OS, which performs preemptive scheduling based on priority, schedules the tasks *A* and *B*.   When *A* has a higher priority than *B*, which of the following is an appropriate action that is performed by the real-time OS?

a) When *A* is launched during the execution of *B*, *B* is put into a "ready" state and *A* is executed.
b) When *A* is launched during the execution of *B*, *B* is put into a "waiting" state and *A* is executed.
c) When *B* is launched during the execution of *A*, *A* is put into a "ready" state and *B* is executed.
d) When *B* is launched during the execution of *A*, *A* is put into a "waiting" state and *B* is executed.

Q19. Which of the following is an appropriate explanation of the spooling function?

a) Execution of the programs is temporarily suspended, and control is transferred to the control program.
b) If a CPU becomes idle because of the execution of input/output instructions while executing a certain task, the CPU is assigned to another task.
c) The access time to auxiliary storage devices is reduced by providing a buffer pool consisting of multiple buffers and by increasing the probability of accessing buffers located in the main storage.
d) The overall processing power of a system is enhanced by performing data transfer between the main storage and low-speed input/output devices via auxiliary storage devices.

Q20. Which of the following is an explanation of an absolute path name of a file system?

a) It is the path name from the current directory up to the target file.
b) It is the path name from the home directory up to the target file.
c) It is the path name from the root directory up to the target file.
d) It is the shortest path name from among the several path names from a directory up to the target file.

Q21. Which of the following is an appropriate explanation of DRAM?

a) It is memory that needs to be refreshed, and is used for main memory in a PC.
b) It is non-volatile memory that can erase and write data in units of one byte, and it is used when data preservation is required even if the power supply is interrupted.
c) It is non-volatile memory that has NAND types and NOR types, and is used for SSD.
d) Its memory cells are composed of flip-flops, and it is used for cache memory.

Q22. Which of the following is the logic circuit that generates the same result as the logical expression $X = \overline{A} \cdot B + A \cdot \overline{B} + \overline{A} \cdot \overline{B}$?   Here, "•" is the logical product, "+" is the logical sum, and $\overline{A}$ is the negation of A.

a)

A
B — X

b)

A
B — X

c)

A
B — X

d)

A
B — X

– 10 –
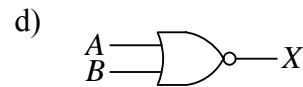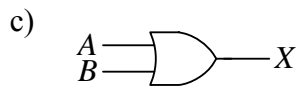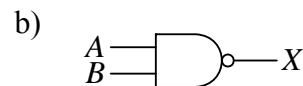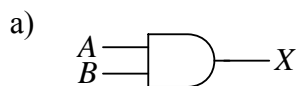
Q23. A device, which operates at a 100V household power supply and through which a current of 10 A flows during operation, is operated from 0 minutes to 120 minutes as shown in the figure below. How much electrical energy, in watt-hour, is consumed at this time? Here, the value of the voltage and current is the effective value, and no current flows when the device stops. Moreover, the power factor is 1.
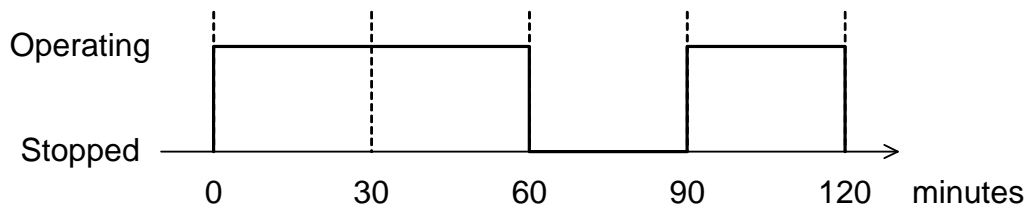
a) 1,000   b) 1,200   c) 1,500   d) 2,000

Q24. Which of the following is the standard used to describe the look and formatting of markup language documents such as HTML and XHTML?

a) CMS   b) CSS   c) RSS   d) Wiki

Q25. In the process of creating animation, which of the following is used to incorporate the natural movement of objects, humans and animals, by using sensors and video cameras?

a) Key frame method   b) Morphing
c) Motion capture   d) Pixel shader

Q26. Among the descriptions concerning database models, which of the following is an appropriate explanation of the network model?

a) It consists of two or more data files located at different sites on a computer network.
b) It presents information in two-dimensional tables with rows and columns.
c) Its records are organized into a tree structure.
d) Its records can have multiple parent records and multiple child records.

Q27. When the relationships between continent and country and between country and city are shown in the class diagram below, which of the following is an appropriate combination of multiplicities that are to be inserted into blank *A* through blank *D*? Here, there is no cross continental country. Each continent has at least one country, and each country has at least one city.

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

Q28. "$a \rightarrow b$" represents the fact that when the value of item a is determined, the value of item b is determined uniquely. For example, "Employee number $\rightarrow$ Employee name" represents that when the employee number is determined, the employee name is determined uniquely. Based on this notation, when the relations between items a through j are established as shown in the figure below, which of the following is the appropriate combination of three tables that defines the relations in the relational database?
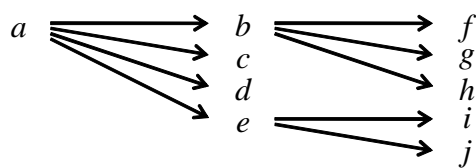
a) Table 1 (a)

   Table 2 (b, c, d, e)

   Table 3 (f, g, h, i, j)

b) Table 1 (a, b, c, d, e)

   Table 2 (b, f, g, h)

   Table 3 (e, i, j)

c) Table 1 (a, b, f, g, h)

   Table 2 (c, d)

   Table 3 (e, i, j)

d) Table 1 (a, c, d)

   Table 2 (b, f, g, h)

   Table 3 (e, i, j)

Q29. In the operation of a relational database, which of the following is an appropriate explanation of projection?

a) From two or more sets of tables, the sets that match conditions are combined together to create a new table.

b) Only specific columns are extracted from a table.

c) The query result of a table and the query result of another table are combined together and set in one table.

d) The rows that match specific conditions are extracted from a table.

Q30. Which of the following is an SQL statement that gives the same result as the SQL statement that is described below for the "Product" table and the "Inventory" table? Here, the underlined part indicates the primary key.

```
SELECT ProductNumber FROM Product
     WHERE ProductNumber NOT IN (SELECT ProductNumber FROM Inventory)
```

Product

ProductNumber	ProductName	UnitPrice

Inventory

WarehouseNumber	ProductNumber	InventortQuantity

a) ```
SELECT ProductNumber FROM Product
WHERE EXISTS (SELECT ProductNumber FROM Product)
```

b) ```
SELECT ProductNumber FROM Inventory
WHERE NOT EXISTS (SELECT ProductNumber FROM Product)
```

c) ```
SELECT ProductNumber FROM Product
WHERE EXISTS (SELECT ProductNumber FROM Inventory
              WHERE Product.ProductNumber = Inventory.ProductNumber)
```

d) ```
SELECT ProductNumber FROM Product
WHERE NOT EXISTS (SELECT ProductNumber FROM Inventory
                  WHERE Product.ProductNumber = Inventory.ProductNumber)
```

Q31. Which of the following is the role of DNS in a TCP/IP network?

a) A private IP address is translated into a global IP address in order to access the Internet.
b) A program in a server can be invoked only by its name without taking the IP address of the server into consideration.
c) In response to an assignment request of an IP address from a PC or a printer, an unused address is chosen from the addresses registered in the server.
d) IP addresses are mapped to domain names, host names, and other such information.

Q32. In OSI basic reference model, what devices are used for segmentation or coupling of Physical layer, Data Link layer and Network layer respectively?

a) Bridge, Repeater, Router
b) Bridge, Router, Repeater
c) Repeater, Bridge, Router
d) Repeater, Router, Bridge

Q33. In TCP/IP networks, which command uses the ICMP "Echo", "Echo Reply" and "Destination Unreachable" messages to test the reachability of the communication partner ?

a) arp
b) echo
c) ipconfig
d) ping

Q34. Which application protocol must support UDP as its transport layer protocol?

a) DNS
b) FTP
c) HTTP
d) Telnet

Q35. Which of the following is an appropriate explanation of POP3 used in e-mail systems?

a) It is a protocol used to authenticate a user with his/her user ID and password after the PPP connection is established.
b) It is a protocol used to exchange e-mail messages between mail servers.
c) It is a protocol used to receive e-mail messages from the mailbox of a mail server.
d) It is a protocol used to send e-mail messages from a PC.

Q36. Which of the following is the most appropriate case example of social engineering?

a) A person scans for open wireless networks available in his/her home area by using his/her portable computer, and then he/she posts the names and locations of the networks found on the website in order to allow his/her friends to have access to free Wi-Fi networks.

b) A phone call was made to a helpdesk of a computer center. By using the personal information scavenged from a trash bin, the caller convinces the helpdesk staff that he/she is a legitimate user, in order to have the password initialized and then break into the system.

c) Advertising messages selling illegal products are sent to an unspecified large number of recipients without prior consent. Even though most recipients ignore or discard the messages, some of them are interested and decide to contact the sender to buy the products.

d) Although a company's computer network is protected by the firewall, malware is able to spread throughout the company because an employee may unintentionally infect a computer with a virus from his/her personal USB flash memory.

Q37. Which of the following is a purpose of using message digest in a message authentication code?

a) To check the encryption method of a message
b) To check the overview of a message
c) To confirm that there is no falsification of a message
d) To secure the confidentiality of a message

Q38. Which of the following is an attack that threatens the "integrity" in information security?

a) A DoS attack by which the system is set to an overloaded state
b) Falsification of a Web page
c) Tapping of communication content
d) Unauthorized copying of data saved in a system

Q39. Which of the following is an explanation of SQL injection?

a) It is an attack by sending data containing a malicious script to a website where a visitor views the visitor's input data on the screen as it is, and making the script executed in the visitor's browser.

b) It is an attack where a command for performing a malicious query or operation in the database is entered when there is a problem in a Web application, and the data of the database is modified or acquired without authorization.

c) It is an attack where a vulnerability of a commercial DBMS (DataBase Management System) is exploited to search the host database server and cause repeated self-infection in order to cause a rapid increase in Internet traffic.

d) It is an attack where a website visitor is made to view a Web page containing an embedded malicious script, and the visitor is then made to perform an unintentional operation on another website.

Q40. Which of the following is an appropriate operation in user authentication that uses an IC card and PIN?

a) If an IC card is lost, a new IC card is issued, and after the PIN is reset, the lost IC card is deactivated.

b) Since each user can be identified by an IC card, a common PIN is set for all users in order to reduce the management workload.

c) The PIN is set by combining the numeric information imprinted on the surface of the IC card.

d) When an IC card is delivered, the PIN is not enclosed, but is notified to the user through another channel.

Q41.   In a database that manages user information, there exists an application that searches for user information and displays it.   In terms of security management, which of the following is an appropriate level of privilege for access to the database to be assigned to this application?   Here, the scope of each privilege is as below.

[Scope of privilege]
Reference privilege: Records can be referred to.
Update privilege: Records can be registered, changed, and deleted.
Administrator privilege: Tables can be referenced, registered, changed, and deleted.

a)   Administrator privilege
b)   Reference privilege
c)   Reference privilege and update privilege
d)   Update privilege

Q42.   When a biometric authentication system is installed, which of the following is the most appropriate point to be considered?

a)   Adjusting the system in consideration of both the probability of incorrectly rejecting an authorized user and the probability of incorrectly accepting an unauthorized user
b)   Combining various measures, such as heuristics, in addition to frequent updates of the pattern file
c)   Getting a reliable third party to issue the digital certificate of the concerned person
d)   Using a library having the function of sanitizing data that may initiate system malfunction

Q43.   Which of the following technology is the most suitable to divide the whole company network into the networks by department?

a) DMZ (DeMilitarized Zone)
b) NAT (Network Address Translation)
c) VLAN (Virtual Local Area Network)
d) VPN (Virtual Private Network)

Q44. When a packet filtering firewall is installed at the point of connection between a company's internal network and the Internet, and PCs on the company's internal network are allowed to access port 80 of Web servers on the Internet, which of the following is an appropriate combination of rules for filtering to grant permission?

a)

Source	Destination	Source Port number	Destination Port number
PC	Web server	80	1024 or more
Web server	PC	80	1024 or more

b)

Source	Destination	Source Port number	Destination Port number
PC	Web server	80	1024 or more
Web server	PC	1024 or more	80

c)

Source	Destination	Source Port number	Destination Port number
PC	Web server	1024 or more	80
Web server	PC	80	1024 or more

d)

Source	Destination	Source Port number	Destination Port number
PC	Web server	1024 or more	80
Web server	PC	1024 or more	80

Q45. There exists an OS that can independently set the reading, writing, or execution rights for a file as the attribute information of the file. One bit is used for each of these three rights to set whether they are permitted or not. When these three bits are set using an octal value from 0 through 7, which of the following is an appropriate description considering the trial results below?

[Trial results]
(i) When 0 is set, reading, writing, and execution are not permitted.
(ii) When 3 is set, reading and writing are permitted, but execution is not permitted.
(iii) When 7 is set, reading, writing, and execution are permitted.

a) When 2 is set, reading and execution are permitted.
b) When 4 is set, only execution is permitted.
c) When 5 is set, only writing is permitted.
d) When 6 is set, reading and writing are permitted.

Q46. Which of the following is the most suitable system for a design using a state transition diagram?

a) A greenhouse control system, which keeps the environment in a greenhouse optimum based on the information of the installed sensors
b) A water bill accounting system, which calculates charges from the data of water meters
c) An inventory-taking system, which counts the inventory assets at the end of each month and at book closing
d) An operations measurement system for system resources, which measures the operational status of the system resources, and generates a report

Q47. Among UML 2.x, (including 2.0 and later versions) diagrams, which of the following is the most appropriate diagram that can gives a graphic overview of the actors involved in a system, different functions needed by those actors and how these different functions are interacted?

a) Activity diagram
b) Communication diagram
c) Interaction Overview diagram
d) Use Case diagram

Q48. Which of the following is an appropriate explanation about the following UML class diagram?
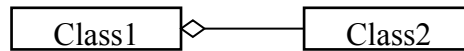
a)   An instance of Class1 associated with has an instance of Class2.

b)   An instance of Class2 is a logical part of an instance of Class1.

c)   An instance of Class2 is a physical part of an instance of Class1.

d)   An instance of Class2 is like an instance of Class1. Class2 inherits from Class1.

Q49. Which of the following is an appropriate description of how to design test cases for a black box test?

a)   Test cases are designed according to the program's functional specifications and interface specifications.

b)   Test cases are designed on the basis of the procedure and internal structure of the program.

c)   Test cases are designed so that each of the decision conditions in the program can evaluate both TRUE and FALSE at least once.

d)   Test cases are designed with reference to program specifications or the source list, after the program specifications are finalized or the coding is completed.

Q50. Which of the following is the purpose of a stress test?

a)   To compare performance with other computers by measuring the execution time of a standard program

b)   To confirm the operation at the limits of processing capability that is required for a system

c)   To confirm that there are no unintended effects on the program functions that have no relation to correction or change in the program

d)   To evaluate the usability of a system by having actual users use the system

Q51. Which of the following is the process of changing a software system in such a way that it does not alter the external behavior of the code yet improves its internal structure?

a) Reengineering   b) Refactoring

c) Restructuring   d) Reverse engineering

Q52. Which of the following is an explanation of the spiral model in system development?

a) In this model, cycles are divided up into smaller, more easily managed iterations called build. Each iteration passes through the requirements, design, implementation and testing phases.

b) In this model, each phase must be completed in its entirety before the next phase begins. At the end of each phase, a review takes place to determine if the project is on the right path and whether to continue the project or not.

c) This model has four phases: Planning, Risk Analysis, Engineering and Evaluation. A software project repeatedly passes through these phases in iterations.

d) This model is a sequential execution of processes. Each phase must be completed before the next phase begins. Testing is emphasized in this model and the testing procedures are developed early in the life cycle before any coding is done, during each of the phases preceding implementation.

Q53. Which of the following is an appropriate tool that implements a deliverable-oriented decomposition of a project into smaller components?

a) Critical Path Management (CPM)

b) Gantt Chart (Gantt)

c) Project Evaluation and Review Technique (PERT)

d) Work Breakdown Structure (WBS)

Q54. In a project to create the screens for a system that is composed of 100 screens in all, there are 30 small size screens of low complexity, 40 medium size screens of medium complexity, 20 large screens of medium complexity, and 10 large screens of high complexity. When the number of person-days is estimated on the basis of the standard task method with the standard number of person-days as shown in the table below, how many person-days are required to complete the project? Here, a review of all the screens requires five person-days, and project management requires 20% of the total person-days including the person-days for review.

[Standard number of person-days per screen]   Unit: Person-day

Complexity / Size	Low	Medium	High
Small	0.4	0.6	0.8
Medium	0.6	0.9	1.0
Large	0.8	1.0	1.2

a) 80   b) 85   c) 101   d) 102

Q55. In the arrow diagram shown in the figure below, in order to reduce the time period of the entire project, some activities from activity A through E are reduced by one day each. Which of the following is a combination of activities by which the entire project can be shortened by two days?
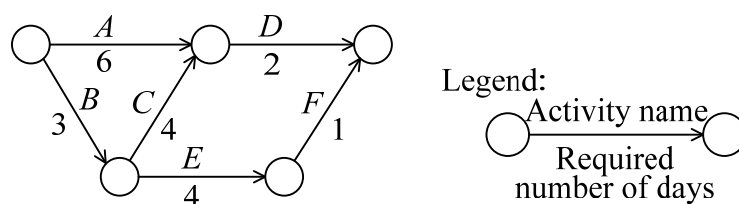
a) A, C, E b) A, D c) B, C, E d) B, D

Q56. What is the function point value of a program that has the functions and characteristics shown in the table below?　　Here, the correction coefficient of complexity is 0.75.

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

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

Q57. An IT service is provided under the conditions described below.　　In order to meet the SLA, which of the following is the maximum allowable downtime (in hours) per month during service hours?　　Here, the number of business days in a month is 30, and there is no planed service outage for a reason of maintenance or something similar during the service hours.

[Conditions of the SLA]
- Service hours:　8 a.m. to 10 p.m. on business days
- Availability:　　99.5% or more

a) 0.3　　　　　　　b) 2.1　　　　　　　c) 3.0　　　　　　　d) 3.6

Q58. According to ISO/IEC 20000-1, which of the following is an activity in the PDCA of the Service Delivery Processes?

a) Documenting supplier management, assigning a contact person and reviewing contracts regularly to meet requirements within SLA

b) Establishing processes and procedures in handling customer complaints with escalation channels and feedback

c) Evaluating the projected capacity and performance for service requests, new technologies, and upgrade procedures

d) Recording changes and updates to existing service assets and configuration items while auditing is done to monitor unauthorized changes

Q59. According to ISO/IEC 20000-1, which of the following is the appropriate processes that contain change management, configuration management, and release and deployment management?

a) Control processes
b) Relationship processes
c) Resolution processes
d) Service delivery processes

Q60. Which of the following is a measure that enables an operator to surely recognize the occurrence of a system fault?

a) To install monitoring cameras covering the entirety of the server room, and to monitor the room continuously
b) To provide a function to perform a full backup of files at a fixed time every day
c) To provide a function to perform a snapshot dump or memory dump in the event of a fault
d) To provide functions to sound an alarm or light indicator lamps, linked to an alarm or other message sent to the system console

Q61. Which of the following is an appropriate description concerning an interview conducted during a system audit?

a) Efforts are made to get documents and records that support the information which has been obtained from the departments under audit through the interview.
b) The departments under audit are immediately instructed to take measures for the improvement of deficiencies identified during the interview.
c) The interview is conducted by one system auditor because some sort of discrepancy may arise in records if multiple auditors are involved.
d) The interviewee is selected from the managers of the departments under audit who are familiar with the business operations to be audited.

Q62. Which of the following is an appropriate description concerning the role of a system auditor?

a) It is to assure the preparation and operations regarding the control of the information system or to give advice on these, from a standpoint of professional standpoint independent from the audit target.

b) It is to evaluate the performance of the information system and to issue an audit working paper to the system users.

c) It is to instruct the testing staff to improve defects found during the comprehensive test for the information system.

d) It is to test if processes are performed according to the plan and then to approve the release.

Q63. Which of the following is an appropriate explanation of BPO?

a) Contracting out all business processes of a company's specific department, such as an administrative department or call center, to an external service provider, together with the operations of a business system

b) Operating a system by renting part of the processing power and memory capacity of the server owned by a telecom carrier, etc., instead of taking possession of a company's own server

c) Reducing the cost of software development by using a temporary staff agency's worker whose labor cost is lower than that of a company's regular employee

d) Using software functions offered by an external service provider via a network, instead of taking possession of company's own software

Q64. Which of the following is the cloud-computing service model that allows users to install operating-system images and their application software on the system?

a) Desktop as a service (DaaS)
b) Infrastructure as a service (IaaS)
c) Platform as a service (PaaS)
d) Software as a service (SaaS)

Q65. According to the ISO/IEC 12207, the activities of the requirements definition process include stakeholder identification, requirements identification, requirements evaluation, and requirements agreement. Among these activities, which of the following is a task that is implemented in requirements identification?

a) Analyzing elicited requirements, eliminating conflicting and ambiguous points, and organizing them as a set of consistent requirements

b) Clarifying which parties will take part in which processes throughout the entire system life cycle

c) Eliciting requirements from stakeholders, and clarifying constraints and operational scenarios

d) Explaining how to resolve conflicting and impractical requirements to stakeholders, and obtaining agreement

Q66. Which of the following is an explanation of the green procurement (sustainable procurement)?

a) It refers to a certificate that enables commercial trading of the green power that is generated from natural energy such as sunlight, biomass, wind power, and geothermal heat.

b) It refers to a mass promotion of the environmental protection activities and the fund raising from investors for the environmental protection.

c) It refers to a preferential purchase of products and services that exert a lower environmental burden.

d) It refers to an international standard concerning environmental labels such as eco mark that is certified by a third party as a product that contributes to environment protection.

Q67. Which of the following is a technique that is used to identify and evaluate the internal and external factors that are helpful or harmful to the objectives of business organizations or projects?

a) Five forces analysis   b) PPM analysis
c) SWOT analysis   d) Value chain analysis

Q68. Which of the following is a technique for classifying company activities into primary activities and support activities, and analyzing which activities generate the profit of the products or services provided to customers?

a) 3C analysis
b) Five forces analysis
c) SWOT analysis
d) Value chain analysis

Q69. Which of the following is an explanation of the core competence?

a) It refers to the business domain that is decided from the viewpoint of the market, technology, and products (or services).
b) It refers to the corporate activities that comply with laws, various regulations, and social norms for managing business.
c) It refers to the overall system optimization techniques for achieving the purpose of organizational activities.
d) It refers to the predominant abilities in the business area of the company, which cannot be imitated by competitors.

Q70. Which of the following is a description of the growth stage of the product life cycle?

a) It is the stage at which companies sell products to early adopters. Companies adopt strategies to enhance product recognition.
b) It is the stage at which growth in demand slows. Companies try to maintain market share and secure profits through various means such as quality improvements.
c) It is the stage at which sales and profit gradually decline. Companies refrain from additional investment and consider withdrawal from the market.
d) It is the stage at which sales increase rapidly. The market becomes active and the competition intensifies because of new market participants.

Q71. Among the different business systems supported by technology, which of the following analyzes routes of distribution, tracking and load tendency?

a) LMS
b) OMS
c) TMS
d) WMS

Q72. Which of the following is an explanation of the strategy map that is used in the balanced score card?

a) It classifies and shows the products or businesses of a company in the four cells formed by the two   axes of the market attractiveness and the company's superiority.

b) It shows the cause-and-effect relationship between issues, countermeasures, and goals, on the basis of the four perspectives that consist of finance, customer, internal business process, and learning and growth.

c) It shows the position of a company or its products in a market by using two key elements as the X-axis and Y-axis.

d) It shows what types of management resources to be used, what types of products and services to be provided, and what types of customers to be targeted.

Q73. Which of the following is an appropriate explanation of the concurrent engineering?

a) A new product development technique that sequentially executes processes such as product design, manufacturing, and sales activities

b) A technique that analyzes a target system and clarifies its specifications

c) A technique that executes processes such as product design and production planning in parallel during the new product development procedure

d) A technique that tries to figure out the optimal combinations of functions and cost, and to improve value through systematic procedures

Q74. Which of the following is an explanation of CAD?

a) By using computers, converting drawings of the product design to the process design information, and supporting automation of machine processing, etc.

b) By using computers, creating drawings of the product design from attribute data concerning product shape, composition, etc.

c) By using computers, evaluating product performance and functions without actual products

d) By using computers, finding required volumes and timing of materials from a production schedule, a BOM (bill of materials), inventory volumes, etc.

Q75. A company sells two products *A* and *B*, making a profit of 40 dollars and 30 dollars per unit on them respectively. They are produced in a common production process and are sold in two different markets. The production process has a total capacity of 3000 person-hours. The production time of product *A* is 3 person-hours which is three times longer than that of product B. The market has been surveyed and company officials feel that the maximum number of units of product *A* that can be sold is 8000 and that of product B is 1200. Subject to these limitations, products can be sold in any combination. Which of the following is a formulation result of a linear programming model for the question which obtains the production amount that maximizes the total profit of the company? Here, assume the number of units produced of product *A* and that of product *B* as *x* and *y*, respectively.

a) Objective function $40x+30y \rightarrow$ to be maximized
   Constraints $3x+9y \leq 3000$
   $x \geq 8000$
   $y \geq 1200$
   $x \geq 0, \ y \geq 0$

b) Objective function $40x+30y \rightarrow$ to be maximized
   Constraints $3x+9y \leq 3000$
   $x \leq 8000$
   $y \leq 1200$
   $x \geq 0, \ y \geq 0$

c) Objective function $40x+30y \rightarrow$ to be maximized
   Constraints $3x+y \leq 3000$
   $x \geq 8000$
   $y \geq 1200$
   $x \geq 0, \ y \geq 0$

d) Objective function $40x+30y \rightarrow$ to be maximized
   Constraints $3x+y \leq 3000$
   $x \leq 8000$
   $y \leq 1200$
   $x \geq 0, \ y \geq 0$

Q76. Peter plans to open his own coffee shop. He uses break-even analysis to evaluate the feasibility. He needs to rent a coffee making machine at 20 dollars per day. The average cost of coffee ingredients is 0.40 dollars per cup and the cost of a plastic cup is 0.10 dollars. He sets a price at 1.50 dollars per cup. What is the sales revenue a day at the break-even point?

a) 10   b) 25   c) 30   d) 75

Q77. There is an enterprise whose current liabilities valued 2,400 dollars and the current assets valued 5,000 dollars including inventory assets valued 200 dollars. What is an acid test ratio (in percentage) of the enterprise?

a) 108   b) 148   c) 200   d) 220

Q78. Break-even point of the new product is 12,000 units a month. Fixed cost is 800,000 dollars a month and variable cost is 20 dollars per unit. Based on the information above, which of the following is a selling price of the new product?

a) 46.67   b) 66.67   c) 86.67   d) 89.23

Q79. A cost schedule showing total costs of the production is given below. Which of the following is an appropriate combination of the average cost of producing 2 units, and the marginal cost of producing the 5th unit?

Number of Output	Total Cost
0	40
1	50
2	60
3	70
4	80
5	90
6	100

	Average cost of producing 2 units	Marginal cost of producing 5th unit
a)	10	5
b)	10	10
c)	30	10
d)	30	20

Q80. Which of the following is an appropriate description of the protection scope of software under the WTO's Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)?

a) Algorithms and program languages are protected under the agreement.
b) Application programs are protected under the agreement but basic programs such as an OS are not covered, because the value of the right is included in the hardware cost.
c) Both source programs and object programs are protected by the agreement.
d) Documents describing a mathematical formula are not protected under the agreement, but the mathematical formula itself is protected.