April 2012

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 in 2012?

   a) March   b) April   c) May   d) June

   Since the correct answer is "b)" (April), mark your answer sheet as follows:

   [Sample Answer]

Q1	Ⓐ	●	Ⓒ	Ⓓ

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 the binary fraction that is equivalent to the decimal fraction 115.625?

a) 1100111.1001110001 b) 1100111.101
c) 1110011.1001110001 d) 1110011.101

Q2. Which of the following is equivalent to the logical expression below? Here, "AND" has higher precedence than "OR", and "NOT" has the highest precedence.

x AND (y OR z) OR y AND (x OR z) OR x AND y AND z

a) x AND y OR x AND z OR y AND z
b) x AND y OR x AND z OR y AND z OR x AND (NOT y)
c) x AND y OR z OR y AND x OR z OR x AND y AND z
d) x AND z OR y AND z OR x AND y AND z

Q3. How many multiplications at a minimum must be performed in order to calculate the polynomial expression "$x^4 - 2x^3 + 5x^2 + x - 6$"?

a) 2 b) 3 c) 5 d) 6

Q4. How many binary numbers can be represented using a 6-bit number that does not have two contiguous 1s? For example, "101010" does not have two contiguous 1s.

a) 8 b) 13 c) 21 d) 34

Q5. When the expression $(A - 2 \times (B + C) - D \times E) \times F$ in conventional infix notation is converted to the prefix expression, which of the following represents the resulting expression?

a) $A2BC + \times - DE \times -F \times$ b) $A2BC + \times - DE \times F - \times$
c) $\times - - A \times 2 \times B + CDEF$ d) $\times - - A \times 2 + BC \times DEF$

Q6. When the figure below shows the process flow of a compiler that is used for procedural languages, which of the following is the appropriate combination that should be inserted into blanks *A* though *C*?

| A | → | B | → | C | → | Optimization | → | Object code generation |
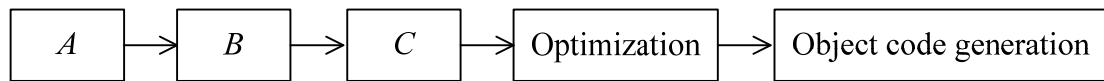
	A	B	C
a)	Lexical analysis	Semantic analysis	Syntax analysis
b)	Lexical analysis	Syntax analysis	Semantic analysis
c)	Semantic analysis	Syntax analysis	Lexical analysis
d)	Syntax analysis	Lexical analysis	Semantic analysis

Q7. Which of the following is an appropriate description concerning a max heap whose node values are 3, 6, 11, 17, 19, 22, and 32?

a) All node values at the deepest level are smaller than those at the upper level.
b) Only one unique heap can be represented graphically.
c) The root node value is always "32".
d) There is a possibility that "3" is a child of the root node.

Q8. Which of the following is an appropriate technique that is used for implementing a queue as a data structure?

a) FIFO   b) LFU   c) LIFO   d) LRU

Q9. Bubble sort is implemented using a technique that repeatedly compares adjacent pairs of elements from left to right and swaps them if they are in the wrong order. Which of the following is the total number of comparisons for sorting a list of "*n*" elements?

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

Q10. The flowchart below shows an algorithm that can be used to sort all elements of one-dimensional array X in reverse order and store them in array Y. In order to complete the algorithm, which of the following should be inserted into blanks A and B? Here, the indices of the first and last elements of each array are 1 and n respectively.
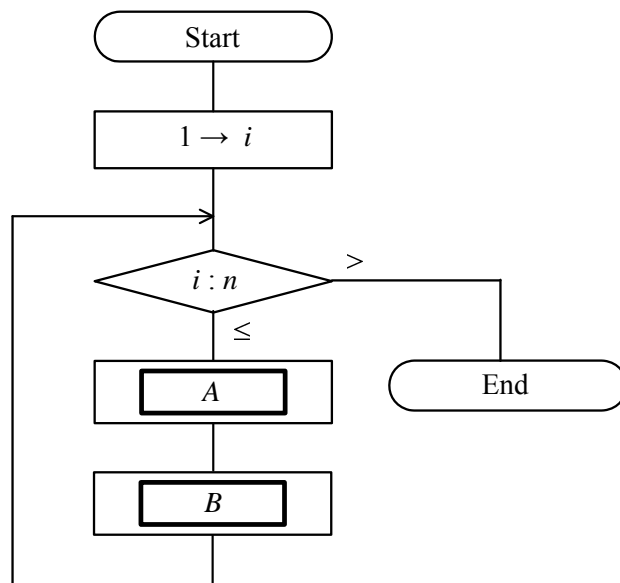
	A	B
a)	$X(i-1) \rightarrow Y(n-i)$	$i+1 \rightarrow i$
b)	$X(i) \rightarrow Y(n-i+1)$	$i+1 \rightarrow i$
c)	$X(n-1) \rightarrow Y(i-n)$	$n+1 \rightarrow n$
d)	$X(n) \rightarrow Y(i-n+1)$	$n+1 \rightarrow n$

Q11. Which of the following is the most appropriate purpose of using DTD (Document Type Definition) with XML?

a) It is used to check if a well-formed XML document is valid.
b) It is used to check if XML syntax rules are met.
c) It is used to describe constraints imposed on XML data types.
d) It is used to perform XML syntax analysis.

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Q12. When a processor performs multimedia or graphic-related application programs with the mixture of vector instructions and scalar instructions, 10% of the computation time is used for vector instructions.   When a newly developed processor can execute vector instructions twice faster than the original processor, approximately how many times faster is the speed of the new processor than that of the original one in the same application environment?

   a) 1.0275   b) 1.0465   c) 1.0500   d) 1.0526

Q13. Which of the following is most suitable for cache memory?

   a) DDR SDRAM   b) Flash memory
   c) Nonvolatile DRAM   d) SRAM

Q14. Which of the following is an appropriate description concerning cache memory?

   a) A write instruction rewrites cache in two ways: one is to rewrite both cache and main memory, and the other is to rewrite only cache until the cache data is removed.
   b) Cache memory is used to fill the gap in memory capacity between real memory and virtual memory.
   c) The substantial improvement in the access speed of semiconductor memory is making cache memory less necessary.
   d) When a cache miss occurs, an interrupt is generated so that the program can transfer data from main memory to cache memory.

Q15. Which of the following is an example of a daisy chain connection?

   a) A keyboard, a mouse, and a printer are connected to a USB hub, and then the USB hub is connected to a PC.
   b) A PC is connected to a measuring device and a printer via RS-232C and USB respectively.
   c) Industrial cameras with each having two IEEE 1394 ports are serially connected, and then one end is connected to a PC.
   d) Several network cameras are connected to a PC through an Ethernet hub or an Ethernet switch.

Q16. When analog audio signals are converted into digital audio signals using the PCM method at a sampling rate of 44.1 kHz, which of the following determines the amount of the encoded digital data.

a) The maximum amplitude of the audio signals
b) The maximum frequency of the audio signals
c) The playback frequency of the audio data
d) The quantization bit width of the audio data

Q17. Which of the following is the appropriate RAID configuration that provides byte-level striping in combination with parity information and stores the parity for each stripe in a dedicated disk?

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

Q18. Which of the following is the configuration of distributed system where hierarchical or dependency relations exist between processors as with relationships between clients and servers?

a) Horizontal function distribution　　　b) Horizontal load distribution
c) Vertical function distribution　　　　d) Vertical load distribution

Q19. Which of the following is a framework or methodology of dividing the resources of a computer into multiple execution environments, by applying one or more concepts or technologies such as hardware and software partitioning, time-sharing, partial or complete machine simulation, emulation, quality of service, and many others?

a) Clustering　　　　　　　　b) Distribution
c) Load balancing　　　　　　d) Virtualization

Q20. A system fails and recovers repeatedly over time, as shown in the figure below. Which of the following is the appropriate combination of the indicators or indexes that represent reliability and availability in RASIS? Here, $T = \dfrac{1}{n}\sum_{i=1}^{n} t_i$ and $S = \dfrac{1}{n}\sum_{i=1}^{n} s_i$.

	Reliability	Availability
a)	T	S
b)	T	$T/(T+S)$
c)	$T+S$	S
d)	$T+S$	$T/(T+S)$

Q21. Which of the following provides a job management function in OS that selects a program with the highest execution priority in the job queue and allocates resources required for the program?

a) Initiator   b) Master scheduler
c) Reader   d) Writer

Q22. In a certain processor, a timer interrupt is generated at a clock frequency of 60 Hz on a "per clock tick" basis. It takes 2 milliseconds (including process switching overhead) to handle the interrupt. What is the percentage of the interrupt handling time in the processor?

a) 6   b) 12   c) 24   d) 60

Q23. In a preemptive multitasking OS environment, when a process is preempted by another process with a higher priority, which of the following is the appropriate state where the former process is to be placed?

a) Ready b) Running c) Terminated d) Waiting

Q24. When four jobs *A* through *D* shown in the table below are executed on a first-come first-served basis, which of the following is the average waiting time (in minutes) in the job queue? Here, the job queue is empty before job *A* arrives.

Job	Arrival time (hh:mm)	Execution time (minutes)
A	0:00	4
B	0:02	6
C	0:05	3
D	0:10	2

a) 2.5 b) 3.75 c) 4.25 d) 6.75

Q25. CPU utilization of a computer system can be improved by using multiprogramming. If there is one process in memory, the CPU utilization is $(1-p)$. Here, "p" is the fraction of time (e.g., I/O time) that a process spends away from the CPU. If there are "n" processes in memory, the probability of "n" processes waiting for an I/O is $p*p...*p$ (*n* times). The CPU utilization is equal to $(1 - p^n)$. When the system has enough main memory space to hold four processes and each process waits for I/O completion during 50% of the execution time, which of the following is the percentage of the CPU time wasted by waiting for I/O completion?

a) 6.25 b) 12.5 c) 87.5 d) 93.75

**Q26.** In a logic circuit shown below, which of the following is an appropriate combination of input signals *A* through *C* that can generate the output signal "0"?
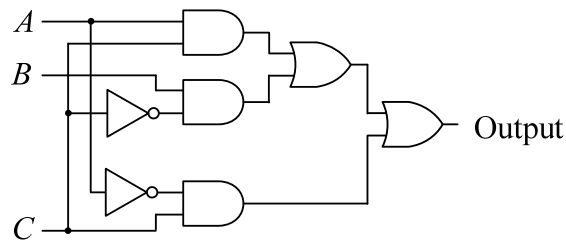
	A	*B*	*C*
a)	0	0	1
b)	1	0	0
c)	1	1	0
d)	1	1	1

Q27. The figure shown below represents a logic gate and its timing chart.   Which of the following is an appropriate logical function of this gate?   Here, both *A* and *B* are the input signals, and *F* is the output signal.
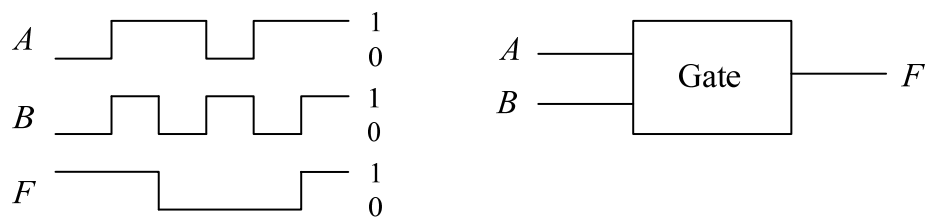
a) AND   b) Exclusive-NOR
c) Exclusive-OR   d) NOR

Q28. Which of the following is the name of a phenomenon where multiple ON/OFF signals are generated during a few milliseconds after a push-button switch with a mechanical contact is pressed once?

a) Buffering   b) Chattering
c) Filtering   d) Switching

Q29. Which of the following is the specification for dividing frequently-used functions of a Java program into reusable components that can be deployed in a network on any major operating system platform?

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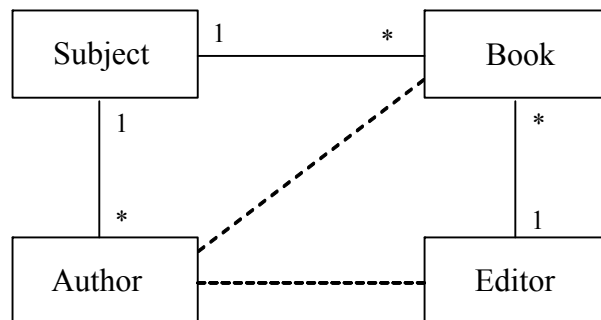c) JavaBeans   d) JavaScript

Q30. According to ISO 9241-11, usability is defined as the "extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency, and satisfaction in a specified context of use." Which of the following is an appropriate method for evaluating the "level of user satisfaction" mentioned in this definition?

a) Cluster analysis method   b) Heuristic evaluation method
c) Interview method   d) Log data analysis method

Q31. Which of the following is an appropriate example of VR (Virtual Reality)?

a) A history teacher makes use of software to present a 3D image of ancient Rome that can be navigated by students to simulate walking through the entire city by using a mouse or a keyboard.

b) Computer games and simulations make use of multimodal devices, such as a wired glove, a headgear, and an omni-directional treadmill, in order to provide very enriching and life-like experience for the user.

c) GPS maps combined with layers of satellite images and GIS information provide accurate or close to accurate topographical information for researchers.

d) Military aircraft equip pilots with headgear that provides heads-up display to combine maps, topographical information, battle ground feedback from various devices such as sensors and satellites.

Q32. A publishing company produces textbooks for high school.   Each book is written by an author who specializes in a subject.   An editor is assigned to work with an author for a book.   An editor can review several books while an author can write several books on the same subject.   There are several authors on the same subject and several editors to choose from.   The E-R diagram below shows the relationships between subject, author, book, and editor, but the relations between author and book and between author and editor are incomplete.   Which of the following is the appropriate combination of relations that are applied to complete the E-R diagram?   Here, 1____* indicates a one-to-many relation, *____* is a many-to-many relation.

```
           1              *
 Subject ---------------- Book
   |  1                     |  *
   |              .         |
   |          .             |
   *      .                 1
 Author ----------------- Editor
```

a)
```
         1            1
 Author ---------------- Book

         1            *
 Author ---------------- Editor
```

b)
```
         1            1
 Author ---------------- Book

         *            *
 Author ---------------- Editor
```

c)
```
         1            *
 Author ---------------- Book

         1            *
 Author ---------------- Editor
```

d)
```
         1            *
 Author ---------------- Book

         *            *
 Author ---------------- Editor
```

Q33. When the database design is divided into three phases (i.e., conceptual design, logical design, and physical design), which of the following is a part of the physical design?

a) Building a model of the data by using the information in user requirements specifications

b) Checking relational database tables for data redundancy by using normalization procedures

c) Constructing a model of the data used in an enterprise based on a specific data model (e.g., relational)

d) Describing base relations, file organizations, and indexes used to improve query performance

Q34. When the table below is used to design a relational database for managing a video-rental shop, which of the following can be a potential candidate key?   Here, (X, Y) represents a tuple of attributes X and Y.

CID	CName	SID	SName	VID	RDate	MID	MName
C01	John	S03	Susan	V01	2012-03-20	M01	Harry Potter
C02	Jim	S01	Sara	V03	2012-03-20	M02	Star Wars
C03	Peter	S02	Kim	V03	2012-03-20	M02	Star Wars
C02	Jim	S01	Sara	V02	2012-03-20	M01	Harry Potter
C03	Peter	S02	Kim	V02	2012-03-21	M01	Harry Potter
C02	Jim	S02	Kim	V01	2012-03-20	M01	Harry Potter
C04	Tim	S02	Kim	V02	2012-03-24	M01	Harry Potter

Note: Acronyms and abbreviations are used as shown below.

CID :   Customer ID   SID :   Staff ID

CName : Customer Name   SName : Staff Name

VID :   Video ID   MID :   Movie ID

RDate :   Rental Date   MName : Movie Name

a) (CID, MID)

b) (CID, VID, RDate)

c) (VID, RDate)

d) (VID, SID)

Q35. In the term "ACID", which is the basic foundation that database transactions are built upon, what does the third character "I" stand for?

a) Independence

b) Integrity

c) Interactivity

d) Isolation

Q36. Which of the following is the UPDATE statement that can correctly update the data of the "Product" table?   Here, the "Product" table is defined by the CREATE statement shown below.

```
CREATE TABLE Product
    (Product_number CHAR(4), Product_name CHAR(20), Supplier_number CHAR(6),
    Unit_price INT, PRIMARY KEY(Product_number))
```

Product

Product_number	Product_name	Supplier_number	Unit_price
S001	A	XX0001	180
S002	A	YY0002	200
S003	B	YY0002	350
S004	C	ZZ0003	400
S005	C	XX0001	380

a) UPDATE Product SET Product_number = 'S001'
        WHERE Product_number = 'S002'

b) UPDATE Product SET Product_number = 'S006'
        WHERE Product_name = 'C'

c) UPDATE Product SET Product_number = NULL
        WHERE Product_number = 'S002'

d) UPDATE Product SET Product_name = 'D'
        WHERE Product_number = 'S003'

Q37. Which of the following is the server that can be used to intercept all messages entering and leaving the network and to effectively hide the true network addresses?

a) DHCP server b) DNS server
c) E-mail server d) Proxy server

Q38. Which of the following is the data transmission technique that has features or characteristics shown below?

- It is designed for cost-efficient data transmission for intermittent traffic between LANs and between end-points in a WAN.
- Data is transmitted in a variable-size unit.
- Error correction (i.e., retransmission of data) is left up to the end-points.
- It is based on the X.25 protocol, but it is faster because of a simplified X.25 protocol with minimal services.
- It provides a mid-range service between ISDN and ATM.

a) Cell relay b) Frame relay
c) Message Switching d) Packet Switching

Q39. In the network shown below, the STP (Spanning Tree Protocol) is used on both S1 and S2 switches.   When the link between two PCs *A* and *C* is established via L1, which of the following is the appropriate link that is used to transfer data between two PCs *B* and *D*?
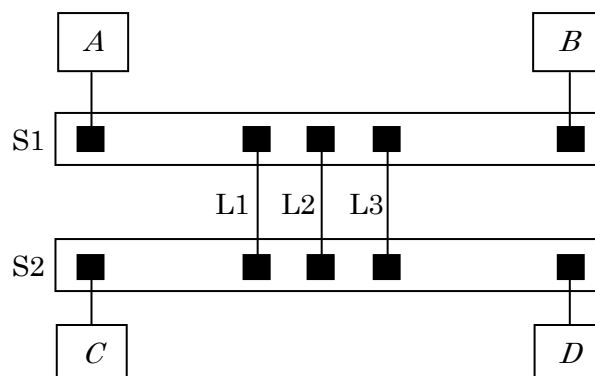
a) Always L1 b) Always L2
c) Always L3 d) Either L2 or L3

Q40. In a URL (Uniform Resource Locator) specified to access a Web page through the Internet, which of the following is the appropriate sequence of four basic parts: the name of the Web page, directory and/or subdirectory which holds the Web page, access protocol, and host name?

a) host name, protocol, directory, page
b) host name, protocol, page, directory
c) protocol, host name, directory, page
d) protocol, page, directory, host name

Q41. Which of the following is used for encoding and interpreting binary files, images, video, and non-ASCII character sets within an e-mail message on the Internet?

a) IMAP b) MIME c) POP3 d) SMTP

Q42. Which of the following is the protocol that is expanded and standardized based on SSL (Secure Sockets Layer) v3 but cannot interoperate with SSL?

a) IPsec (Internet protocol security)
b) RSH (Remote shell protocol)
c) SSH (Secure shell protocol)
d) TLS (Transport layer security protocol)

Q43. Which of the following provides a baseline of security requirements for the operations of CA (Certification Authority) and RA (Registration Authority)?

a) Certificate policy
b) Certificate practice statement
c) Statement of applicability
d) System security policy

Q44. Which of the following is an appropriate description concerning a digital envelope?

a) The sender and recipient must securely share a single private key in advance, and the key is used for both encryption and decryption.
b) The sender encrypts a hash of the data with the sender's private key. The recipient decrypts it by using the sender's public key, and checks if it matches a hash the recipient computes.
c) The sender encrypts the message by using symmetric key cryptography and then encrypts the symmetric key by using public key cryptography.
d) The sender encrypts the message by using the recipient's public key prior to sending it. The recipient decrypts the message with the recipient's private key.

Q45. There are two methods of biometric authentication: one extracts physical characteristics and the other extracts behavioral characteristics. Which of the following uses behavioral characteristics?

a) Authentication is performed by extracting characteristics from the branch angle of a branch point of a blood vessel and from the distance between branch points.
b) Authentication is performed by extracting characteristics from the chaotic pattern of wrinkles spreading out from the pupil.
c) Authentication is performed by extracting characteristics from the writing speed and pen pressure used when a signature is produced.
d) Authentication is performed by extracting characteristic points called minutiae from the pattern formed by ridge lines.

Q46. Which of the following is a method that is used to check if an image or other digital content has been illegally copied and resold?

a) Digital certificate
b) Digital preservation
c) Digital signature
d) Digital watermark

Q47. The class diagram below shows part of an ordering system used for mail order and teleshopping. Which of the following is the most appropriate combination of relations that should be inserted into blanks *A* through *D* in order to complete the diagram?
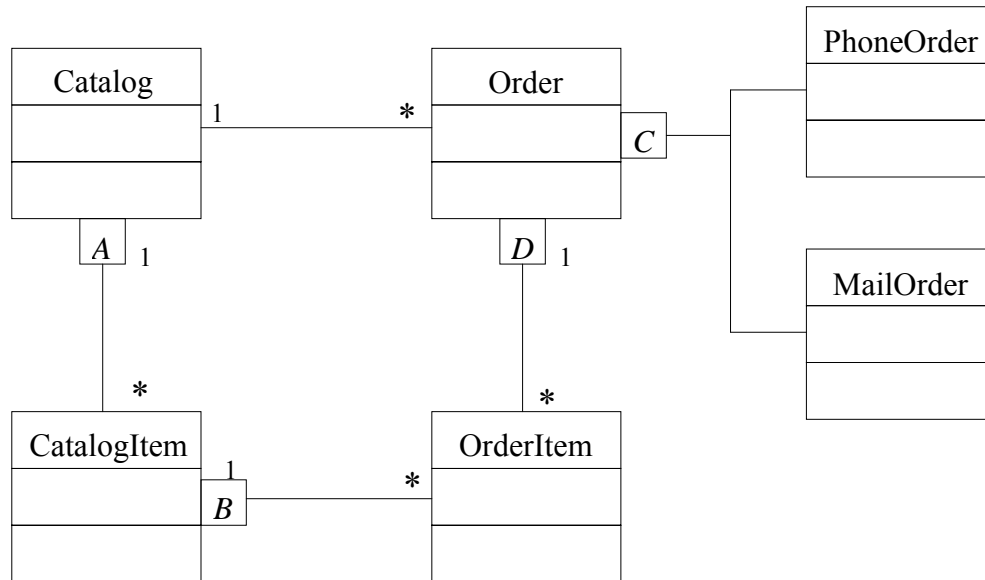
	A	*B*	*C*	*D*
a)	◇ (Aggregation)	← (Navigability)	◁— (Generalization)	◆ (Composition)
b)	◆ (Composition)	◁— (Generalization)	← (Navigability)	◇ (Aggregation)
c)	△ (Generalization)	◆— (Composition)	◇— (Aggregation)	↑ (Navigability)
d)	↑ (Navigability)	◇— (Aggregation)	◆— (Composition)	△ (Generalization)

Q48. The figure below shows an example of a DFD used in structured analysis.   What does the symbol "___" represent in the figure?
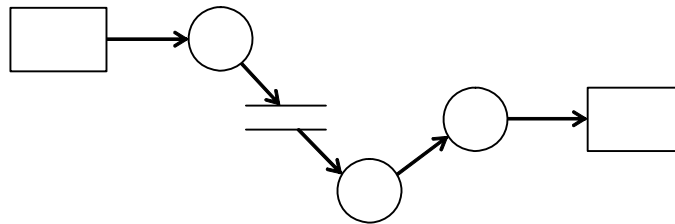
a) Data flow
b) Data store
c) External entity
d) Process

Q49. Which of the following is a diagram that is used for modeling the event-driven or discrete behavior of an object in UML 2.x (i.e., UML 2.0 or later)?

a) Activity diagram
b) Object diagram
c) Sequence diagram
d) State machine diagram

Q50. From internal and external viewpoints concerning software product development and maintenance, which of the following is an appropriate quality characteristic that includes several sub-characteristics such as maturity, fault tolerance, recoverability, and availability?

a) Functional suitability
b) Maintainability
c) Portability
d) Reliability

Q51. Which of the following is a type of integration test that has the characteristics listed below?

[Characteristics]
- All of the related program modules are combined and tested at once.
- Neither drivers nor stubs are required.
- It is useful for small programs, but not for commercial development projects.

a) Big bang test
b) Bottom-up test
c) Sandwich test
d) Top-down test

Q52. Which of the following is a typical method that is contained in agile software development?

a) Dynamic programming   b) Extreme programming

c) Server-side programming   d) Web programming

Q53. When 50% of the undefined specifications are defined each time a prototype is created, how many prototypes should be created to define over 90% of the specifications that are undefined at the start of prototyping?

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

Q54. Which of the following is an appropriate explanation concerning a milestone in project management?

a) A milestone is a major event in a project schedule that is easily identifiable by such things as the completion of a significant deliverable and the occurrence of an event.

b) A milestone is conducted at the mid-term or end of a project by an outside facilitator in order to provide the project stakeholders with the opportunity to be candid.

c) The goal of a milestone is to identify and mitigate problems with large projects as early in the project as possible to minimize their impact.

d) The purpose of a milestone is to visually and structurally provide the relationships among all the project deliverables and their various components.

Q55. The workload required to develop a system is estimated at 80 person-months if it is carried out by one person. When four staff members with the same productivity work together to develop the system, each member's productivity is expected to decrease by 20%. How many working days does it take for the four members to develop this system? Here, this development work can be equally divided into four parts, and the four members can perform each individual part in parallel. In addition, each member can work 22 working days per month.

a) 352   b) 440   c) 528   d) 550

Q56. When an application program has functions and characteristics shown in the table below, which of the following is the function point value of the program? Here the correction coefficient of complexity is 0.5.

User function type	Number of items	Weighting factor
External input	2	4
External output	1	5
External inquiry	1	4
Internal logical file	0	10
External interface file	1	7

a) 10   b) 12   c) 15   d) 24

Q57. Which of the following is the project management knowledge area that includes the processes of creating a staffing management plan, acquiring project team, developing project team, and managing project team?

a) Communications management
b) Human resource management
c) Integration management
d) Scope management

Q58. According to ISO/IEC 20000 (Information technology – Service management), which of the following is a process that has the objective to define and control the components of the service and infrastructure and to maintain accurate information on such components?

a) Change management
b) Configuration management
c) Incident management
d) Release management

Q59. Which of the following is an appropriate description concerning data backup?

a) A backup should always be made to the same storage media in order to minimize the amount of time required to make a backup.
b) A backup should be made to a magnetic tape in order to enable random access when data is restored from the backup.
c) A differential backup method should be used to minimize the amount of time required to perform a full restore from backups.
d) Backup processing should not overlap with ordinary business processing in order to guarantee the integrity of backed-up data.

Q60. In IT service management, which of the following is an activity that is performed as incident management?

a) Checking to see if a failure report from a user matches a known error
b) Evaluating if customer satisfaction with the service desk meets the request level
c) Investigating the effect of changes made to a program
d) Reviewing measures when the amount of free space on a disk is near the threshold

Q61. Which of the following is an appropriate description concerning the implementation structure of a system audit?

a) For an audit of development status in an information systems department, the audit team consists of department members familiar with the details of the development.
b) When the auditor receives support from another expert, the expert is responsible for the scope of the support, the methods, and the judgment of the audit results.
c) The auditor reports the results of the audit to the requester so that the requester can give instructions for improvement based on the audit report.
d) When an information system audit is performed as part of a business operations audit, the audit team consists of staff members of the user department.

Q62. Which of the following is an appropriate description concerning an interview or a hearing that is conducted during a system audit?

a) The auditor should instruct the department under audit to take improvement measures for deficiencies identified during the interview.
b) The auditor should make an effort to get documents and records that confirm the information obtained from the department under audit during the interview.
c) The entire interview should be conducted by a single auditor, because discrepancies may occur in the record if multiple auditors are involved.
d) The interviewee should be selected from managers of the department under audit who are knowledgeable about the business operations to be audited.

Q63. Which of the following is an appropriate measure that management takes to guarantee the apparent independence of internal system auditors?

a) Establishing the leaning system of audit techniques for auditors
b) Making it obligatory for auditors to learn about IT continuously
c) Placing the department of auditors under the direct control of management
d) Specifying and announcing the knowledge and experience that auditors need

Q64. The "four domains" of enterprise architecture include business architecture, technology architecture, application architecture, and one other.   Which of the following is the one remaining architecture?

a) Bus architecture
b) Data architecture
c) Software architecture
d) Systems architecture

Q65. Which of the following is the purpose of BPM that is a management approach in a company or an organization?

a) Analysis and effective use of a company's information resources
b) Continuous improvement of a company's operational processes
c) Effective use of a company's management resources
d) Management and analysis of a company's customer information

Q66. Which of the following is an explanation of "contact management" that is a basic function of SFA (Sales Force Automation)?

a) Enhancing sales efficiency and effectiveness by responding promptly to inquiries from salespersons

b) Improving the performance level of the entire sales department by identifying and sharing sales techniques accumulated on an individual basis

c) Increasing the rate of order acceptance by having the entire sales organization respond to a customer, rather than having only a single salesperson do so

d) Performing effective sales activities for existing and prospective customers by managing a set of records including customer visiting days and sales results

Q67. Which of the following is an appropriate explanation of the RFI that is created when a new information system is procured?

a) A request is made from the ordering party to the supplier in order to change the details agreed upon in the contract.

b) A request is made to conclude the contract after the roles of the ordering party and the supplier are confirmed.

c) A request is made to the vendor for helpful information by showing the details of business operations and the purpose of the computerization.

d) A request is made to the vendor for the submission of a proposal by showing the system to be procured and the procurement conditions.

Q68. When a company's business is divided into four categories *A* through *D* as shown in the figure below, which of the following is the characteristic of the business that is classified as category *B*?
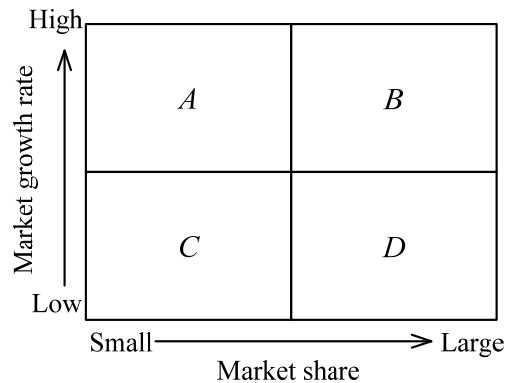
a) It currently serves as a primary supply source of cash, and no additional investments should be made.

b) It has little need for additional investments in business continuity, and the possibility of withdrawal must be considered in the future.

c) It is currently generating a large inflow of cash, but it also needs continuous investment into the future.

d) It is currently generating a small inflow of cash, but some additional investments may make it change to a supply source of cash in the future.

Q69. Which of the following is the technique and concept for improving management efficiency by planning and controlling the company-wide management resources in an effective and integrated way?

a) CRM   b) ERP   c) MRP   d) SCM

Q70. The four perspectives of the BSC (Balanced Score Card) includes "financial," "learning and growth," "internal business process," and one other.   Which of the following is the one remaining perspective that is sometimes extended to or replaced by "stakeholder" for modified or extended BSC models?

a) Company's own strength   b) Compliance
c) Customer   d) Governance

Q71. Which of the following is an appropriate explanation of a franchise chain in the retail industry?

a) A form of organization established by multiple retailers in which those retailers jointly perform their business activities such as procurement, inventory management, and product development

b) A form of organization in which a group of outlets are opened in a commercial accumulation area that is planned and created through regional development activities

c) A form of organization in which a head office provides to its members usage rights of its trademarks and signs, and also provides managerial training and assistance in exchange for a fixed rate of compensation

d) A form of organization lead by a wholesale distributor in which multiple retailers voluntarily participate to gain the benefit of cooperation while their independence is maintained
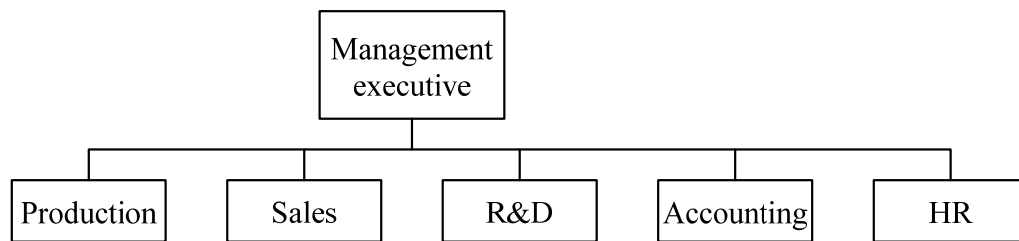
Q72. Which of the following is an appropriate characteristic of an RFID tag that is a type of IC tag and is used for locating and tracking merchandise, inventory, or other assets?

a) It optically reads information encoded in a barcode.
b) It reads information stored on magnetic material upon physical contact.
c) It reads information without physical contact by using electromagnetic waves.
d) It reads information without physical contact by using infrared rays.

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

a) A communication service that provides value-added functions such as storage of data transmitted over the network and conversion of data formats

b) A method for electronically exchange of business data between computers over a network, based on standard formats and protocols

c) An international standard for e-mail services which provides the generation, transmission, and processing of messages, based on the OSI basic reference model

d) An ordering system that enables orders to be placed by transmitting order information from a data entry terminal to the head office or a supplier

Q74. Which of the following is a business organization that is divided according to the type of work performed as shown in the chart below?

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                    ┌──────────────┐
                    │  Management  │
                    │  executive   │
                    └──────────────┘
        ┌─────────┬─────────┬─────────┬─────────┐
   ┌──────────┐┌────────┐┌───────┐┌───────────┐┌──────┐
   │Production ││ Sales  ││ R&D   ││Accounting ││  HR  │
   └──────────┘└────────┘└───────┘└───────────┘└──────┘
```

a) Divisional organization
b) Functional organization
c) Matrix organization
d) Project organization

Q75. Which of the following is an appropriate explanation of accessibility in the context of information technology?

a) Environment where a working style with time-efficient and stress-free commuting can be chosen by using communications networks effectively
b) Environment where even those who are handicapped or elderly have an easy access to information equipment and receive information services
c) Environment where up-to-date information technology, such as mobile computing and home networking, enhances the convenience of computerization
d) Environment where users can use communications terminals, such as cell phones and smart phones, while they move from location to location

Q76. A trucking company has two types of trucks, A-type and B-type, as shown in the table below, and the company has a contract to deliver 900 boxes at a time by using the company's own trucks.   However, because of the limited availability of truck drivers, only a total of 10 trucks can be dispatched at a time.   Which of the following is the set of expressions that can determine the number of trucks so as to minimize the delivery cost?   Here, x and y are the number of A-type trucks and the number of B-type trucks, respectively.

	A-type truck	B-type truck
Maximum loading capacity	90 boxes	70 boxes
Number of company's own trucks	8	6
Cost per delivery	$400	$300

a) Conditions $90x + 70y \leq 900$

$x + y \leq 10$

$0 \leq x \leq 8, \quad 0 \leq y \leq 6$

Objective function $400x + 300y \rightarrow$ Minimize

b) Conditions $90x + 70y \leq 900$

$x + y \geq 10$

$0 \leq x \leq 8, \quad 0 \leq y \leq 6$

Objective function $400x + 300y \rightarrow$ Minimize

c) Conditions $90x + 70y \geq 900$

$x + y \leq 10$

$0 \leq x \leq 8, \quad 0 \leq y \leq 6$

Objective function $400x + 300y \rightarrow$ Minimize

d) Conditions $90x + 70y \geq 900$

$x + y \geq 10$

$0 \leq x \leq 8, \quad 0 \leq y \leq 6$

Objective function $400x + 300y \rightarrow$ Minimize

Q77. An acceptance inspection is to be conducted on a purchased component that has a non-defective ratio of 0.9 and a defective ratio of 0.1. Four plans A though D are proposed for this acceptance inspection. The costs per non-defective and per defective for each plan are shown in the table below. Which of the following is the plan that has the lowest expected cost?

Plan	Cost per non-defective component	Cost per defective component
A	0	1,500
B	40	1,000
C	80	500
D	120	200

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

Q78. The table below shows the income statement for a certain company. Which of the following is the amount of sales (in million dollars) at the break-even point?

Unit: million dollars

Account	Sub-account		Amount
Sales			700
Cost of sales	Variable cost	100	
	Fixed cost	200	300
Gross profit			400
Selling, general, and administrative expenses	Variable cost	40	
	Fixed cost	300	340
Profit before tax			60

a) 250   b) 490   c) 500   d) 625

Q79. Among various types of license agreements for a software package, which of the following is the most appropriate explanation of a site license?

a) A software package can be installed on a designated server in a company or an organization, and can also used by a definite number of users.
b) A software package can be installed on a designated server in a company or an organization, and can also be used by any and all clients to access the server.
c) A software package can be installed on any and all computers, such as PCs, workstations, and servers, at a given location in a company or an organization.
d) A software package can be installed anywhere within a company or an organization, even if installation involves multiple locations.

Q80. Which of the following is the globally recognized model that is used for measuring the maturity level of software and systems development processes and providing guidance for quality processes across a project, a division, or an entire organization?

a) CMMI   b) MBNQA   c) SLA   d) SLCP