October 2012

Applied 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 Applied IT Engineer Examination conducted?

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

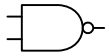
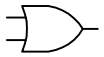
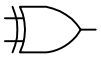
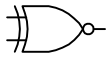
   Since the correct answer is “b)” (October), mark your answer sheet as follows:

   [Sample Answer]

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. A complete basis is a set of functions that can represent all possible Boolean functions. In other words, it can be used to compute any Boolean function or to compose any combinational logic circuit. Which of the following can provide such a complete basis by itself?

a) {AND} b) {NAND} c) {OR} d) {XOR}

Q2. When a computer handles integer values in a 4-bit signed two's complement format, which of the following is an arithmetic calculation that produces a carry but no overflow?

a) $5+6$ b) $-5+6$ c) $5+(-6)$ d) $-5+(-6)$

Q3. Which of the following is a Karnaugh map that is equivalent to the minimized Boolean expression shown below? Here, "+" is the logical sum, "$\bullet$" is the logical product, and $\overline{X}$ is the negation of X.

$$B + A \bullet C + \overline{A} \bullet \overline{C}$$

a)

C \ AB	00	01	11	10
0		1	1	1
1	1	1	1	

b)

C \ AB	00	01	11	10
0	1			
1				1

c)

C \ AB	00	01	11	10
0	1	1	1	
1		1	1	1

d)

C \ AB	00	01	11	10
0				1
1	1			

Q4. When only three types of bit strings 0, 10, and 11 are available, how many valid 7-bit strings can be represented? For example, the bit string 0101110, which is composed of "0, 10, 11, 10", is a valid bit string, but 1100101 is invalid.

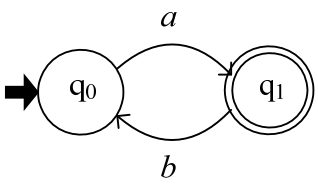
a) 21 b) 43 c) 85 d) 96

Q5. A *k*-string is defined as a string of length *k* and an *n*-substring as an ordered sequence of *n* elements, which do not need to be consecutive, of the original *k*-string. How many *n*-substrings are contained in a *k*-string? Here, when two or more *n*-substrings have the same elements, they are all counted separately as different substrings.

a) $\frac{k!}{(k-n)!}$ b) $\frac{k!}{(k-n-1)!}$

c) $\frac{k!}{n!(k-n)!}$ d) $\frac{k!}{n!(k-n-1)!}$

Q6. Which of the following regular expressions is represented by the state transition diagram of a finite automaton shown below? Here, a regular expression may be enclosed in parentheses for grouping. The plus sign "+" is used to designate one or more occurrences of the preceding pattern, and the asterisk "∗" designates zero or more occurrences of the preceding pattern.



a) $(ab)*$ b) $(aba)*$ c) $a(ba)*$ d) $a+(ba)*$

Q7. Which of the following is the transmission technique whereby several low-speed digital channels are combined into a high-speed transmission channel by allocating brief, interleaved time periods to each low-speed channel?

a) FDM b) PCM c) TDM d) WDM

Q8. A binary search tree is created by inserting the series of values shown below.

10 3 15 8 5 18 16 12

When the value "10" is deleted from the tree, which of the following values can replace it?

a) 3 b) 8 c) 15 d) 18

Q9. A binary heap can be implemented using a one-dimensional array A where the root node is stored in $A(1)$ and the i-th element $A(i)$ has two children $A(2i)$ and $A(2i+1)$. When the root node is deleted four times from the max heap implemented using the array shown below, which of the following shows the order of deleted nodes? Here, each time a root node is deleted, a max heap is reconstructed using the remaining nodes.

55 35 45 25 15 28 38 15 10

a) 55 35 45 25 b) 55 35 45 38
c) 55 45 35 38 d) 55 45 38 35

Q10. There is a dataset that contains distinct data sorted in descending order. In the worst case scenario, how long does it take to sort the dataset in ascending order by using the quick sort algorithm? 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) $O(n^2)$ c) $O(n \log_2 n)$ d) $O(n^2 \log_2 n)$

Q11. Which of the following can be used along with markup languages, such as HTML and XML, in order to describe the presentation semantics and to separate document content from document presentation?

a) CSS b) DOM c) DTD d) SAX

Q12. In a CPU that runs at a clock frequency of 700 MHz, when the number of clocks required to execute an instruction and the appearance ratio of the instruction are as shown in the table below, what is the approximate performance of this CPU in MIPS?

Type of instruction	Number of clocks required to execute the instruction	Appearance ratio (%)
Register-register operation	4	30
Memory-register operation	8	60
Unconditional branch	10	10

a) 10 b) 50 c) 70 d) 100

Q13. Which of the following is a programming method that enables a CPU's pipeline processing to work effectively?

a) Using as many CASE statements as possible
b) Using as many functions as possible
c) Reducing the number of branch instructions
d) Reducing the number of memory access instructions

Q14. When the write-back algorithm is used for accessing main memory at high speed, which of the following is an appropriate explanation of how to write data to cache memory and main memory?

a) Data is written only to the cache memory, and when it is removed from the cache memory, the corresponding main memory is updated.
b) Data is written simultaneously to both the cache memory and the main memory.
c) Data is written simultaneously to the buffer and the cache memory, and then it is written sequentially from the buffer to the main memory.
d) The main memory is divided into multiple blocks which operate independently, and data is written to each of the blocks in parallel.

Q15. Which of the following is an appropriate explanation of a DMA controller?

a) It has a count register that counts in sync with the operating clock and keeps track of the lapse of time by using the register.
b) It performs the exchange of data between main memory and I/O devices or within main memory without the intervention of a CPU.
c) It performs the sum-of-product operation at high speed which takes a long CPU time to execute.
d) It provides memory management functions such as a virtual memory function and a memory protection function.

Q16. Which of the following is an appropriate description concerning an RPC (Remote Procedure Call)?

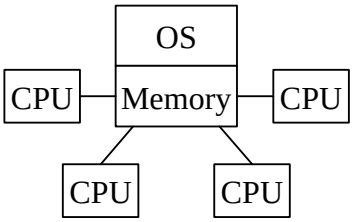
a) A procedure call is implemented by storing a group of procedures called drivers in a file and transferring the file to another computer.
b) A procedure can be called only between computers running the same OS.
c) A procedure on another computer can be called only when the same programming language is used.
d) A procedure provided by another computer can be called like a procedure on the same computer.

Q17. Which of the following is used to classify disk arrays into five RAID levels (RAID 1 through RAID 5)?

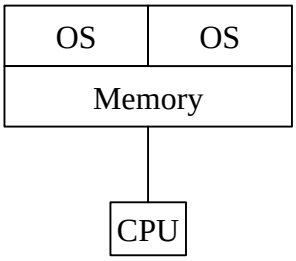
a) The access performance of the hard disk drives that constitute a RAID array
b) The combination of methods and positions to record data and redundant bits
c) The differences in the interface between the RAID array and the computer
d) The value of MTBF showing the guaranteed reliability

Q18. Which of the following is an appropriate combination of computer systems and configuration diagrams?

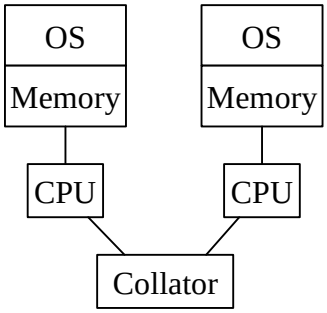
a) Cluster configuration



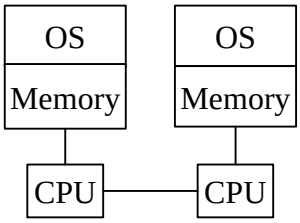
b) Dual configuration



b) Duplex configuration



d) Loosely coupled multiprocessor configuration



Q19. Which of the following is an appropriate description concerning the technology for improving the reliability of a system?

a) Enhancing the reliability of system components through quality management, rather than taking action at the occurrence of a failure, is referred to as fault avoidance.
b) Keeping the system in a predefined safe state at the occurrence of a failure is referred to as fail-soft.
c) Making a correction at the occurrence of a failure so as to prevent its effect from spreading outside as an error is referred to as fail-safe.
d) Providing a predefined reduced scope of services at the occurrence of a failure is referred to as fault masking.

Q20. In a Web system used for product search and order entry, Table 1 shows the number of transactions by hour, and Table 2 shows the relationship between the TPS (Transactions Per Second) and the number of required CPUs. What is the minimum number of CPUs required by this Web system? Here, the overhead of the OS and other processing can be ignored, and transactions occur evenly during each hour.

Table 1 Number of transactions by hour

	9:00 to 10:00	11:00 to 12:00	13:00 to 14:00
Product search	12,000	48,000	24,000
Order entry	6,000	24,000	12,000

Table 2 Relationship between the TPS and the number of required CPUs

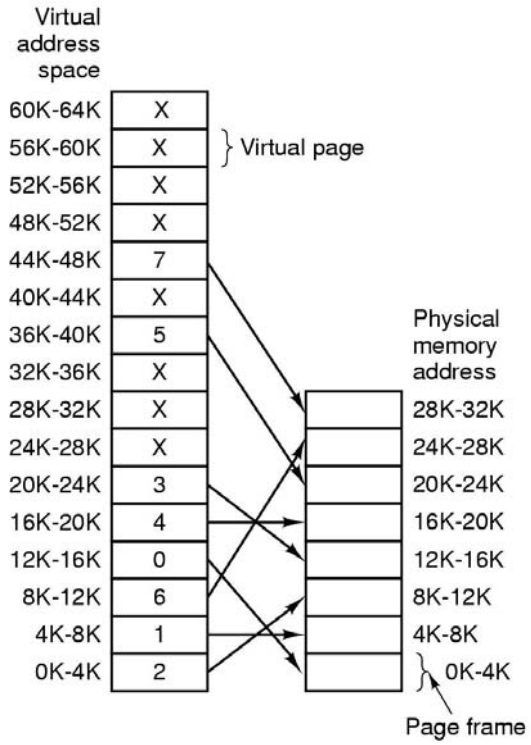
TPS	Up to 10	Up to 20	Up to 30	Up to 40
Number of required CPUs	1	2	3	4

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

Q21. In a multiprogramming environment, there exists a critical section that is a sequence of instructions and can only be executed by at most one process at a time. Which of the following is a synchronization technique that can be used to control such a critical section?

a) Context switch
b) Multithread
c) Preemption
d) Semaphore

Q22. The figure below shows the relation between virtual memory addresses and physical memory addresses at a particular point in time in the page-based virtual memory system. Every 4K page begins on a multiple of 4096 and ends on a multiple of 4095, so 4K-8K means 4096-8191 and 8K-12K means 8192-12287. Which of the following is the physical address corresponding to the virtual memory address 20?



a) 4096 b) 8191 c) 8192 d) 8212

Q23. In a computer system with two-level paging virtual memory, when the 32-bit virtual address has the 10-bit page directory index and the 10-bit page table index, what is the page size in KB?

a) 2 b) 4 c) 6 d) 8

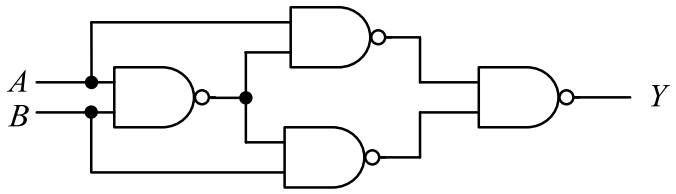
Q24. On a given computer, which of the following is a language processing program for creating an object program that can be run on another computer with a different instruction format?

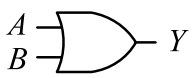
a) Cross compiler
b) Emulator
c) Optimizing compiler
d) Program generator

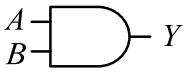
Q25. Which of the following is an appropriate characteristic of OSS (Open Source Software)?

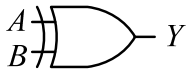
a) OSS can be redistributed by limiting the area of usage and users.
b) OSS must be distributed free of charge.
c) The copyright of OSS is abandoned.
d) The source code of OSS is allowed to be changed under certain conditions.

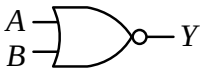
Q26. Which of the following is a logic gate that is equivalent to the logic circuit shown below?



a) 

b) 

c) 

d) 

Q27. Which of the following is an appropriate description concerning measures for power saving of a microprocessor?

a) By increasing the operational voltage, the internal arithmetic processing is performed at high speed, and thus power consumption can be reduced.
b) By lowering the operating frequency of a CMOS processor, the electrical current during a logical inversion decreases, and thus power consumption is reduced.
c) By using a bipolar device rather than a CMOS device, power consumption can be reduced.
d) By using the clock gating method, the supply of electric power to the processor can be stopped during standby, and thus power consumption can be reduced.

Q28. Which of the following is an appropriate explanation of damage from ESD (Electrostatic Discharge) that is a possible failure mechanism of LSI?

a) A phenomenon where a semiconductor device is broken because of the conduction of a parasitic thyristor
b) A phenomenon where a semiconductor device is broken because of the sudden release of an accumulated electrical charge
c) A phenomenon where an electrical wiring line is cut because of mechanical force
d) A phenomenon where an electrical wiring line is cut because of overcurrent

Q29. Which of the following is an appropriate example of designing a Web page from the viewpoint of improving accessibility?

a) In order to create good layout and presentation, tables are effectively used.
b) In order to emphasize an item where input is necessary, a cautionary note such as "(Mandatory)" is clearly written next to the item name in a highlighted color.
c) In order to enable prediction of the content of a hyperlink's destination, the URL of the link destination is appended to the "alt" attribute of the hyperlink image.
d) In order to ensure that users can listen to audio, the audio is automatically played back when a Web page is displayed.

Q30. Which of the following is an appropriate description concerning computer graphics?

a) The metaball technique calculates the brightness from the data of a given space without tracing the line of sight in the reflection or transmission direction.
b) The radiosity method determines the brightness by taking into consideration the effect of interreflection between diffuse reflectors.
c) The ray-tracing algorithm creates an image by pasting a separately defined pattern on the surface of an object having a defined shape.
d) The texture mapping technique removes hidden surfaces by calculating the intersections between the line of sight and all objects with respect to every pixel and selecting the intersection nearest to the line of sight.

Q31. Which of the following is the appropriate explanation concerning logical data independence in the ANSI/SPARC three-level schema architecture?

a) It is possible to change a certain level of schema without changing any lower level schemas.
b) It is possible to change a certain level of schema without changing any upper level schemas.
c) It is possible to change the conceptual schema without changing the external schemas or their application programs.
d) It is possible to change the internal schema without changing the conceptual or external schemas.

Q32. There are two relational database tables *A* and *B*; *A* has 2 rows and 2 columns, and *B* has 3 rows and 3 columns. Which of the following is the size (i.e., rows and columns) of the table that can be obtained as a result of the Cartesian product operation of the two tables?

	Number of rows	Number of columns
a)	5	5
b)	5	6
c)	6	5
d)	6	6

Q33. When the SQL statement is executed on two relational database tables T1 and T2 as shown below, which of the following tables is created? Here, T1.B and T2.X have the same data type. In the resulting tables, "**" denotes NULL or empty (i.e., blank) depending on the SQL implementation.

```
SELECT T1.A, T1.B, T2.X, T2.Y
       FROM T1 RIGHT OUTER JOIN T2
       ON T1.B >= T2.X
```

T1

A	B
p	1
q	2
r	3

T2

X	Y
2	*a*
3	*b*
4	*c*

a)

T1.A	T1.B	T2.X	T2.Y
q	2	2	*a*
r	3	3	*b*

b)

T1.A	T1.B	T2.X	T2.Y
q	2	2	*a*
r	3	2	*a*
r	3	3	*b*

c)

T1.A	T1.B	T2.X	T2.Y
p	1	**	**
q	2	2	*a*
r	3	2	*a*
r	3	3	*b*

d)

T1.A	T1.B	T2.X	T2.Y
q	2	2	*a*
r	3	2	*a*
r	3	3	*b*
**	**	4	*c*

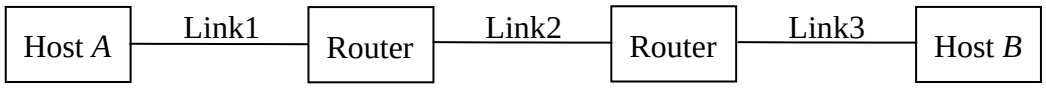
Q34. Which of the following is an appropriate description concerning triggers in database management systems?

a) Triggers are procedures that are always executed explicitly.
b) Triggers are procedures that are used to optimize the database.
c) Triggers can be executed implicitly based on a particular database event.
d) Triggers can be executed only before a change is made to the database.

Q35. When the recovery manager of a DBMS makes use of a transaction log in order to recover from a crash, which of the following is the most appropriate combination of ACID properties ensured by the recovery manager?

a) Atomicity and durability
b) Atomicity and isolation
c) Consistency and durability
d) Consistency and isolation

Q36. As shown in the figure below, two hosts *A* and *B* communicate with each other via three communication links with two routers, and the transmission rates of Link1, Link2, and Link3 are 1 Mbps, 10 Mbps, and 100 Mbps, respectively. When host *A* requests to send a packet of 1500 bytes to host *B*, how long (in milliseconds) does it take to transmit the packet? Here, the processing delay and queuing delay time at the routers and the propagation delay time on each link can be ignored.

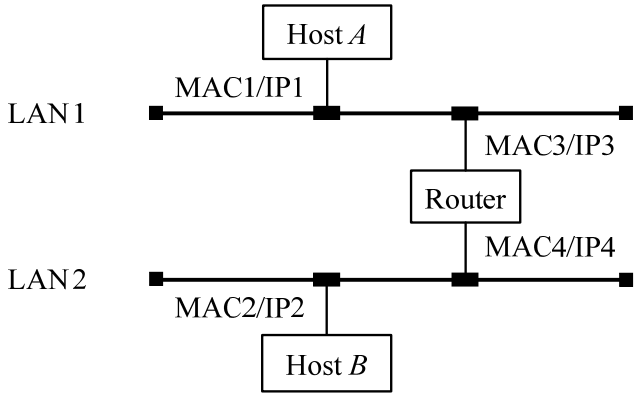


a) 1.665
b) 3.6
c) 12.0
d) 13.32

Q37. In a network using the CSMA/CD access method, when a node detects another signal while transmitting a frame, which of the following is an appropriate process that the node should perform?

a) The node continues to transmit the frame and then transmits a jam signal to indicate that a collision has occurred.
b) The node continues to transmit the frame and then waits for a random time interval so that another node can transmit a frame.
c) The node stops transmitting the frame immediately and then waits for a random time interval so that another node can transmit a frame.
d) The node stops transmitting the frame, transmits a jam signal, and then waits for a random time interval before trying to send that frame again.

Q38. In the LAN environment of the IP network shown in the figure below, packets are transmitted from Host *A* to Host *B*. Which of the following is an appropriate combination of the Ethernet frame destination and the IP datagram destination in a packet in LAN1? Here, in the notation of MAC*n*/IP*m*, MAC*n* represents the MAC address, and IP*m* represents the IP address of the host's or router's interface.



	Ethernet frame destination	IP datagram destination
a)	MAC2	IP2
b)	MAC2	IP3
c)	MAC3	IP2
d)	MAC3	IP3

Q39. Which of the following is an appropriate explanation of NAPT of an Internet connection?

a) It performs conversion between a combination of private IP address and port number and a combination of global IP address and port number.
b) It performs conversion between a host name and an IP address.
c) It performs conversion between an IP address and a MAC address.
d) It performs one-to-one conversion between a private IP address and a global IP address.

Q40. Which of the following is the protocol that is used to call data or a service residing in another computer and in which message description consists of an XML header and an XML body?

a) CORBA b) DCOM c) SIP d) SOAP

Q41. Which of the following is an appropriate description concerning public key cryptography?

a) AES is an algorithm for public key cryptography publicly sought by NIST.
b) RSA is an algorithm for public key cryptography that uses the difficulty of prime factorization.
c) When public key cryptography is used to make communication secure, the decryption key of the recipient is made publicly known.
d) With public key cryptography, the number of destinations to which the private key is distributed becomes greater as the number of users increases.

Q42. Which of the following is a popular form of DoS attack that exploits the TCP 3-way handshake connection mechanism and its limitation of managing the incomplete connection queue, and thereby causes servers to lose resources necessary to respond to new connection requests sent by clients?

a) Buffer overflow b) IP spoofing
c) Smurfing d) SYN flooding

Q43. Which of the following is an appropriate explanation concerning data diddling?

a) Obtaining sensitive or confidential data left in a computer or in discarded or stolen media
b) Stealing very small amounts of money from a large number of accounts over a long period of time
c) Swapping one piece of data for another making it difficult to tell if a crime has been committed
d) Transmitting confidential or proprietary content with malicious intent, usually outside an organization

Q44. In a computer center, incidents are classified into six types as follows:

Scan:	Probes, scans, and other doubtful accesses
Abuse:	An invalid relay that misuses the functions of a server program
Forgery:	Delivery of an e-mail with the forged header
Intrusion:	Intruding on a system
DoS:	An attack that leads to interruption of service operation
Other:	Other attacks

Under these conditions, which of the following is an appropriate combination of types for the three incidents below?

Incident 1:	The trace reveals that a worm attack was attempted, but there was no intrusion.
Incident 2:	A service was interrupted because of network congestion.
Incident 3:	A stepping-stone program for a DoS attack was set up in the system.

	Incident 1	Incident 2	Incident 3
a)	Abuse	DoS	Intrusion
b)	Abuse	Forged	DoS
c)	Scan	DoS	Intrusion
d)	Scan	Forged	DoS

Q45. Which of the following is an act classified as social engineering?

a) Cracking a password by using a brute force attack tool
b) Intruding into a system by exploiting software vulnerabilities
c) Intruding into a system through a backdoor automatically created by virus infection
d) Obtaining the password of a user by pretending to be a system administrator

Q46. When UML is used for object-oriented development, which of the following is the appropriate view that describes how the functionality shown in the use case view is provided (or describes the structures such as classes and objects) and is primarily of use to the designers and developers?

a) Deployment view
b) Design view
c) Implementation view
d) Process view

Q47. Among the characteristics of software analysis and design techniques, which of the following is a characteristic of the data-oriented analysis and design technique?

a) Designing the data structure so that a program can access data with maximum efficiency
b) Focusing on the data structure of information resources when the target area of business operations is modeled
c) Implementing changes in the specifications with relatively little effort after system development by changing and adding data structures and procedures locally
d) Partitioning the program during the course of defining detailed functions so that module independence increases

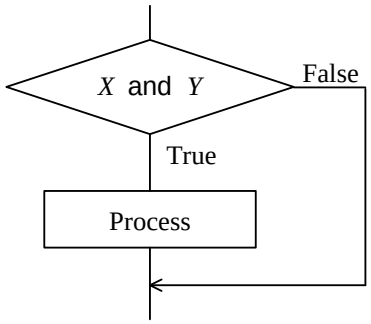
Q48. In an object-oriented program, which of the following a technique used for relating a message to a method at run time?

a) Dynamic binding
b) Encapsulation
c) Multiple inheritance
d) Static binding

Q49. Which of the following is the test that is performed to verify that the system works with established procedures and manuals in actual system environments including network, database, etc.?

a) Integration test
b) Operational test
c) System test
d) Unit test

Q50. When the part of the program logic shown in the flowchart below is tested based on "condition coverage", which of the following is the appropriate combination of test cases *A* through *D*?



Test case	*X*	*Y*
A	True	True
B	True	False
C	False	True
D	False	False

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

Q51. Which of the following is an appropriate description concerning the initial level in the staged representation of CMMI?

a) Processes are characterized for projects and are often reactive.
b) Processes are continually improved.
c) Processes are performed but are controlled in an ad hoc manner.
d) Processes are statistically measured and controlled.

Q52. Which of the following is the appropriate combination of process areas that are required to achieve the “managed” maturity level (or Level 2) in the staged representation of CMMI?

a) Organizational innovation and deployment, and causal analysis and resolution
b) Organizational process focus, organizational training, risk management, and validation
c) Organizational process performance, and quantitative project management
d) Project planning, project monitoring and control, and requirements management

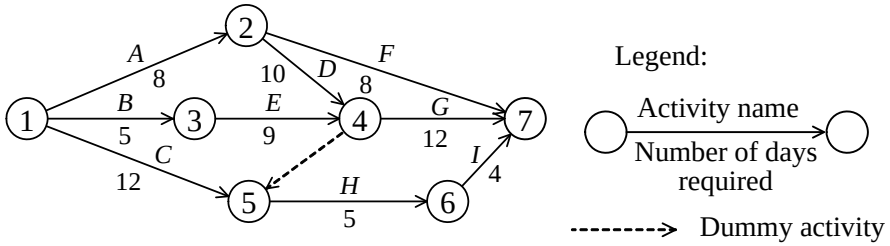
Q53. Which of the following is defined in the WBS of PMBOK?

a) Deliverables of elements, exceptions, and limitations of a project
b) Methods of executing, monitoring, controlling, and terminating projects
c) Project activities necessary for completing a work package
d) Work packages where project activities are hierarchically broken down

Q54. Which of the following is a characteristic of the Gantt chart that is used in the process management and progress management of a project?

a) Activities become easier to manage by breaking down each activity into elements.
b) The free float (or slack time) for each activity can be understood easily.
c) The start point and end point of each activity can be understood at a glance.
d) The time sequence of activities and the critical path can be identified clearly.

Q55. The activities of a project are planned as shown in the diagram below. In order to complete the project in the minimum number of days, in how many days at the latest after the start of the project should node ⑤ be passed?



a) 12 b) 14 c) 18 d) 21

Q56. The table below shows the results of earned value analysis performed at the end of the 5th month of a 10-month project. When current cost efficiency continues, how much (in million dollars) is EAC (Estimate At Completion)?

Management item	Amount (in million dollars)
BAC (Budget At Completion)	200
PV (Planned Value)	100
EV (Earned Value)	80
AC (Actual Cost)	120

a) 220 b) 240 c) 260 d) 300

Q57. The number of elements is counted for five element items of an application: external input, external output, internal logical file, external interface file, and external inquiry. Then, each element is weighted and aggregated. Which of the following is a method or a model that is used for estimating the scale of software development, based on an assumption that the aggregated value correlates to the scale of development?

a) COCOMO
b) Doty model
c) Function Point method
d) Putnam model

Q58. Which of the following is an appropriate item to be contained in an SLA?

a) The characteristics, components, and fee of all services provided by the service provider
b) The distribution of roles between the service desk and the IT support department
c) The operational requirements for IT service that are submitted by the users
d) The service objectives and scope of responsibilities agreed upon by the client and the service provider

Q59. Which of the following is an appropriate explanation of TCO?

a) It is the cost including everything from the installation of hardware and software to operations management.
b) It is the cost incurred during the period from the installation of hardware and software until the start of the operation.
c) It is the cost of development and hardware for a business system installed at a company.
d) It is the cost required for hardware and technical support such as helpdesk and user education.

Q60. When the activity cycle for capacity planning is divided into monitoring, analysis, tuning, and implementation, which of the following corresponds to an explanation of tuning?

a) In order to increase the accuracy of workload prediction for a new business, the workload of an existing business is measured, and trends are analyzed.
b) In order to make a plan about when and what is needed based on a prediction of workload, the performance of the existing system is used as a reference.
c) In order to maximize the performance of the existing system, the changes are reviewed, and the method for the changes is decided.
d) In order to optimize the utilization of hardware such as CPU, memory, and storage, the measurement cycle and the reporting time are planned.

Q61. Which of the following is a responsibility of a system auditor?

a) Describing audit opinions in the audit report
b) Disclosing audit results externally
c) Improving upon the issues identified in an audit report meeting
d) Managing the system to be audited

Q62. Which of the following is an appropriate description concerning a point to be checked in an audit of software asset management?

a) Checking to see if compatibility with the existing system is evaluated at the time of installation
b) Checking to see if evidence such as a software license certificate is retained in an appropriate manner
c) Checking to see if measures to localize failures are taken through appropriate methods such as database partitioning
d) Checking to see if the software vender is fully organized for maintenance and support

Q63. From the viewpoint of IT governance, which of the following is an appropriate policy for management to evaluate an improvement plan that is submitted by the audited department in response to the recommended improvements described in a system audit report?

a) Making improvements based on the status of management resources
b) Making improvements exclusively focusing on the functional aspect of the information system
c) Making improvements that can be achieved within one year
d) Making improvements within the scope of the computerization budget of the audited department

Q64. Which of the following is an appropriate explanation of EA (Enterprise Architecture)?

a) It refers to a technique of evaluating the current and future status of a project by quantifying the project progress and work performance based on the value of the output.
b) It refers to a technique of optimizing business operations and systems for the purpose of modeling the business operations and systems of the entire organization in a unified way and improving both of them simultaneously.
c) It refers to an organizational ability for a company to control the development and implementation of IT strategy and to lead the company in a desired direction for the purpose of achieving competitive superiority.
d) It refers to internal controls built in business processes to ensure all approved business operations are precisely processed and recorded in a business management system.

Q65. Which of the following is a process by which information used for developing software systems is identified, captured, and organized with the purpose of making it reusable when new systems are developed?

a) Domain analysis
b) Object-oriented analysis
c) Requirements analysis
d) Use case analysis

Q66. In an information strategy, which of the following is the purpose of defining a business model at the phase of the total optimization planning?

a) To confirm the business procedures in order to create user manuals and operations manuals required for the actual operations of the information system
b) To identify necessary components, such as hardware, software, and network, in order to build the information system
c) To organize the relationship between business operations and information across the enterprise and set out a clear vision of the way information systems should be
d) To understand the scope and development scale of the computerization and estimate the required period of time, person-hours, and costs

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

a) It refers to a business system that manages mission-critical tasks in an integrated manner, in order to use the management resources of a company effectively and improve the management efficiency.
b) It refers to a design approach that provides elements of business processes and the IT infrastructure that supports them, as services based on software components.
c) It refers to a technique of drastically reviewing existing organizations and business rules and restructuring workflows, management mechanisms, and information systems in a corporate reform.
d) It refers to a written agreement between an outsourcer and an IT outsourcing service provider on the quality of service.

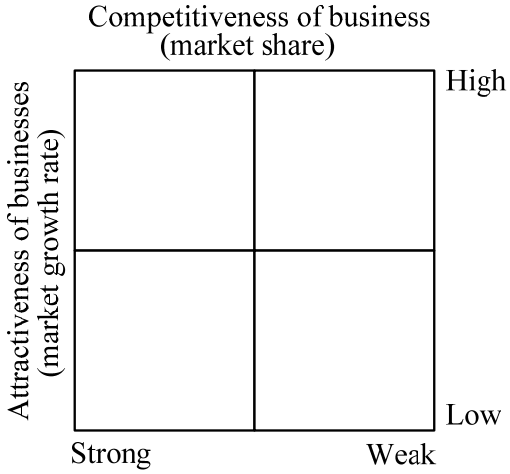
Q68. In the requirements definition, which of the following is a diagram that is used to clarify the scope of all the business operations including users by representing the functions of the business operations separately from the users and external systems?

a) Activity diagram
b) Class diagram
c) State transition diagram
d) Use case diagram

Q69. Among the requirements of an order management system, which of the following is an appropriate example of a “non-functional” requirement?

a) In order to maintain the availability of the order management system at a predetermined level, the system can be recovered within half a day when a fault occurs.
b) The products to be shipped are limited to those where the person in charge of receiving orders enters the information received from the customer into the system, and the person in charge of sales management enters an approval for the order.
c) When an order is processed, inventory is automatically allocated in real time for products which have inventory in the warehouse.
d) When an order is received from a customer, the balance credit amount is calculated, and if the result is negative, a warning message is displayed on the input screen.

Q70. A portfolio categorization matrix is shown below. Which of the following is the purpose of using this matrix to analyze business plans and competitive superiority?



a) To evaluate tactics for maintaining a competitive edge in the market by setting an objective and improving product quality
b) To evaluate the change in the market by considering seasonal fluctuation factors and geographical distribution so that an objective can be set
c) To evaluate the current position of the company as the basis for setting an objective and prioritizing resource allocation
d) To evaluate the current position of the company so that the promotion effect defined as an objective can be measured

Q71. Which of the following is an appropriate explanation of core competence?

a) A bundle of skills and technologies that enables differentiation from competitors
b) Basic principles and action guidelines on business activities
c) Business opportunities and threats in the environment surrounding the company
d) Objectives to be achieved by implementing business strategy

Q72. Which of the following is an appropriate combination of KPI (Key Performance Indicator) and KGI (Key Goal Indicator) that is set by a sales department?

	KPI	KGI
a)	Number of visits for existing customers	Number of visits for new customers
b)	Number of visits for new customers	Total sales amount of new customers
c)	Total sales amount of existing customers	Total sales amount of new customers
d)	Total sales amount of new customers	Number of visits for new customers

Q73. In a process that aims for the maximum refinement, technology follows a course of evolution which comprises the introduction stage, growth stage, maturity stage, decline stage, and then moves to the next technology phase. Which of the following is used for representing this technological evolution process?

a) Bathtub curve
b) Demand curve
c) Learning curve
d) Technology S curve

Q74. Which of the following is an appropriate explanation of SFA?

a) It is a method of consolidating marketing research information together with customer information, sales tools, and negotiation process.
b) It is a method or a concept of improving business efficiency by planning and managing company-wide business resources effectively and comprehensively.
c) It is a method or an information system that supports the flow of information between different companies to efficiently address logistics concerns of production and sales.
d) It is a strategy of segmenting the market structure where a product is positioned for one segment of the market with its corresponding price and product value.

Q75. Which of the following is an explanation of a derivative?

a) It refers to financial products such as forwards, swaps, and options.
b) It refers to the avoidance of risks that arise from future uncertainties, such as interest rate risks and currency risks.
c) It refers to the bond portion of bonds which have new share subscription rights.
d) It refers to the fact that a transaction is described in neither the balance sheet nor the income statement.

Q76. Company *X*, a manufacturer, performs four jobs *A* through *D* by using NC machine tools. The setup time of each job is shown in the table below. When the jobs are performed so that the total setup time is minimal, what is the total setup time in hours? Here, the jobs may be performed in any order, and the total setup time can be calculated based on each setup time required from the "FROM" job to the "TO" job.

Unit: hour

FROM \ TO	Job *A*	Job *B*	Job *C*	Job *D*
Job *A*		2	1	2
Job *B*	1		1	2
Job *C*	3	2		2
Job *D*	4	3	2	

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

Q77. Which of the following is an appropriate explanation of corporate governance?

a) In addition to essential profit-making activities, a company contributes appropriately for the betterment of society by acting as a member of society.
b) It is a mechanism for monitoring whether or not business management is being performed appropriately, and maintaining the soundness of corporate activities.
c) It publicizes the business status of a company accurately, promptly, and continuously as a part of public relations with investors and analysts.
d) It quantitatively measures and analyzes the cost effectiveness of environmental conservation measures, and publicizes the cost and effects of environmental conservation.

Q78. Among the financial statements, which of the following is represented by three categories of activities: “sales activities,” “investment activities,” and “financial activities”?

a) Balance sheet
b) Cash flow statement
c) Income statement
d) Statements of shareholders’ equity

Q79. The material below shows the profit and loss record of the current fiscal year. In the plan for the next fiscal year, the operating profit is set as 30 million dollars. How much should the plan for total sales in the next fiscal year be in million dollars? Here, the fixed cost and rate of variable ratio for the next fiscal year are not different from those for the current fiscal year.

[Material] Unit: million dollars

<Profit and loss record of current fiscal year>

Sales	500
Material cost (Variable cost)	200
Outsourcing cost (Variable cost)	100
Fixed manufacturing cost	100
Gross profit	100
Fixed selling cost	80
Operating profit	20

a) 510 b) 525 c) 550 d) 575

Q80. Which of the following is an explanation of compliance enhancement in corporate management?

a) Curbing the occurrence of illegal acts by management staff and employees that can threaten the survival of the company
b) Establishing a framework that enables sound management by keeping the use of power by management staff in check
c) Improving the level of satisfaction of the interested parties, such as customers, shareholders, and employees, to ensure continued growth of the company
d) Increasing competitiveness by securing management resources that can be a source of differentiation against competitors