

**Q1.** Which of the following is equal to hexadecimal number 0.75?

a)  $2^{-2}+2^{-5}+2^{-7}+2^{-8}$

b)  $2^{-2}+2^{-3}+2^{-4}+2^{-6}+2^{-8}$

c)  $2^{-1}+2^{-2}$

d)  $2^{-1}+2^{-2}+2^{-3}+2^{-4}+2^{-6}$

**Q2.** In which number system does the following computation hold?

$131-45=53$

a) 6

b) 7

c) 8

d) 9

**Q3.** When a certain integer value is converted to the binary representation in which a negative value is expressed as its two's complement, the lowest two bits are "11." Which of the following statements is true for the remainder that is produced when that integer value, in the decimal representation, is divided by 4? Here, assume that the decimal portion of the absolute value of the quotient of the division operation has been truncated.

a) The remainder is 3 if the integer value is positive.

b) The remainder is 3 if the integer value is negative.

c) The remainder is -3 if the integer value is negative.

d) The remainder is 0, regardless of whether the integer value is positive or negative.

**Q4.** How many bytes are needed in order to represent a signed six-digit decimal number as a packed decimal?

a) 3

b) 4

c) 6

d) 7

**Q5.** Which of the following is the absolute value of the negative number 10101110, expressed as two's complement?

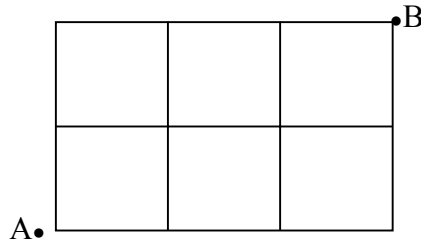
a) 01010000

b) 01010001

c) 01010010

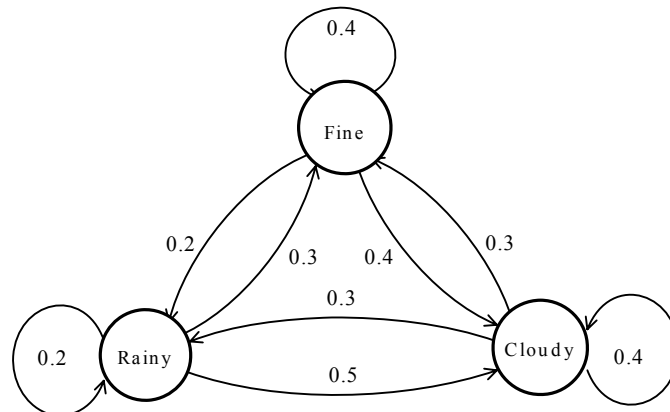
d) 01010011

**Q6.** How many shortest paths are there travelling along the lines from point A to point B in the diagram? In this case, the vertical lengths of all the blocks are equal, and the horizontal lengths of all the blocks are also equal.



- a) 6
- b) 10
- c) 12
- d) 36

**Q7.** The following diagram depicts daily changes in the weather in a given region. The numbers in the diagram indicate the probability of a change in the weather from the previous day. When it is rainy on a given day, what is the probability that it will be fine two days later?



- a) 0.15
- b) 0.27
- c) 0.3
- d) 0.33

**Q8.** Which of the following truth tables represents the formula  $Z = \overline{X} \cdot \overline{Y} + X \cdot Y$ ? Here,  $\cdot$  is the logical product,  $+$  the logical sum and  $\overline{A}$  the negation of A.

a)

$X$	$Y$	$Z$
0	0	0
0	1	0
1	0	0
1	1	1

b)

$X$	$Y$	$Z$
0	0	0
0	1	1
1	0	1
1	1	0

c)

$X$	$Y$	$Z$
0	0	0
0	1	1
1	0	1
1	1	1

d)

$X$	$Y$	$Z$
0	0	1
0	1	0
1	0	0
1	1	1

**Q9.** There is an 8-bit register. The values of the bits in the register are  $d_0, d_1, \dots, d_7$  and the value of the parity bit is  $p$ . Which of the following expressions always holds an odd parity? Here,  $\oplus$  represents an exclusive OR operation.

a)  $0 \oplus d_0 \oplus d_1 \oplus \dots \oplus d_7 = p$

b)  $d_0 \oplus d_1 \oplus \dots \oplus d_7 = p$

c)  $d_0 \oplus d_1 \oplus \dots \oplus d_7 \oplus p = 0$

d)  $d_0 \oplus d_1 \oplus \dots \oplus d_7 \oplus p = 1$

**Q10.** There are two numbers expressed as four-bit binary numbers. The logical bit-by-bit product of them is 0010, and the logical bit-by-bit sum of them is 1011. What is the sum of the two numbers?

a) 1100

b) 1101

c) 1110

d) 1111

**Q11.** The following table is a state transition table for checking an input character string. This check rejects the string if the state is “e” after a character is inputted. Assuming that the initial state is “a,” which of the strings shown below would be rejected when inputted? Note that the “△” here is used to denote a space.

		Input characters				
		Space	Numeral	Sign	Decimal point	Others
Current state	a	a	b	c	d	e
	b	a	b	e	d	e
	c	e	b	e	d	e
	d	a	e	e	e	e

- a) +0010                      b) -1                      c) 12.2                      d) 9.△

**Q12.** There exists data in a list structure with bidirectional pointers such as those shown below. If employee G is to be added between employee A and employee K, how many pointers will have their values changed after the addition?

Before addition

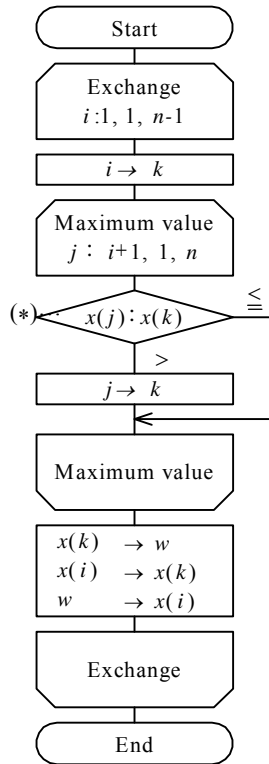
Address	Employee	Next pointer	Previous pointer
100	Employee A	300	0
200	Employee T	0	300
300	Employee K	200	100

After addition

Address	Employee	Next pointer	Previous pointer
100	Employee A	a	b
200	Employee T	c	d
300	Employee K	e	f
400	Employee G	x	y

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

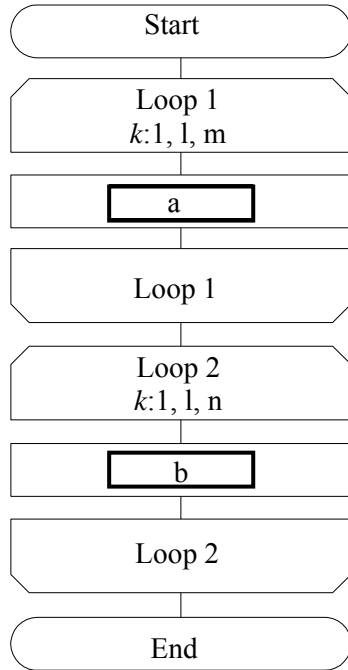
**Q13.** In the following flowchart, values are sorted in ascending order according to the maximum value selection method. Which of the following is an expression that expresses the number of times the asterisked operation (comparison) is performed?



Note: The loop-end repetition specification is as follows:  
Variable name: initial value, increment, termination value.

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

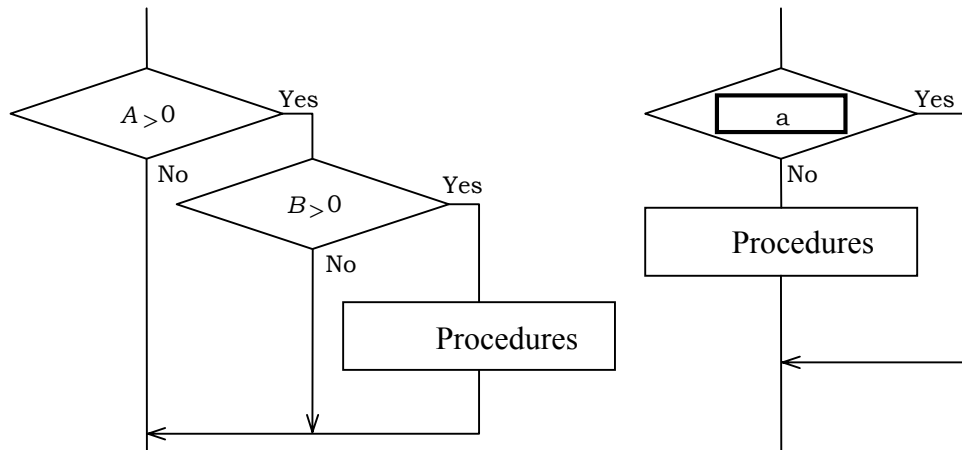
**Q14.** Arrays X and Y store character strings of lengths m and n. The figure below is a flow chart expressing an algorithm in which a character string, obtained by concatenating the character string of length n after the character string of length m, is stored in array Z. Which processes are the correct ones to insert into **a** and **b** in the figure? In this example, it is assumed that a single character is stored in a single array element.



Note: The repetition specification in the loop headers denotes the following:  
Variable names: initial value, increment, terminal value.

	a	b
a)	$X(k) \rightarrow Z(k)$	$Y(k) \rightarrow Z(m+k)$
b)	$X(k) \rightarrow Z(k)$	$Y(k) \rightarrow Z(n+k)$
c)	$Y(k) \rightarrow Z(k)$	$X(k) \rightarrow Z(m+k)$
d)	$Y(k) \rightarrow Z(k)$	$X(k) \rightarrow Z(n+k)$

**Q15.** There are two integer type variables “A” and “B.” In order for the following two flowcharts to have the same effect, regardless of the values of “A” and “B,” what conditional expression must be inserted in [a]? Here, “AND,” “OR” and “ $\bar{X}$ ” refer to logical product, logical sum, and negation of “X,” respectively.



- |   |  |
|---|--|
| a) $(A > 0) \text{ AND } (B > 0)$                       | b) $(A > 0) \text{ OR } (B > 0)$                       |
| c) $\overline{(A > 0)} \text{ AND } \overline{(B > 0)}$ | d) $\overline{(A > 0)} \text{ OR } \overline{(B > 0)}$ |

**Q16.** Which of the following types of memory allows data to be rewritten and erased electrically, and retains its contents even when the power is turned off?

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

**Q17.** A system must execute 800,000 instructions per transaction. What is the transaction processing capacity (transaction/sec) on a 20 MIPS processor whose utilization is 80%?

- |      |       |       |       |
|------|-------|-------|-------|
| a) 2 | b) 20 | c) 25 | d) 31 |
|------|-------|-------|-------|

**Q18.** Which of the following is an appropriate explanation of the pipeline processing method for a processor?

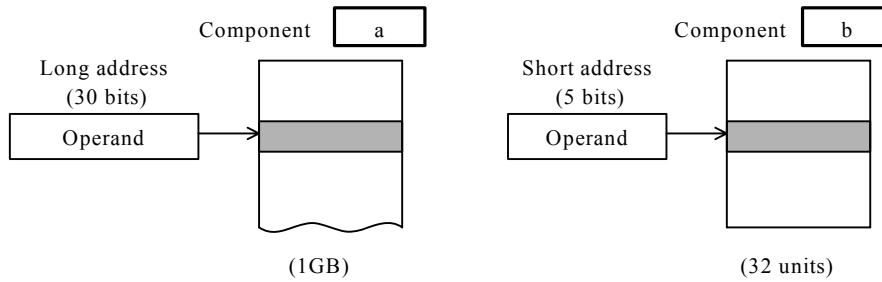
- a) A system in which multiple processors are synchronized with each other to execute a single instruction on their own data.
- b) A system in which the execution time required for a single instruction in a single processor is made as short as possible.
- c) A system in which a single processor simultaneously executes multiple instructions, as their stages are slightly shifted.
- d) A system in which multiple processors execute their own instructions on their own data.

**Q19.** The following table contains a mixture of a particular computer's instructions. What is roughly the processing performance of this computer in MIPS?

Instruction type	Execution speed (ms)	Occurrence rate (%)
Integer operation instruction	1.0	50
Move instruction	5.0	30
Branch instruction	5.0	20

- a) 0.1                      b) 0.3                      c) 1.1                      d) 3.0

**Q20.** The diagram below shows the components serving as the read source or storage destination of instructions or data, specified by a machine instruction operand in a certain computer system. Which of the following is an appropriate combination expressing a and b?



	a	b
a)	Main memory	Register
b)	Hard disk	Main memory
c)	Hard disk	Register
d)	Register	Hard disk

**Q21.** Which of the following is a correct description concerning memory interleaving, a technique for increasing computer speed?

- a) Data is directly transferred between the main memory and an I/O device as well as between main memories without going through the CPU.
- b) To send data to the main memory, data is written to the cache and, when the cache overflows, the data is written to the main memory.
- c) By copying part of the data from the main memory to the cache, the difference in access speeds to registers and to the main memory decreases.
- d) The main memory is divided into multiple groups which operate independently and groups are accessed in parallel.

**Q22.** There are two computers, X and Y, with exactly the same conditions except that the access time of the cache memory and main memory differ, as shown in the figure and table below. When a certain program was run on both computers, processing time was the same for both. What is the hit rate of the cache memory in this case? Assume that no factors other than CPU processing have an impact on the hit rate.

Fig. Configuration

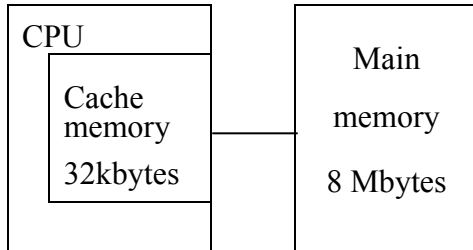


Table Access Time

	Unit: nsec	
	CPU X	CPU Y
Cache memory	40	20
Main memory	400	580

- a) 0.75                      b) 0.90                      c) 0.95                      d) 0.96

**Q23.** Which of the following is a correct explanation for the large capacity of DVDs?

- a) Magnetic heads have multiple magnetic intensities.
- b) Magnetic heads have multiple magnetic polarities.
- c) Laser beams deliver high luminosity.
- d) Laser beams have a short wavelength.

**Q24.** Which of the following describes the correct size relationship of the data capacity units of a magnetic disk device?



- a) Cylinder > Sector > Track
- b) Cylinder > Track > Sector
- c) Sector > Track > Cylinder
- d) Track > Sector > Cylinder

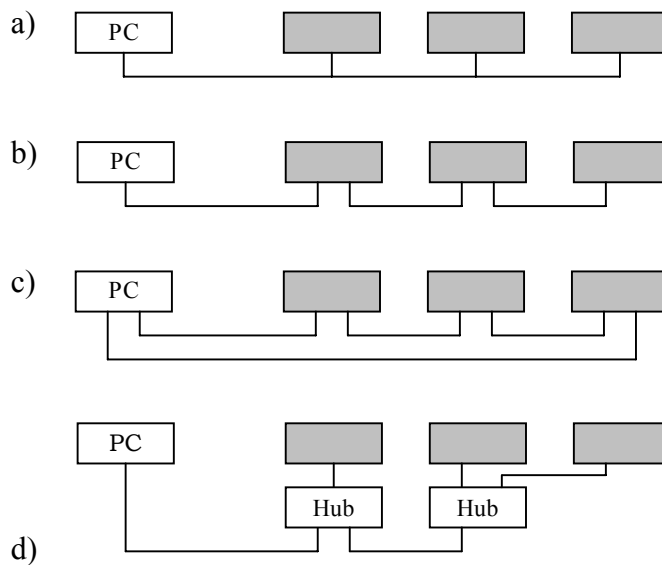
**Q25.** There is a system which manages the files area in units of blocks, each containing eight 500-byte sectors. How many sectors in total would be assigned to save two files, one consisting of 2,000 bytes and the other of 9,000 bytes? Assume that the sectors occupied by management information, such as directories, can be ignored.

- a) 22                      b) 26                      c) 28                      d) 32

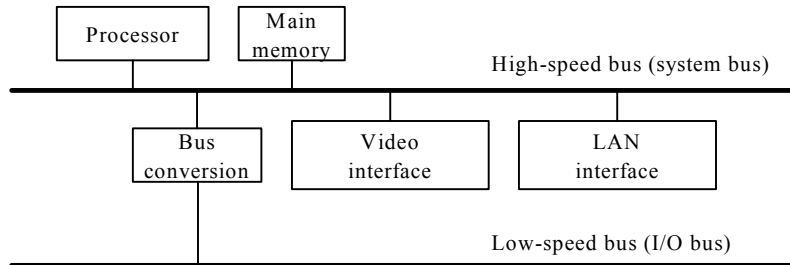
**Q26.** Which of the following is a suitable description of CD-ROMs?

- a) It is not possible to write data to CD-ROMs, but because they have faster access speed than magnetic disk devices, they are suitable for randomly accessed databases with no information additions or updates.
- b) Each piece of data is managed using three address levels—cylinder, track, and sector.
- c) With ISO 9660, an international CD-ROM logical file format, information pertaining to directories cannot be stored. Therefore, hierarchical structures are managed by using long file names, containing symbols like “/” and “¥”, for all files.
- d) Areas containing digital data in sector increments, such as data and programs for processing that data, can be mixed together with areas containing audio information like that of musical CDs.

**Q27.** Which of the following is the correct method of connecting devices to a PC using the USB (Universal Serial Bus) interface, a bus interface for peripheral devices? Here,  represents a USB peripheral device, and  represents a cable.



**Q28.** In addition to a video interface and LAN interface, which of the following is suitable for connection to the high-speed bus (system bus) in a PC with the bus configuration shown below?



- a) Keyboard/mouse interface
- b) Hard disk interface
- c) Printer interface
- d) Floppy disk interface

**Q29.** There is a digital camera which captures images of 24-bit color information at a resolution of H1,600 x V1,200 dots. If an 8-Mbyte recording memory is used with this camera, how many images can it record? Assume that image compression is not used.

- a) 1
- b) 4
- c) 11
- d) 15

**Q30.** The priority level of three tasks and the operation sequence and processing times of a CPU and I/O devices when each task is executed alone are as shown in the table below. How many msec of idle time does the CPU have from the time at which it becomes possible to simultaneously execute all three tasks until the execution of all stacks ends? Assume that no conflicts occur in I/O operations and that OS overhead can be ignored.

Priority level	Operation sequence and processing times when executed alone (unit: msec)
High	CPU(3) → I/O(5) → CPU(2) → I/O(5) → CPU(2)
Middle	CPU(2) → I/O(6) → CPU(2) → I/O(5) → CPU(2)
Low	CPU(1) → I/O(5) → CPU(2) → I/O(4) → CPU(1)

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

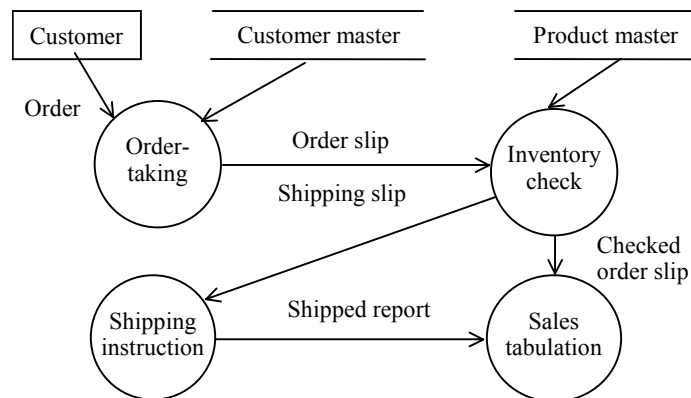
- Q31.** Which of the following descriptions of the LRU method in regards to page replacement algorithms is correct?
- a) A method that replaces the oldest page.
  - b) A method that replaces the page that was referenced last.
  - c) A method that replaces the page whose elapsed time after last reference is the longest.
  - d) A method that replaces the page that has been referenced least frequently.
- Q32.** Which of the following is an appropriate description of multiprogramming?
- a) CPU utilization is reduced, but turnaround time can be improved.
  - b) Multiprogramming is possible only between tasks allocated to the same virtual storage space.
  - c) Multiple tasks can be placed in the main memory, thus enabling apparent sharing of the CPU.
  - d) Multiprogramming is a function on single-processor systems; it cannot be used on multi-processor systems.
- Q33.** Which of the following is a correct description concerning memory leaks?
- a) When the number of applications simultaneously executed increases, the main memory capacity becomes insufficient and most of the processing time is spent for paging which drastically lowers throughput.
  - b) Because of a bug in the application or OS, the main memory space that was secured during operation is not freed up, making fewer areas of the main memory accessible.
  - c) A method for loading necessary modules into the main memory when the program execution area is limited in size.
  - d) Processing that exchanges contents between the main memory and an auxiliary storage.

- Q34.** Which of the following statements correctly describes the API (Application Program Interface) in an OS?
- a) It is a mechanism by which the application directly operates the hardware so as to execute the various functions.
  - b) It is a mechanism by which the various functions made available by the OS are used from the application.
  - c) It is a mechanism by which multiple applications communicate with one another over a network.
  - d) It is a mechanism that standardizes menu items of all the applications for the convenience of users.
- Q35.** Which of the following file organization methods is composed of multiple members and is the most suitable for program libraries?
- a) Partitioned organization
  - b) Indexed organization
  - c) Sequential organization
  - d) Direct organization
- Q36.** Which of the following can be assessed by the TPC benchmark performance evaluation method?
- a) OLTP performance
  - b) Disk device performance
  - c) Network performance
  - d) Processor performance

- Q37.** Which of the following is suitable as a description of SPECint, which is used as a performance evaluation index?
- a) It is the number of floating point operations that can be performed per second, and is used mainly as a performance measure for scientific and engineering computations. However, it is also used as an evaluation index for super-parallel computers.
  - b) It is the average number of instruction executions per second. Evaluation results typically differ according to the design method and component configuration. It is used to compare CPU performance among computer systems made by the same manufacturer and with the same architecture.
  - c) It applies to an OLTP system. It permits evaluation not only of its CPU performance, but also evaluation of the system including magnetic disk device I/O and DBMS performance.
  - d) It is obtained from a number of benchmarks executing integer operations, and is used to evaluate CPU, memory system, and compiler code generation performance.
- Q38.** Which of the following descriptions concerning the evaluation of system performance is correct?
- a) For OLTP (Online Transaction Processing), the MIPS value is used to evaluate system performance.
  - b) Response time and turnaround time are indexes for evaluating performance from the standpoint of a system operations administrator.
  - c) It is common that response time is improved as the utilization of system resources becomes higher.
  - d) The number of transactions and jobs that can be processed within a unit of time is important when evaluating system performance.
- Q39.** Assume that the utilization ratio of a computer system with an MTBF of 1,500 hours and an MTTR of 500 hours is to be increased by a factor of 1.25. What must the MTTR be?
- a) 100
  - b) 125
  - c) 250
  - d) 375

- Q40.** Which of the following is a correct statement concerning virtual reality?
- a) Using technology such as CG, virtual reality expresses the world created inside a computer as if it were the real world.
  - b) For the purpose of improving GUI, it does not display an image incrementally from the top, but first displays a rough mosaic-like image and gradually sharpens it.
  - c) Virtual reality tests whether or not hypothetical results can be obtained from the computer simulation of wind tunnel tests used for automobile or aircraft design.
  - d) Virtual reality makes human recognition and inference ability possible on a computer.
- Q41.** Which of the following statements correctly describes a characteristic of a recursive program?
- a) A recursive program can recall itself from within itself.
  - b) A recursive program can be located in and executed from an arbitrary address in the main memory.
  - c) A recursive program can produce correct results even if simultaneously called by multiple tasks.
  - d) A recursive program can be repeatedly executed without reloading.
- Q42.** Though originally the term referred to a small program, nowadays it indicates a compiled object code that is stored in a server and, whenever requested by a client, is sent to the client and executed. What is the term in question?
- a) Applet                      b) Servlet                      c) Script                      d) Thread
- Q43.** Which of the following functions are included in downstream CASE tools?
- a) System analysis and definition
  - b) Test support
  - c) Project support
  - d) Prototyping

**Q44.** Which term describes the following type of diagram?



- a) DFD                      b) State transition diagram                      c) Flowchart                      d) Petri net

**Q45.** Which of the following would generally be considered a subclass of “automobile” in object orientation?

- a) Engine                      b) Serial number                      c) Tire                      d) Truck

**Q46.** Which of the following is a correct statement concerning reverse engineering of software?

- a) Reverse engineering extracts design specifications from an implemented program.  
 b) Reverse engineering designs a program in the order of output >> process >> input.  
 c) Reverse engineering makes it possible for the hardware to perform functions handled by the software.  
 d) Development languages and development tools are selected according to the content of program processing.

**Q47.** Which of the following ways to divide a module causes the weakest module coupling?

- a) Including as many functions as possible in one module.  
 b) Handing over only the necessary data items as parameters between two modules.  
 c) Using a global area to share data items with other modules.  
 d) Handing over parameters so as to control logic for another module when that module is called.

**Q48.** Company A decided to conduct a study of its loyal customer segment. A “loyal customer” is defined as a customer who had recently made a purchase and who had made frequent purchases in the past. In order to determine the extent of the loyal customer segment within its customer base, the company decided to prepare an analysis table counting by period and by frequency the number of customers who have made purchases within the last month, the last two months, the last three months, and so on. Which of the following analysis tables is best for easily determining the extent of the loyal customer segment?

a)

Month	No. of purchases		
	10	9	...
Most recent month	550	650	...
Most recent 2 months	700	850	...
⋮	⋮	⋮	⋮

b)

Most recent month	Most recent 2 months	Most recent 3 months	...
3,500	3,800	4,200	...

10	9	8	...
2,000	2,500	2,800	...

c)

No. of purchases	Month	No. of customers
10	Most recent month	550
	Most recent 2 months	700
	⋮	⋮
9	Most recent month	650
	⋮	⋮

d)

Month	No. of purchases	No. of customers
Most recent month	10	550
	9	650
	⋮	⋮
Most recent 2 months	10	700
	⋮	⋮

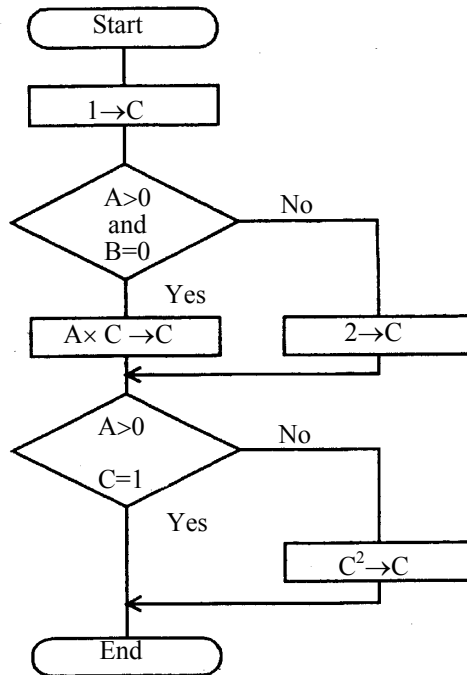
**Q49.** Which of the following results adds the check digit determined through the method shown below? In this case, the data is 7394, the weight constant is 1234, and the radix is 11.

[Method]

- (1) Determine the product of each digit of the data and the corresponding digit of the weight constant, then calculate their sum.
- (2) Divide the sum by the radix and determine the remainder.
- (3) Subtract the remainder from the radix, then add the first-place digit of the result to the end of the data as a check digit.

- a) 73940                      b) 73941                      c) 73944                      d) 73947

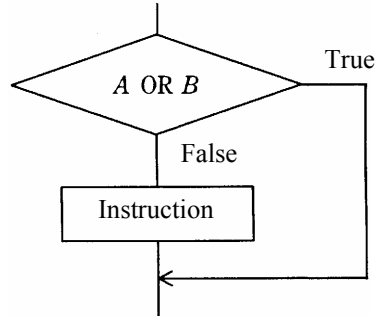
**Q50.** What is the minimum test case for satisfying the decision condition coverage (branch coverage) in the flowchart shown below?



- a) (1) A=0, B=0                      (2) A=1, B=1
- b) (1) A=1, B=0                      (2) A=1, B=1
- c) (1) A=0, B=0                      (2) A=1, B=1                      (3) A=1, B=0
- d) (1) A=0, B=0                      (2) A=0, B=1                      (3) A=1, B=0                      (4) A=1, B=1

- Q51.** A black box test is a type of testing technique used in software development. Which of the following statements accurately describes a black box test?
- a) A black box test analyzes the source program and tests program control flow and the flow of data such as variables. It is mainly performed by third parties and not by the program developer.
  - b) A black box test tests whether or not the program functions as the designer intended. It is mainly performed by third parties and not by the program developer.
  - c) The objective of a black box test is to execute all of the instructions in the program at least once. It is mainly performed by the program developer him/herself.
  - d) A black box test is based on the internal specifications that describe the internal structure and logic of the program. It is mainly performed by the program developer him/herself.
- Q52.** In creating a program, which of the following is appropriate as an explanation of structured programming, which is the main point of modular logic design?
- a) Creating coding indentation rules to make source listing easier to see.
  - b) Making use of notes so that processes can be understood simply by reading the notes.
  - c) The rule-of-thumb size of a single module is 50 to 150 lines of code.
  - d) Structured programming is done with three basic structures: sequence, selection, and repetition.
- Q53.** For system development, a project is divided into a number of work units and an execution plan is prepared. Which of the following statements is correct concerning this way of dividing up work?
- a) In general, the larger the work unit, the more accurately person-hours can be estimated.
  - b) A WBS is created based on an arrow diagram drawn up as a result of the work division.
  - c) The work divided up in detailed scheduling should be sufficiently detailed so as to be assignable to individuals.
  - d) It is essential that the smallest unit of the work divided up in general scheduling is a unit which can be implemented by one person.

**Q54.** Which of the following is suitable as a test case for testing the illustrated logic through decision condition coverage (branch coverage)?



a)

<i>A</i>	<i>B</i>
False	True

b)

<i>A</i>	<i>B</i>
False	True
True	False

c)

<i>A</i>	<i>B</i>
False	False
True	True

d)

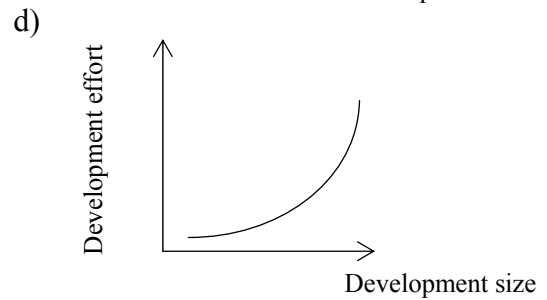
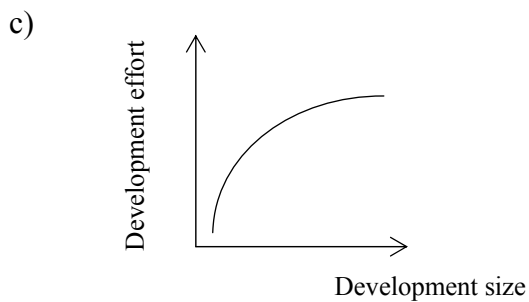
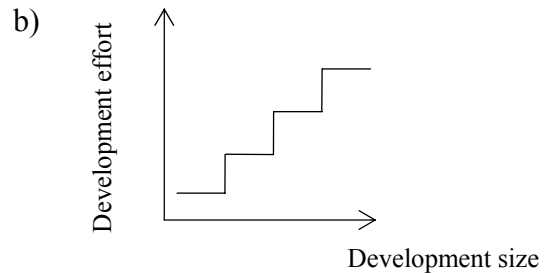
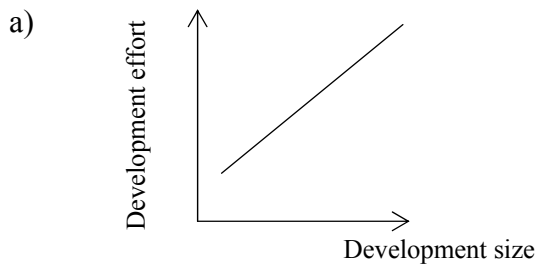
<i>A</i>	<i>B</i>
False	True
True	False
True	True

**Q55.** The following table gives the number of items by category and the weighting factor for user functions of an application program. Information is based on the function point concept. How many function points does this application program have? Here, the additional multiplication factor for complexity is 0.75.

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

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

**Q56.** Which of the following is the most appropriate graphical expression of the relationship between software development size and development effort?



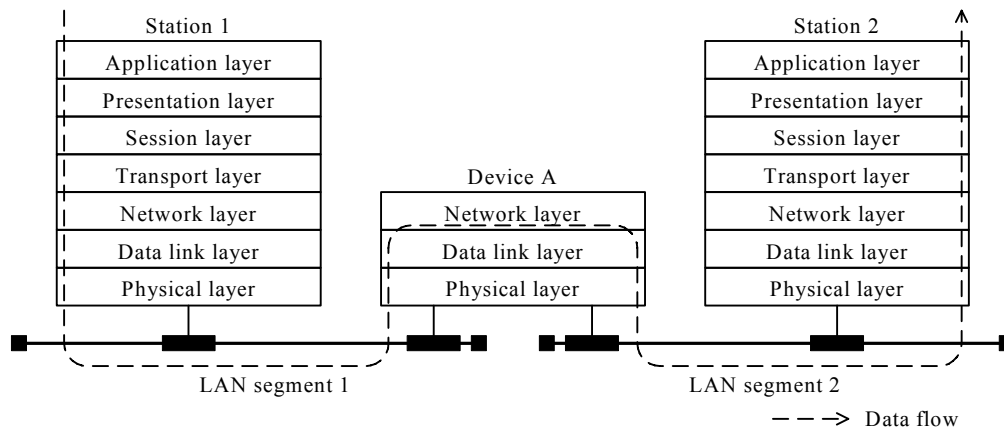
- Q57.** Which of the following is a correct description concerning an all-at-once transfer that switches everything from an old system to a new system?
- a) If errors result because of the transfer, the effect these errors have is less than in the case of sequential transfer.
  - b) The operation and maintenance load associated with the transfer are less than in the case of sequential transfer.
  - c) Development and transfer take a longer time than in the case of sequential transfer.
  - d) Even after transferring over to the new system, it is easy to switch back to the old system.
- Q58.** A computer system consisting of a main unit, a display, a printer, and a modem is used for an average of three hours per day, thirty days per month. What is the cost of the electricity needed to power the system per month? Assume that the main unit consumes 200W, the display 140W, the printer 355W, and the modem 5W. Also assume that electricity costs 25 cents per kilowatt hour. Do not consider any basic charges, etc., for the electricity.
- a) 63                      b) 525                      c) 765                      d) 1,575
- Q59.** When an attempt was made to open a file on a floppy disk by a word processor program, a certain message was displayed and it was never possible to properly open the file. Assuming the file is not corrupted, which of the following is the most likely cause of this?
- a) An attempt was made to open a file on a write-protected floppy disk.
  - b) An attempt was made to open a file created using a different word processor program or a different version.
  - c) An attempt was made to open a text file created using a text editor.
  - d) An attempt was made to open a file with read-only attributes.

- Q60.** When a certain system was put into operation, inquiries on operational procedures and confirmations of specifications were received frequently and, as a result, developers were quite tied up with them. Which of the following is an appropriate way to cope with user requests such as these?
- a) Have users e-mail their inquiries on operational procedures and specification confirmations to developers.
  - b) Create a query box to which specification confirmations are directly sent and respond to these inquiries once a month.
  - c) Centralize inquiry receptions to a help desk and create and publish FAQs for commonly asked questions.
  - d) Create a help desk and respond on its judgment to requests for improvements that come with inquiries on operational procedures and specification confirmations.
- Q61.** Which of the following layers of an OSI basic reference model is comparable to an HDLC procedure?
- a) Data link layer
  - b) Transport layer
  - c) Network layer
  - d) Physical layer
- Q62.** Assuming that a high-quality digital network is being used, which communications service achieves high-speed communications by discarding the data in question when a data transfer error is detected within the network, and leaving retransmission control to the user?
- a) Line switching service
  - b) Leased line service
  - c) Packet switching service
  - d) Frame relay service
- Q63.** Which of the following is a correct statement in regard to a CSMA/CD 10Mbps LAN?
- a) If transferred frames crash, the send terminal stops transmission, waits a random amount of time and then resends the data.
  - b) If multiple terminals send data at the same time, time-divided multiplexing is used for the transmission route. Therefore, the transfer speed of 10Mbps cannot be guaranteed.
  - c) Tokens must be acquired for the terminal to obtain the right to transfer data.
  - d) Time slots are determined by the terminal, so data must be sent in that time slot.

**Q64.** Which of the following values is closest to the line usage rate (%) when a file with an average size of 1000 bytes is transferred every two seconds between terminals connected through a leased line with a communication speed of 64,000 bits per second? Here, control information equivalent to 20% of the transfer amount is added during file transfer.

- a) 0.9                      b) 6.3                      c) 7.5                      d) 30.0

**Q65.** The diagram below shows an OSI basic reference model of the functions of device A which connects two LAN segments. Which of the following is suitable as device A?



- a) Gateway                      b) Bridge                      c) Repeater hub                      d) Router

**Q66.** Which of the following statements correctly describes the function of a proxy server used on the Web?

- a) A proxy server converts private IP addresses used on an intranet into global IP addresses, and vice-versa.  
 b) A proxy server dynamically assigns an IP address to a client when the client connects to the network.  
 c) When a client connected to an internal network communicates with an external server, a proxy server acts as a relay and connects to the server on behalf of the client.  
 d) A proxy server has a correspondence table of host names and IP addresses, and notifies a client of the IP address of a host when the client sends a query.

**Q67.** What is the resulting data that is returned by executing the following SQL statement on the tables “STUDENT” and “DEPT” below?

```
SELECT NAME FROM STUDENT,DEPT
WHERE BELONG_TO = DEPT_NAME AND LOCATION = 'SHINJUKU'
```

STUDENT

NAME	BELONG_TO	ADDRESS
Mary Brook	Science	Shinjuku
John Smith	Engineering	Shibuya
Jim Dinkey	Humanity	Shibuya
Susan Regan	Economics	Shinjuku

DEPT

DEPT_NAME	LOCATION
Science	Shinjuku
Engineering	Shinjuku
Humanity	Shibuya
Economics	Shibuya

- a) Mary Brook
- b) Mary Brook  
John Smith
- c) Mary Brook  
Susan Regan
- d) Mary Brook  
John Smith  
Susan Regan

**Q68.** Which of the following is an appropriate description of relational database views?

- a) It is not possible to define a view from multiple tables.
- b) When a column is added to an original table, the view must be redefined.
- c) Users must know not only the view structure but also the structure of the original table itself.
- d) Views are helpful in terms of data protection and data integrity since the usable range can be limited.

**Q69.** Which of the SQL statements below acquires Table B from Table A?

Table A

Employee ID	Name	Department code	Salary(\$)
10010	Lucy Brown	101	2,000
10020	Mike Gordon	201	3,000
10030	William Smith	101	2,500
10040	John Benton	102	3,500
10050	Tom Cage	102	3,000
10060	Mary Carpenter	201	2,500

Table B

Department code	Employee ID	Name
101	10010	Lucy Brown
101	10030	William Smith
102	10040	John Benton
102	10050	Tom Cage
201	10020	Mike Gordon
201	10060	Mary Carpenter

- a) `SELECT department_code, employee_ID, name FROM A  
GROUP BY employee_ID`
- b) `SELECT department_code, employee_ID, name FROM A  
GROUP BY department_code`
- c) `SELECT department_code, employee_ID, name FROM A  
ORDER BY employee_ID, department_code`
- d) `SELECT department_code, employee_ID, name FROM A  
ORDER BY department_code, employee_ID`

**Q70.** Which of the following statements correctly describes the objective of setting up relationships (referencing a primary key using a foreign key) between tables in a relational database?

- a) In the case where two tables are related, to impose a restriction in such a way that, when a record in one of them is updated or deleted, reference consistency in the other table can be maintained.
- b) To increase search and update speed by storing the correlated tables near to one another.
- c) To restore records damaged by a system failure wherever possible based on the relationship between the correlated tables.
- d) To prevent fragmentation in the record storage area caused by repeated deletion and addition of records.

**Q71.** Which of the following descriptions concerning security on the Internet is correct?

- a) When using a data base server via the Internet, measures must be taken to prevent illegal access to the data base and falsification of data.
- b) When sending e-mails via the Internet, the arrival of the e-mail can be confirmed as long as the e-mail has been encrypted.
- c) In order to be able to use the Internet, a user must register in a user authentication system.
- d) Even if a company's internal e-mail system is connected to outside networks through the Internet, the transmission of confidential company information to a recipient who is outside the company can be automatically prevented by installing a firewall.

**Q72.** Which of the following is suitable as a description of worms, which are illegal programs?

- a) They are written in a macro language which is specially designed for software applications.
- b) Worm functions are activated and destroy data files and the like on a certain specified date or when specified conditions are met.
- c) Worms copy themselves and move from one computer to the next through a network.
- d) Worms infect other programs and propagate independently, without using a network.

**Q73.** Which of the following is a correct statement concerning bar codes?

- a) EAN code contains a check digit.
- b) PLU (Price Look Up) adds price information to bar codes.
- c) Source marking means that the store attaches the bar code label.
- d) Bar codes represent numbers, and they cannot represent letters.

**Q74.** Which of the following is an appropriate description of the development of an overall plan for an information system?

- a) The CIO collects all systemization requests from the user department at each site, and proceeds in sequence, starting with those that can be started.
- b) The CIO makes adjustments with business plans, studies technology trends, etc. and establishes an overall plan as a mid/long-term plan. Next, the CIO obtains approval and support for the plan from top management.
- c) The leaders of the individual user departments work as key persons, and provide information on and consolidate individual plans to form an overall plan.
- d) Specialists in telecommunications in the information systems department develop an overall plan, taking into consideration leading-edge technologies.

**Q75.** Which of the following is suitable as a description of a break-even point?

- a) If fixed costs do not change, the break-even point rises when variable costs decline.
- b) If fixed costs do not change, the break-even point falls by half when variable costs fall to half their original level.
- c) Sales at the break-even point are equal to the sum of fixed and variable costs.
- d) If variable costs do not change, the break-even point rises when fixed costs decline.

**Q76.** In order to compare company-entrance exam questions of last year with company-entrance exam questions of the current year, a large number of employees were asked to answer both sets of questions. The coefficient correlation and regression line for all employees were determined, plotting the scores for last year's problems on the  $x$  axis, and the scores for the current year's problems on the  $y$  axis. Which of the following is an appropriate description of the results?

[Results]

The correlation coefficient was 0.8.

The slope of the regression line was 1.1.

The value of the  $y$  segment of the regression line was 10.

- a) From the value of the  $y$  segment of the regression line, it is clear that even those whose score for the current year's problems was 0 were able to achieve a score of approximately 10 for last year's problems.
- b) From the slope of the regression line, it is clear that the average score for the current year's problems was 1.1 times the average score for last year's problems.
- c) From the slope of the regression line and the value of the  $y$  segment, it is clear that the current year's problems were easier than last year's problems.
- d) The correlation coefficient exhibits a value close to 1, making it clear that the current year's problems were good.

**Q77.** Which of the following is appropriate as an explanation pertaining to the relationship diagram technique?

- a) It is a method for determining a process leading to the desired results for a problem in which a variety of results are surmised as a situation progresses.
- b) It is a method for clarifying the causal relationship between events in which complex factors intertwine with each other .
- c) It is a method whereby brainstorming is done to group collected pieces of information according to their relationships with each other, so as to clarify the problem to be solved.
- d) It is a method whereby means/measures for achieving a goal/target are deployed in sequence, in order to determine the optimal means/measures.

**Q78.** Which of the following statements correctly describes a control chart?

- a) A network diagram is created with arrows connecting the individual tasks and indicating their chronological relationships. The control chart is useful for identifying process bottlenecks and preparing schedules.
- b) A center line and a pair of upper and lower boundary lines are drawn, and the characteristic values of products or the like are plotted. The control chart is useful for detecting quality problems and process abnormalities, so that the causes of problems can be eliminated and problem recurrences prevented.
- c) The numbers of product defect instances and the amounts of money lost are categorized according to defect cause, then sorted in descending order and totalled. This makes it possible to identify items whose improvement will have a greater impact.
- d) Elements considered possible causes of a problem are arranged in a shape such as a fishbone diagram. This makes it possible to identify the essential causes of the problem, and is useful in solving it.

**Q79.** Which of the following is a system for exchanging data between enterprises, and is used in electronic commerce?

- a) CA
- b) EDI
- c) SET
- d) SSL

**Q80.** Which of the following is an appropriate description of Malaysian Computer Crimes Act 1997?

- a) Unauthorised access to computer material is an offence.
- b) Possession and use of unlicensed software product is an offence.
- c) Access to computer room is an offence.
- d) Possession of stolen computer hardware and software is an offence.