

元智大學 101 學年度研究所 碩士班 招生試題卷

系(所)別：通訊工程學系碩士班

組別：通訊組

科目：計算機概論

用紙第 / 頁共 2 頁

●不可使用電子計算機

Part 1: Multiple choice questions (30%). Each correct answer worth 3 pts.

1. The CPU uses repeating machine cycles to execute instructions in the program, one by one, from beginning to end. Which phase in following not a part of machine cycle?
(a) ready (b) execute (c) decode (d) fetch
2. In operating system, the _____ scheduler creates a process from a job and changes a process back to a job.
(a) job (b) process (c) virtual (d) queue
3. Audio is an example of analog data. Which process is not used to transfer audio to digital data?
(a) Sampling (b) Quantization (c) Encoding (d) Decoding
4. _____ is a protocol which can send mails from source to destinations.
(a) Post Office Protocol (POP) (b) Internet Mail Access Protocol (IMAP)
(c) Simple Mail Transfer Protocol (SMTP) (d) File Transfer Protocol (FTP)
5. _____ is responsible for the logical delivery of message between client and server processes.
(a) Ethernet (b) Transmission Control Protocol (TCP)
(c) Hypertext Transfer Protocol (HTTP) (d) Internet Protocol (IP)
6. To run a program on a computer, the program needs to be translated into the computer's native machine language. _____ can translate the whole source program into the object program and save the result in a file.
(a) Assembler (b) Interpreter (c) Preprocessor (d) Compiler
7. A computer has 64MB of memory. Each word is 16 bits. How many bits are needed to address each single word in memory?
(a) 22 bits (b) 25 bits (c) 26 bits (d) 32 bits
8. Assume that a, b, c and d are Boolean variables and $a=c=1$, $b=d=0$. Which Boolean expressions has value 1?
(a) $ab+cd$ (b) $b'cd+ab'c'$ (c) $ad+ab'c$ (d) $a'bc+ab'c'+b'd$
9. In the _____ method for synchronizing the operation of the CPU with an I/O device, the I/O device informs the CPU when it is ready for data transfer.
(a) programmed I/O (b) interrupt-driven I/O (c) DMA (d) Isolated I/O
10. In a linked list, each element contains _____.
(a) data (b) a link (c) a record (d) a and b

Part 2: Short problems (70%).

11. (4pts) There are 20,000 symbols needed to be translated into bit pattern. How many bits do you want to represent all of these symbols?
12. (12 pts) The original TCP/IP protocol suite was defined as having four layers: host-to-network, internet, transport and application layers. Please briefly describe the function of each layer in the TCP/IP protocol suits.

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13. Assume 8 bits are used to allocate a signed integer in a computer. The 2's complement representation is used, too. Answer the following questions:
- (a) (4 pts) Show the 2's complement representation of the integers 15 and -16. Give your answer both in binary and hexadecimal.
 - (b) (3 pts) Perform the addition of 15 and -16 based on your results from (a). Give your answer both in binary and hexadecimal format.
 - (c) (3 pts) There are two binary numbers $A=01010101B$ and $B=10101111B$. Add them together in binary format. Show the sum in decimal format.
14. An imaginary computer has sixteen data registers (R0 to R15), 1024 words in memory, and 24 different instructions (add, subtract, and so on).
- (a) (6 pts) What is the minimum size of an instruction in bits if a typical instruction uses the following format: subtract M R3.
 - (b) (5 pts) What is the size of the program counter in the computer.
 - (c) (5 pts) What is the size of the address bus in the computer.
15. (5 pts) Find how many times the statement in the following code segment in C is executed:

```
for(int i = 3; i < 15; i++) {  
    Statement;  
    i = i + 2;  
}
```

16. (7 pts) Change the following segment of code to use a switch statement:

```
if(A == 'a') statement1;  
else if(A == 'b') statement2;  
else if(A == 'c') statement3;
```

17. (7 pts) Find the error in the following program segment and explain how the error can be corrected.

```
int sum(int x, int y)  
{  
    int result;  
    result = x + y;  
}
```

18. (9 pts) Find the error in the following program segment and explain how the error can be corrected.

```
[1] #define SIZE 100;  
[2] SIZE = 10;  
[3] int b[10] = {0}, i;  
[4] for(i=0; i<=10; i++)  
[5]     b[i] = 100;
```